MOBILE SERVICES AND APPLICATIONS: AN EMPIRICAL INVESTIGATION FROM THE SERVICE SUPPLY PERSPECTIVE

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ABSTRACT

Mobile data service (MDS) supplier decisions about developing and providing a new service (including investment planning and resource allocation prioritization) are informed by the assessment of its potential to generate customer demand. Given the complex and dynamic nature of the MDS ecosystem, coupled with a competitive and technology-saturated customer market, this study contends that a better understanding of MDS supplier perceptions about customer demand may contribute to a better understanding of MDS adoption and use by customers.

However, there has been to date limited research into the role of MDS supplier perceptions about customer demand for new and existing MDS. The research presented in this thesis addresses this gap by investigating mobile industry stakeholder perceptions about customer demand for MDS within the context of the MDS supply and regulatory environment.

The thesis first develops a conceptual model for the study of mobile data service adoption from an MDS supply perspective that considers the relationship between perceived customer demand for MDS and MDS adoption and use. A research framework derived from the model is applied to a qualitative study of the views of the research participants (MDS developers and providers) about customer demand for and customer adoption of MDS, about the role of key MDS supply stakeholders such as mobile network operators, and about the role and impact of the regulatory environment. Data gathered at two study locations are analyzed extensively. Based on a critical review and synthesis of the findings the study develops propositions and frameworks that address the study's aim.

Overall the outcomes of the study contribute generally to the body of knowledge by: (i) explaining how MDS stakeholder perceptions about customer demand for MDS may affect MDS supply decisions and consequently, customer acceptance and use of MDS; and (ii) demonstrating how an MDS supply perspective that reflects MDS supplier perceptions about customer requirements, expectations, and specific attitudes, may be added to models for the investigation of MDS adoption and use.

In doing so the study makes several specific contributions. It proposes a perceived service value framework that includes three new dimensions: perceived service need (service specialization, uniqueness, mobility support, and ability to enhance quality of

life), perceived service choice (customer expectations to be able to benefit from an "always competitive" service environment), and perceived service delivery performance (the interplay between service performance in the technical sense, and service performance in terms of meeting customer expectations about service capabilities).

Furthermore, the study proposes a novel two-dimensional MDS customer typology that considers customer conservativism and customer attitude to paid mobile services. The typology identifies factors that may facilitate attitude change and lead to a transition from a "less likely to adopt MDS"' customer type, to a "more likely to adopt MDS" one. The study proposes as well an MDS adoption and use framework that links perceived service value and customer type, and shows how perceived awareness, affordability and trialability, social factors, and incentives to use, may act as change factors, moderating the effect of perceived service value and customer type on MDS adoption and use.

The study offers a number of recommendations that have practical implications. First, that developing mobile alternatives to existing services remains a viable business option as customers expect to have a choice of services. However, in order to compete with services offered on other channels, mobile alternatives need to be carefully designed and priced.

Second, that in order to be successful, technologically innovative MDS need to be developed with one or more specific customer segment's existing or potential needs in mind. Therefore, extreme attention needs to be paid to the service's overall performance as a customer may never return to an MDS that has not met his or her expectations.

Third, for a new MDS, non-traditionalist customers who accept the commercial nature of MDS should be targeted first. Smart device ownership is a strong MDS adoption motivator. Therefore, MDS suppliers need to form partnerships with device/platform vendors (and MNOs) in order to create service promotion platforms, and to offer appropriate adoption incentives. Importantly, MDS suppliers should seek to develop active relationships with their customers by providing a service value co-creation space (including social media channels) with opportunities for customer participation, and by opening up the service development process to facilitate critical evaluation and use of customer input.

Finally, the study contributes methodologically by developing a robust, comprehensive and auditable methodology for gathering and thematically analyzing qualitative data guided by a research framework, and preparing the data for further analysis. The methodology could be applied to other contexts and other research topics where interview data are to be gathered and analyzed thematically (possibly but not necessarily applying a CAQDAS).

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ABBREVIATIONS AND ACRONYMS

Abbreviation/Acronym	Definition
3G (4G, 5G)	Third (fourth, fifth) generation of mobile technology
A	Inter Coder Agreement Level
app	(mobile) application
ATT	Attitude
AU	Actual Use
B2B	Business-to-Business
B2C	Business-to-Customer
B2E	Business-to-Employee
BI	Behavioural Intention (to use)
C2C	Citizen-to-Citizen
CAQDAS	Computer-assisted Qualitative Data Analysis Software
CI	Continuance Intention
COMP	Compatibility
DTPB	Decomposed Theory of Planned Behaviour
DUN	Data Unit Number
eBusiness	Electronic Business
EC	European Commission
ECM	Expectation-Confirmation Model
eCommerce	Electronic Commerce
EFTPOS	Electronic Funds Transfer at the Point of Sale
EMS	Enabling Mobile Services
EMSP	Enabling Mobile Service Provider
EU	European Union
EXP	Experience
G2C	Government-to-Customer
GPS	Global Positioning System
IDT	Information Diffusion Theory
IC	Intention to Continue (use)
ICT	Information and Communication Technology
IMG	Image
IU	Intention to use
IS	Information Systems
ITU	International Telecommunications Union
LBS	Location Based Service/Services
MAD	Mobile Application Developer
mAdvertising	Mobile Advertising
mBanking	Mobile Banking
mBusiness	Mobile Business
mCommerce	Mobile Commerce
MCS	Mobile Customer Service/Services
MCSA	Mobile Customer Service Aggregator
MCSP	Mobile Customer Service Provider
MDDV	Mobile Device Developer/ Vendor
MSCD	Mobile Service Content Developer
MFi	Made for iPhone/iPod/iPad
MDS	Mobile Data Service/Services
mGaming	Mobile Gaming
mHealth	Mobile Health
MI	Mobile Internet
mLearning	Mobile Learning
mMarketing	Mobile Marketing
MNO	Mobile Network Operator
mPayment	Mobile Payment

Abbreviation/Acronym	Definition
MVNO	Mobile Virtual Network Operator
NFC	Near Field Communication
PBC	Perceived Behavioural Control
PE	Perceived Enjoyment
PEU	Perceived Ease of Use
PRL	Proportional Reduction of Loss
PU	Perceived Usefulness
RE	Relative Advantage
RNC	Radio Network Controller
ROI	Return on Investment
SAT	Satisfaction
SDK	Software Development Kit
SE	Self-efficacy
SI	Social Influence
SN	Subjective Norms
SQ	Service Quality
SV	Service Value
SMS	Short Message Service (a.k.a. text messaging, or texting)
TAM	Technology Acceptance Model
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
TSM	Trusted Service Manager
TTF	Tack-Technology Fit
TUANZ	Telecommunications Users Association of New Zealand
UB	Usage Behaviour
UTAUT	Unified Theory of Acceptance and Use of Technology
VOL	Voluntariness
Wi-Fi	A wireless local area network technology (IEEE 802.11)
WOM	Word of Mouth

ATTESTATION OF AUTHORSHIP

I hereby declare that this submission is my own work and that to the best of my knowledge and belief, it contains no material previously published or written by another person except where explicitly indicated and acknowledged, nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.

Signed by: Krassie Petrova 

Date: …24 May 2016…….

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CHAPTER 1. INTRODUCTION

The research presented in this thesis studies mobile supply chain stakeholder participants in order to investigate and identify important dimensions of supply-side factors influencing the adoption of mobile services and applications in the current competitive and technology-saturated service market. A model that includes a service demand perspective and a service supply perspective is proposed, and used to develop a research framework which guides the empirical investigation of two separate study samples (drawn from two different countries). The findings of the empirical investigation are analyzed and their implications are discussed. Research limitations are highlighted, and directions for further research are provided.

This chapter briefly introduces the background and key concepts related to mobile data services and applications and presents the context from which the study motivation is derived. The study objectives are formulated and the research scope and contribution are identified. The last section of the chapter describes the thesis organization and summarizes its content.

1.1 Mobile Data Technologies, Services and Applications

To use mobile devices not only for communication (voice and text messaging) but for common everyday tasks such as paying for one's car park using SMS (short message service, or text messaging), or performing a banking transaction using a mobile phone has become a reality, due to the rapid progress in the area of mobile data technology. While 3G mobile data networks are currently prevalent and SMS is still widely used it is expected that the gradual transition to the next generation mobile data technology (4G and 5G), coupled with innovative approaches such as software-defined networking and network virtualization, may offer even more opportunities for the development of innovative customer-oriented services S. Chen and Zhao (2014); (Chin, Fan, & Haines, 2014; M. Yang et al., 2015)[1]. The level of mobile device penetration (globally) has been extremely high: while in 2011 only about 25% of all mobile phones in the world were smart phones[2] it is predicted that by 2020 the number of smart phones will be 60% or

[1] The first (analogue) mobile phones form the 1980s were replaced by a second generation in the 1990s; 2G technology supported text messaging SMS but could not reliably support mobile data transmission. The next generations (3G and 4G) were fully developed mobile data technologies (http://www.3g.co.uk/PR/Feb2012/3g-what-is-3g-explained-in-simple-terms.html)

[2] http://www.digitalbuzzblog.com/2011-mobile-statistics-stats-facts-marketing-infographic/

more of all mobile phones, and that mobile data traffic annual growth rate will reach 60%[3]. In the Asia-Pacific region it is expected that 4G connections will grow as 4G capable devices become more affordable and by 2019 will comprise 25% and more of all mobile connections[4].

This growth has created a potentially very significant customer market for services that individual customers can use at their convenience – anytime and anywhere within the reach of their mobile network connection. Instances of numerous readily available and relatively simple mobile services can be found in the mobile applications online stores (Basole & Karla, 2012); as far back as April 2011, the number of downloadable mobile applications for just one smart phone platform – Android, was already nearing 130 000 (Ye, Kankanhalli, Goh, & Sun, 2011). Reportedly by mid-2015 there were 1.5 million applications available to the users of the arguably most popular smart device platform (iPhone)[5]. According to Gartner Inc. in 2015 mobile commerce generated some 22% of all USA digital commerce revenue; its share is expected to reach 50% by 2017, driven by smart phone adoption and customer "mobile engagement behaviour" [6].

Given this strong growth trends in mobile technology use and the increased popularity of smart phones, it may be expected that designing, developing and providing MDS use will continue to appear as an important innovative aspect of mobile technology adoption, and that new and diverse services will therefore, be offered. The rapid technology development and increased customer participation have thus created a stimulating but challenging environment for service developers and providers (Weber, Haas, & Scuka, 2011). It may also be expected that customers will become active participants ("value co-creators") in the mobile service system where service value will be determined by its use context and by the experiences of the customer (H.-M. Chen & Vargo, 2010).

1.2 Key Concepts and Definitions

According to Baida, Gordijn, and Omelayenko (2004) services are activities performed by businesses service providers that may result in tangible or intangible benefits. The definition proposed by Hofacker, Goldsmith, Bridges, and Swilley (2007) differentiates

[3] http://www.ciena.com/connect/blog/Infographic-Data-consumption-.html
[4] http://www.bworldonline.com/content.php?section=Technology&title=infographic-mobile-data-traffic-forecast&id=104934
[5] http://www.statista.com/statistics/263795/number-of-available-apps-in-the-apple-app-store/
[6] http://www.gartner.com/newsroom/id/2971917

between the means of service production, and the service outcome for services that are supported by and delivered through electronic networks platforms (eServices). eServices are "an act or performance that creates value and provides benefits for customers through a process that is stored as an algorithm and typically implemented by a networked software".

With these definitions in mind and following Bina & Giaglis's (2007) description of mobile services as mobile technology based, non-voice, value-added services for customers and end users, the following definition captures the understanding underpinning this research: mobile data services (MDS) are activities performed by service providers that create value and provide benefits to customers through processes involving the use of appropriate mobile technology hardware and software. The definition applies to the whole spectrum of customer-oriented MDS, including mobile applications distributed through specialized stores.

The currently prevalent mobile technologies that support MDS can be categorized as device based mobile technologies including SMS, Near Field Communication (NFC), and positioning technologies (satellite- or mobile network based), and software based mobile technologies including access to the mobile Internet (MI), and mobile applications available from mobile service platforms ("mobile apps").

Given the choice of technologies, each specific MDS may need different mobile technology support. Specific MDS vary in terms of technology used. For example, mobile learning (mLearning) may be SMS based (Sharples, Taylor, & Vavoula, 2010) or may require the use of specialized software: either as a downloadable application, or as a native application developed for a particular combination of mobile hardware and software development platform (Maske, Guhr, Köpp, & Breitner, 2011). Specialized MDS may require the involvement of several service providers, for example, mobile banking (mBanking) in Taiwan is offered in partnership including three mobile network operators and 20 banks (H.-F. Lin, 2011).

Furthermore, there are services that enable the consumption of other MDS – such as mobile payment (mPayment) which enables paying for goods and services at the point of sale using a mobile device (Omarini, 2013), and location based services (LBS) which enable service content customization based on information about the geographical location of the customer (Dhar & Varshney, 2011; H. Xu, Teo, Tan, & Agarwal, 2012). Multiple supply chain participants may be involved in providing enabling services; for

example, mPayment in China is provided by mobile network operators, in cooperation with banks and third-party financial operators (Y. Lu, Yang, Chau, & Cao, 2011). The educational MDS proposed by Edge, Searle, Chiu, Zhao, and Landay (2011) is another example: here location data is used in order to deliver contextually relevant foreign language content to students of the language by using the operational capability of an already existing LBS-based mobile marketing (mMarketing) campaign that sends short adverts related to the geographical position of the mobile phone user.

1.2.1 Customer oriented, and enabling mobile services

In this research, customer oriented MDS that have monetary value attached to each service transaction and are developed in a specific service domain (e.g., education, banking, gaming) are also referred to as mobile customer services (MCS). Services that support other mCommerce services (e.g., mPayment provides a payment option - Kreyer, Pousttchi, & Turowski, 2002), and also LBS (provide location data, are referred to as enabling mobile services (EMS). Both MCS and EMS may require different service providers to cooperate (e.g., banks and mobile network operators, in the case of mPayment). Some MCS may need the development of specialized software and means for its distribution. For example, in the case of mBanking the customer may need to download (from their specific mobile phone vendor store) the software their specific bank requires (Bons, Alt, Lee, & Weber, 2012); in the case of mPayment, standardized cross-industry solutions involving mobile operators, software developers, financial institutions, device vendors, merchants) are needed (Ozcan & Santos, 2015; Samtani, Leow, Lim, & Goh, 2003). Similarly, LBS need high interoperability across platforms in order to be efficient (S. Kang, Kim, & Jang, 2007).

MDS monetary value varies with the type of the service as the service transaction cost (from a customer view point) varies with the service business model. While a texted advertisement sent to a customer regarding a nearby food outlet may be free to the recipient, an interactive service (e.g., support for studying a foreign language) may incur the cost of the mobile Internet connection, and the cost of the service itself (including downloadable content and/or downloadable software, and subscription or licence fees).

1.2.2 Mobile commerce

As defined, MCS and EMS are commercial transactions that exemplify the notion of mobile commerce (mCommerce). MCommerce is often considered as an extension of electronic commerce (eCommerce) – a way to buy products and services without the

need to use a desktop computer connected to the Internet as a transaction and communication medium: according to Schneiderman (2000) "…mobile commerce offers the added benefit of mobility that makes conducting business or making a purchase via the Internet an anywhere, anytime experience" (p. 1).

The following definition of mCommerce derived from (Kalstrom, 2000) reflects better the focus of the research reported in this thesis: A value-added service that enables mobile customers and end-users to conduct reliable and secure transactions through specifically-designed mobile applications. This definition places an appropriate emphasis on the *service* and its value to the *customer* rather than on the mobile technology itself; the technologies and software needed to support the service and its customer oriented features such as location and use context-awareness are regarded as part of the service architecture.

1.2.3 Mobile business

Camponovo and Pigneur (2003) define mobile business (mBusiness) as "…all activities related to a (potential) commercial transaction through communications networks that interface with mobile devices". mBusiness can also be viewed as "mobile electronic business", i.e., as a specific type of electronic business (eBusiness), defined for example, as "… carrying out business activities that lead to an exchange of value, where the parties interact electronically, using network or telecommunications technologies". (Jones, Wilikens, Morris, & Masera, 2000). Furthermore, the traditional eBusiness models B2C and B2B (business-to-customer and business- to-business, respectively) are also used in relation to mBusiness services (Turban, Lee, & Viehland, 2004, p. 385). More recently developed mobile services operate within models such as B2E (business-to-employee), G2C (government-to-citizen), and C2C (citizen-to-citizen) (Basole, 2007; J. Gao, Edunuru, Cai, & Shim, 2005; Song & Cornford, 2006).

In this research, the mBusiness B2C model is considered as comprising mobile content or services that involve a direct commercial transaction; such services may be delivered as mobile content or services from third parties, and may be personalized using mobile technology capabilities (Leem, Suh, & Kim, 2004); thus (and similarly to defining mCommerce), the mBusiness definition above is extended to include the interactions between the industry participants involved in creating a service and bringing it to individual customers or end-users. From this perspective MCS and EMS can be viewed

as customized value-added mCommerce services that operate within a B2C mBusiness environment.

1.2.4 Mobile service supply

MCS and EMS are designed, developed and provided to the customer through a complex chain of industry participants regarded in recent research as forming a mobile service ecosystem (Basole & Karla, 2012; Becker, Mladenow, Kryvinska, & Strauss, 2012) of which customers are also a part (Dennehy & Sammon, 2015). Customer interactions with a mobile service occur across the ecosystem: customers may access multiple data networks (the public Internet, the wireless networks provided by mobile operators, and the private networks which may be operated by intermediaries such as enabling service providers), and may engage with businesses acting as service aggregators (such as the Vodafone New Zealand Live! portal[7]), with companies that have added a mobile channel to its existing services (e.g., a bank such as the New Zealand Westpac[8]), or with an application developer who has published a downloadable application at a store such as "Google Play" [9] (a market place for Android applications).

The two major mobile service supply stakeholder groups ("technology providers" and "service developers and providers") are shown in the conceptual MDS supply and demand model in Figure 1-1. The technology provider group owns and/or makes available the mobile technology necessary to deliver MCS and EMS. It is represented by mobile network operators (MNOs), mobile virtual network operators (MVNOs), and mobile device developers/vendors (MDDVs). The service developer and provider group creates and/or delivers MCS and EMS to businesses, end-users, and customers. It includes participants such as mobile application developers (MADs), mobile service content developers (MSCDs), mobile customer service providers (MCSPs), enabling mobile service providers (EMSPs), and mobile customer service aggregators (MCSAs). Legislators and regulators develop and provide the legislative and regulatory environment within which developers and providers operate. Participants in all groups may compete but also need to cooperate and /or collaborate to enable the development of the mobile ecosystem (e.g., Basole, Russel, Huhtamäki, & Rubens, 2012; Feijoo, Gómez-Barroso, Aguado, & Ramos, 2012; Gaur & Ondrus, 2012; Koeder, Tanaka, & Misawa, 2012).

[7] http://www.vodafone.co.nz/mobile-advertising/vodafone-live.jsp
[8] https://sec.westpac.co.nz/mobile/public/Login.html#login
[9] https://play.google.com/store/apps

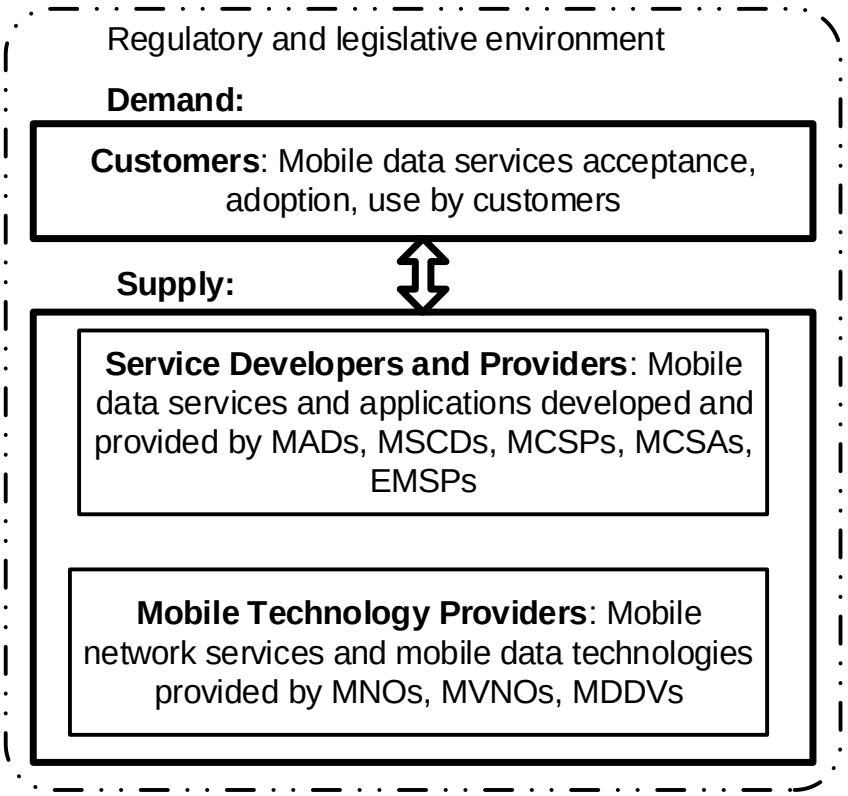

Figure 1-1. MDS supply and demand: A conceptual model. Adapted from "Mobile Services and Applications: Towards a Balanced Model", by Petrova and MacDonell (2010, p. 183)

Overall, the MDS supply chain represents a network that connects the players in the two stakeholder groups; stakeholder groups perform value-added activities and the supply chain as a whole delivers value to the service customer or end-user (Du, Lai, Cheung, & Cui, 2012; Olla & Patel, 2002). More specifically the above structuring of the MDS supply chain echoes the conceptual value network model of service ecosystems proposed by Basole and Rouse (2008) in which enablers, service providers and consumers interact in order to create value; their interactions are also influenced by the social, technological, economic and political context of the service value network. In Figure 1-1 t the demand stakeholders (customers) correspond to Basole and Rouse's consumers, the technology provider stakeholder group corresponds to Basole and Rouse's enablers; service developer and provider stakeholders correspond to service providers. All stakeholders operate within a legislative and regulatory context.

The conceptualization of the MDS supply chain in Figure 1-1 provides only a broad picture. However, it helps to position the main participants and outline their roles; as Basole and Rouse (2008) note the existing market is rather complex from a consumer point of view, and what creates and drives value is not yet well understood.

1.3 Understanding MDS Acceptance, Adoption and Use

Models and instruments used to study eCommerce penetration and adoption have been adapted to studies of mCommerce uptake (Pedersen, 2001), incorporating constructs that reflected support of user mobility, for example, services dynamically adjusting to be available at the location at which the mobile user operated at the time of the transaction (Varshney, Vetter, & Kalakota, 2000). Further results indicate that actual and future MDS use cannot not be understood without considering customer perceptions about specific service value – as also concluded by Bouwman, Carlsson, Walden, and Molina-Castillo (2009) (based on the study of mobile service use in Finland during the period 2004–2006).

The level of customer acceptance and use of a specific MDS can vary significantly across geopolitical contexts that are otherwise characterized by similar levels of mobile phone use as a communication device. For example, mPayment has been known since the late 90s of the previous century and has become popular in a number of European and Asian countries since the 2000s (Dahlberg, Mallat, Ondrus, & Zmijewska, 2008). Even though New Zealand compares well with global trends in mobile phone penetration and smart phone ownership (Petrova & Mehra, 2010) mobile payment its use in New Zealand was not widely spread at the time of the research. However, although it has begun to gain popularity (Petrova & Wang, 2013). This example serves to illustrate that the widespread ownership and increased use of mobile technology may not always lead to MDS use – also noted by Constantiou, Damsgaard, and Knutsen (2007). In other words, it cannot be assumed that mobile technology adoption is synonymous with MDS adoption.

Existing research models developed to study technology adoption have been adapted to study both mobile technology and MDS adoption (Carlsson, Carlsson, Hyvönen, Puhakainen, & Walden, 2006; S. Kim & Garrison, 2009; López-Nicolás, Molina-Castillo, & Bouwman, 2008; Pedersen & Ling, 2003; Qi, Li, Li, & Shu, 2009; Scornavacca, Barnes, & Huff, 2006; Y. S. Wang, Lin, & Luarn, 2006). However, in more recent work it has been suggested that technology users as conceptualized in traditional information systems (IS) research have been replaced by “service consumers” for whom the important aspect is the service experience (Tuunanen, Myers, & Cassab, 2010); as famously predicted by Mark Weiser more than 20 years ago (as reprinted in Weiser, 1999) the technology infrastructure is increasingly becoming subsumed by the service and is no longer “noticeable”. Therefore, studying MDS

adoption requires the development and validation of models that distinguish between the technology and the service adoption perspectives of MDS (Thong, Venkatesh, Xu, Hong, & Tam, 2011), and consider mobile technology adoption through the prism of MDS adoption as mobile technology use is directly related to the particular mobile service delivery platform (Becker et al., 2012). Furthermore, MDS acceptance and adoption have been studied with the intent to identify factors affecting the customer decision to use MDS. Issues related to the processes of meeting customer needs and preferences (i.e., mobile service demand) by the gamut of industry players (i.e., mobile service supply) has attracted less attention, even though customer adoption of MDS is likely to be dependent on factors related to the role and contribution of the supply stakeholders identified (e.g., content and service providers, telecommunication service providers, device manufacturers).

As Basole and Rouse (2008) point out, while "it is [for] consumers to value products and services", it is also for the actors in the value network "to provide this value" (p. 57). In the case of MDS service, value is created through a collaborative process that involves industry players and aims to design, build and provide services of required functionality and expected quality (Qi et al., 2009). Therefore, it may be important to understand the relationships across the stakeholder value chains, and the regulatory and socio-economic contexts within which MDS are being built and provided may play a similar role, i.e., the MDS ecosystem (Basole & Karla, 2012).

1.3.1 Service value

Perceived service value reflects customer perceptions regarding the overall utility of a service based on their assessment of its perceived benefits and service-associated "sacrifices" (cost of acquisition) and/or disadvantages (Schilke & Wirtz, 2012). Perceived value drives customer adoption and continued use intentions; for example, Kranz (2012) proposes that the perceived monetary value of the service may positively influence attitude towards MDS while according to Tojib and Tsarenko (2012) experiential value drives advanced MDS actual use.

Understanding the specific perceived value different services have to different customers may be of significant importance in understanding the potential demand for and actual use of MDS (Bouwman et al., 2009), as customer value perceptions influence intention to continue service use (Y. H. Kim, Kim, & Wachter, 2013; Y.-F. Kuo, Yen, Wu, & Deng, 2009; Tojib & Tsarenko, 2012). For example, H.-W. Kim, Chan, and

Gupta (2007) found that in the case of MI adoption, perceived value positively influences intention to adopt; a similar finding in the case of mobile health (mHealth) services is reported by Deng, Mo, and Liu (2014).

Studying mobile network traffic enables some limited inferences to be drawn regarding MDS value based on actual use. For example, Heikkinen and Berger (2011) found that while the daily demand patterns for access to MI and for access to the fixed Internet were similar across their sample of 57 countries studied, there were differences in the type of traffic content as mobile broadband access was not used for high-volume transactions such as music or video downloads. The authors hypothesize that service quality related factors such as the higher cost and the lower reliability of mobile data networks may have influenced user choice but also point out that no conclusions about customer preferences can be made as mobile traffic data do not differentiate between individual MDS. However, industry predictions still indicate a strong belief that mobile video will account for more than two-thirds of all mobile data traffic in the near future, increasing 14-fold between 2013 and 2018 (Cisco, 2014). To this end an interesting finding was reported in (Oeldorf-Hirsch, Donner, & Cutrell, 2012). Customers who were conscious of the cost of mobile data chose to download videos of lower technical quality (in terms of bit and frame rate and audio quality) if these were rich in video content. in other words, the dominant dimension of service value for these customers was likely to be service content. According to the authors providing video downloads of lesser technical quality to such a customer group may lead to monetary benefits and thus to increased use.

1.3.2 Customer perceptions

Customers may value MDS because they can enhance both the utilitarian and hedonistic aspect of their everyday life style, according to Bina, Karaiskos, and Giaglis (2007). However, demographically different customer groups may have different preferences for MDS type, content and service delivery method (Constantiou et al., 2007; S. Lee, Shin, & Lee, 2009), with demographic segments being relatively narrow (Oh, Yang, Kurnia, & Lee, 2008). In addition, a range of customer preferences related to particular services and specific service contexts have been identified. Examples include, among others, undergraduate student demand for “small size” mLearning tasks as reported by Maske et al. (2011), the positive role of customer innovativeness as a determinant of mHealth service adoption (Rai, Chen, Pye, & Baird, 2013), or customer preferences for mBanking services offered jointly by a bank and an MNO (Mishra & Sing Bisht, 2013).

Furthermore, service adoption and continued use may be significantly influenced by service quality. For example, the use of high-performance mobile devices such as smart phones may have a positive effect on deriving experiential value which contributes positively to value-added mobile service adoption (Tojib, Tsarenko, & Sembada, 2014).

Akter, D'Ambra, and Ray (2013) define perceived mobile service quality as an overall judgment about a service's "excellence". Service quality perceptions about how the service performs in terms of content, interface, navigation, and visual appeal have been found to be a determinant of perceived service value as well as of satisfaction (Y.-F. Kuo et al., 2009). Further research has identified dimensions of quality specifically relevant to mobile services such as service reliability (Abu-El Samen, Akroush, & Abu-Lail, 2013) and service information (S. Lee et al., 2009). Service quality has been shown to have a strong and significant effect on cumulative satisfaction (i.e., satisfaction with service performance over time) and to be positively correlated with customer intention and future behaviour (Zhao, Lu, Zhang, & Chau, 2012). A decline in MDS channel performance may lead to a significantly reduced service use (S. Lee et al., 2009). These results are in line with Wixom and Todd's theory (2005) that quality as an object based belief influences object-based attitudes (e.g., satisfaction) and ultimately determines behavioural beliefs about usefulness (value), and attitudes towards adoption.

A model that considers service value and satisfaction as two of the three antecedents of customer intention to use a service is proposed and validated in (Cronin, Brady, & Hult, 2000). The third antecedent is service quality, which is also a predictor of both service value and satisfaction; service value is also influenced by the sacrifice made by the customer.

1.3.3 Customer demand

It may be inferred from the work reviewed so far that service-customer lifestyle "fit" (i.e., the service meets a real need, satisfying specific requirements), and service quality (i.e., the level at which the service performs its functions over time) are two important service characteristics that influence the level of customer demand for a specific MDS. More specifically, the customer decision to adopt a mobile value-added service is influenced to a significant extent by the answer to the question "Is the service meeting a *real need?*", and that the customer decision to continue to use an MDS is based on the answer to the question "*How well* does the service meet the need"?

Projecting initial and post-adoption customer demand plays an important role in the service providers' decisions making process about offering a new service and/or continuing to offer a service. It has been recommended that service providers should "…form reasonable customer expectations which are aligned with the information quality and the quality for the service in order to foster customer satisfaction" (J. Y. Kim & Lee, 2013). To be able to do this MDS need to develop a good understanding of customer demand for particular MDS, then adapt and respond quickly to the variety of emerging customer situations, with the "right offering" (Heikkilä, 2002).

1.4 Research Motivation, Aim and Objectives

Prior results suggest that service providers need to understand customer expectations and how new service characteristics may satisfy them (Heikkilä, 2002; J. Y. Kim & Lee, 2013; Sun, Ju, & Su, 2006). It is important to evaluate a prospective new service taking into account the needs of its target group (Kam, Tibuzzi, & Hua, 2004; F.-R. Lin & Hsieh, 2011; Oh et al., 2008). Also important is to assess the service's potential to generate customer demand, before making decisions about investment planning and resource allocation prioritization (S. Lee et al., 2009). Therefore, given the complex and dynamic nature of the MDS ecosystem a better understanding of supplier perceptions about customer demand may contribute to a better understanding of the MDS adoption and use in the competitive and technology-saturated service market. However, there has been to date limited research into the role of service developer and provider perceptions about customer demand for new and existing MDS in the acceptance and adoption of MCS and EMS. The research aims to address this gap by investigating mobile industry stakeholder perceptions about customer demand for MDS within the context of the MDS market environment. Its main research question can be formulated as:

Main research question: "What are the views of mobile industry stakeholders about customer demand for MDS?"

To accomplish its aim, the study sets two objectives. First, to review the relevant literature and develop a research framework that considers the relationship between perceived customer demand and MDS adoption and use, and second, to investigate empirically MDS supplier perceptions based on the research framework.

1.5 Study Approach

The study approach can be described as mostly exploratory, according to the definition of exploration given by Onwuegbuzie and Leech (2006): "…exploration involves using primarily inductive methods to explore a concept, construct, phenomenon, or situation in order to develop tentative hypotheses or generalizations". First, the literature about the phenomenon (MDS adoption and use) and results from prior investigations are explored in order to develop generalizations, then the phenomenon is explored from a stakeholder perspective and further generalizations are derived. As a theory emerges from analysis and comparisons the study acquires an explanatory perspective. According to Onwuegbuzie and Leech, "…explanation represents developing theory for the purpose of elucidating the relationship among concepts or phenomena and determining reasons for occurrences of events"; the study proposes explanations about how and why MDS supplier perceptions about customer demand play a role in MDS adoption, therefore, the theory that it builds can be classified as a "theory for explaining" with reference to the taxonomy of IS theories proposed by Gregor (2006).

Consequently, the research followed a phased approach. The conceptual MDS adoption model proposed at the initial phase (2008-09) builds on and complements models and frameworks found in prior research including some of the researcher's published work. It was used to develop a research framework for the investigation of perceived customer demand for MDS. Two separate empirical investigations were conducted as part of the second research phase (carried out in 2010–11 and 2012–13 respectively). Designing and conducting the studies became the main focus of the research. The detailed descriptions of the research methodology and the investigation process including data gathering and analysis constitute the most significant part of the thesis. Finally, during the third phase (2014-16) the tentative assertions based on the empirical findings were discussed in the context of the extant literature and used as a measure of the validity and relevance of the exploratory model. Models and frameworks supported by the findings were built by "developing systematic, conceptually coherent explanations" (Weitzman, 2000).

1.6 Contribution

As highlighted by Gregor (2006), an explanatory theory contributes to the body of knowledge if it argues plausibly and consistently about new and interesting insights and provides credible and transferable outcomes. The outcomes of the study contribute to

the body of knowledge by: (i) explaining how (mCommerce) value chain stakeholder perceptions about customer demand for MDS may affect MDS supply decisions and consequently, customer acceptance and use of MDS; and (ii) how an MDS supply perspective that reflects MDS supplier perceptions about customer requirements, expectations, and specific attitudes, may be added to MDS adoption and use investigations. Stakeholder participants in the value chain such as mobile service providers, application designers and network operators may benefit directly from the outcomes, which should provide them with a fuller understanding of customers' needs and requirements and their significance for mobile service and application design. MDS customers should also benefit from the increased service value – services that meet their present and anticipated future needs and expectations.

1.7 Thesis Organization

The thesis is organized along the phases of the research process described above (Figure 1-2); the blocks that correspond to the thesis chapters can be seen as the "stepping stones" on the path the research follows. The diagram is used throughout the thesis to link the research process to the way it is reported on by mapping each chapter onto the relevant portion of the research process path.

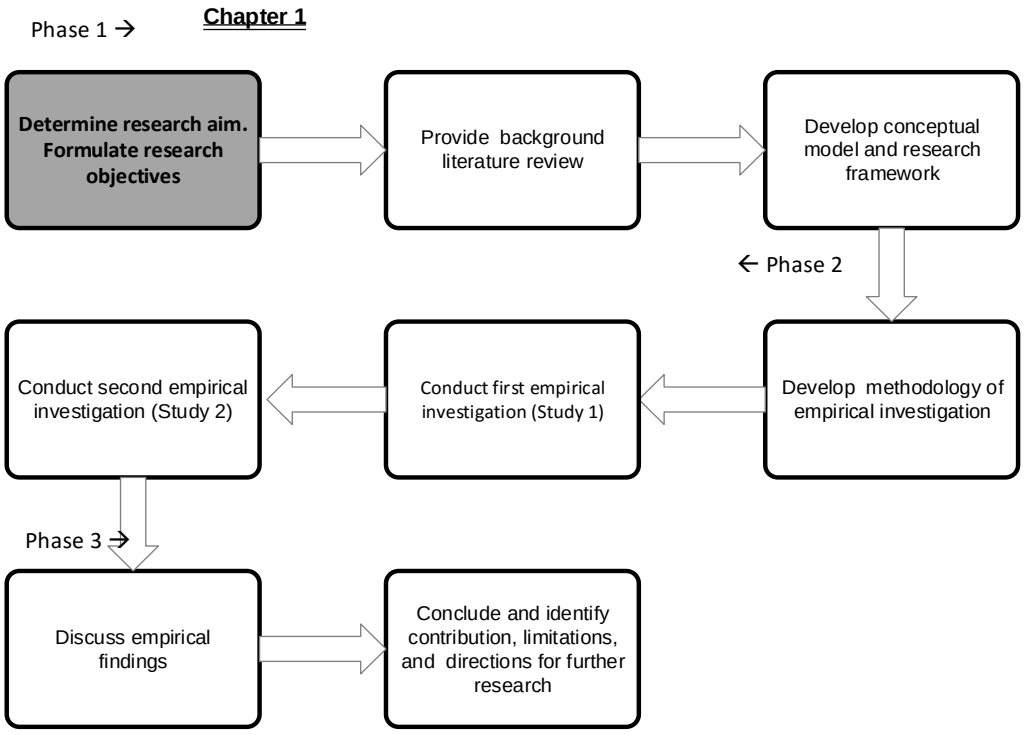

Figure 1-2. Research process path (Chapter 1)

The organization of the main thesis document is shown in Table 1-1 which contains brief synopsis of each of the eight thesis chapters. Chapters 1, 2 and 3 refer to the first

phase of the research; more specifically Chapter 1 introduces the research context, its aim and main research question, and the study objectives. Chapter 2 provides a background literature review on MDS customer adoption and use that is used to support the development of the conceptual study model and research framework in Chapter 3. Chapters 4, 5, and 6 refer to the second phase of the research. Chapter 4 describes the research design and methodology used to conduct the empirical investigation (Study 1 and Study 2). It identifies the philosophical assumptions of the study; it also describes its research method and the data collection techniques and procedures, outlines the data analysis approach, and discusses issues related to research trustworthiness (rigour)

Chapter 5 and Chapter 6 expound on the steps and the conduct of the qualitative data analysis process, with the findings of the two empirical investigations presented and discussed in the context of the main research question. The last two chapters represent the third and last phase of the research. In Chapter 7 the discussion returns to the study aim; it develops a service supply perspective on MDS adoption by proposing models and framework that draw on the findings of the two empirical studies and on the extant literature. The last chapter (Chapter 8) summarizes the work, outlines its contribution, limitations and implications, and provides guidelines for further research.

Across the thesis references are made to additional material included as an appendix. The appendices (Table 1-2) include: a list of publications authored or co-authored by the researcher relevant to the topic of the research (Appendix A), material supporting the literature review in Chapter 2 (Appendix B), material related to the development of the research model and instrument and obtaining ethical approval (Appendix C - Appendix F), and material related to Studies 1 and 2 (Appendix G - Appendix Z).

An electronic copy of the NVivo® project (used in Study 2) is available upon request. While detailed NVivo file and folder references are provided in Chapter 6 as a means to navigate the project file it is not anticipated that the reader would need to peruse it; extensive relevant data excerpts and data summaries are included in the thesis body and also in the Appendices).

Table 1-1. Chapters in the main thesis body

Chapter	Description
1	INTRODUCTION. Introduces the research background and the key concepts, formulates the overall research aim and objectives, outlines broadly the study approach, and describes the thesis organization.
2	MDS ADOPTION AND USE: A LITERATURE REVIEW. Reviews prior work on customer adoption and use of MDS and provides a literature based background that supports the development of the study models and the research framework.
3	STUDY MODELS. Develops an MDS adoption process model that includes perceived customer demand, conceptualizes perceived customer demand as a factor in service provider decision making, and proposes a framework for its empirical investigation.
4	EMPIRICAL INVESTIGATION: DESIGN AND METHODOS. Develops and describes the research design, justifies the use of a qualitative approach, discusses the choice of methods for data collection and analysis, and provides methodological guidelines.
5	STUDY 1. Presents a step by step by step description of the data collection, coding and analysis process in the second empirical study (undertaken in Bulgaria), develops a thematic map , and addresses the specific research questions
6	STUDY 2. Presents a step by step by step description of the data collection, coding and analysis process in the second empirical study (undertaken in New Zealand), develops a thematic map , and addresses the specific research questions.
7	FURTHER ANALYSIS AND DISCUSSION. Highlights methodological issue, provides a comparison of the outcomes of the two studies, addresses the study's aim and main research question, discusses the findings, and develops conceptual representations.
8	CONCLUSION. Summarizes the main outcomes of the study, discusses its contribution to research and practice, outlines and discusses the study's limitations, and provides directions for further research.

Table 1-2. Thesis appendices

Appendix	Description
A	Publications
B	Literature review companion
C	Study interview guides
D	Ethical approval
E	Participant information sheet
F	Project background
G	Study 1: Participant background
H	Study 1: Participant responses
I	Study 1: Data coding (Stage 2 – intermediary)
J	Study 1: Dodes-s1 (Stage 2)
K	Study 1: Data coding (Stage 2- final)
L	Study 1: Codes-s1 (Stage 3)
M	Study 1: Data coding (Stage 3)
N	Study 1: Codes-s1 (Stage 4)
O	Study 1: Codes-s1 (final)
P	Study 1: Additional data
Q	Study 2: Interview transcripts
R	Study 2: Initial codes
S	Study 2: Coding review report
T	Study 2: Codes-s2 (Stage 1)
U	Study 2: Coded data organized by emerging theme (Stage 2)
V	Study 2: Codes-s2 (Stage 2)
W	Study 2: "To use later" data (Stage 2)
X	Study 2: Codes-S2 organized by basic, organizing and global Theme (Stage 3)
Y	Study 2: Coded data organized by global theme (Stage 3)
Z	Study 2: Member check data

1.8 Summary of Chapter 1

This chapter introduces the key concepts, positions the study, identifies its context, and formulates the research aim and objectives. It describes briefly the research approach, outlines the main contributions of the study, and explains how the thesis is organized. The chapter that follows presents the findings of the literature review.

CHAPTER 2. MDS ADOPTION AND USE: A LITERATURE REVIEW

As stated in Chapter 1, the research aims to contribute to a better understanding of the MDS adoption and use through the exploration of mobile industry stakeholder (mobile service supplier) perceptions about customer demand for MDS within the context of the MDS market environment. The main research question of the study is: "What are the views of mobile industry stakeholders about customer demand for MDS?". The study sets two objectives through which to address the main research question – first, to propose a conceptual model and a research framework that considers the relationship between perceived customer demand and MDS adoption and use, and second, to investigate empirically MDS supplier perceptions by applying the framework. The chapter contributes to the first study objective by providing an input to the development of the conceptual model and research framework. , Its position in the overall research process is shown in Figure 2-1.

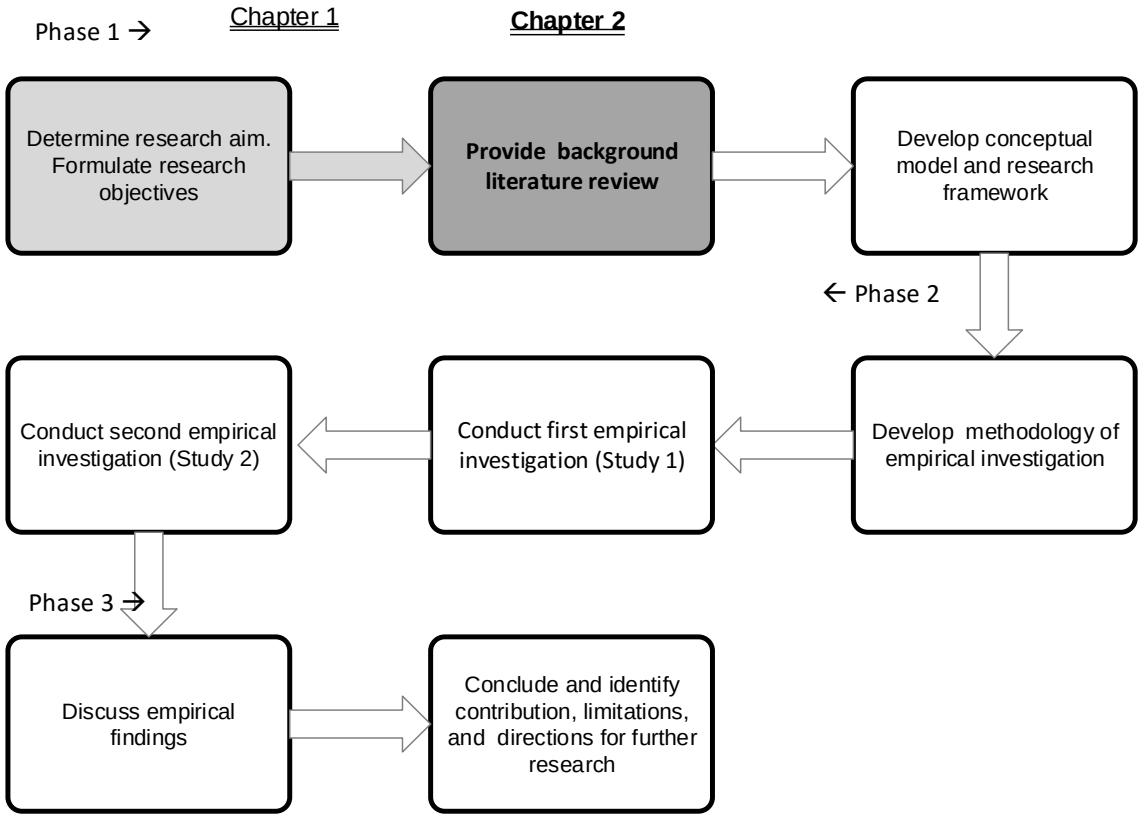

Figure 2-1. Research process path (Chapter 2)

The chapter is organized as follows. First, it introduces the literature review motivation, objectives and scope, then describes selected adoption models pertaining to the research, and finally, summarizes and presents the outcomes of the review.

2.1 Review Objectives, Approach and Scope

There is already a significant number of studies (including empirical research) that investigate the adoption of mobile services, mCommerce and mobile technologies. These studies focus primarily on customer adoption, use behaviour and decision making including factors such as customer motivation, requirements, and perceptions about value. The frameworks and models proposed, explored and validated often draw on prior work in technology adoption (Dahlberg, Guo, & Ondrus, 2015; Ovčjak, Heričko, & Polančič, 2015), and also on eCommerce adoption (Kourouthanassis & Giaglis, 2012; Swilley & Goldsmith, 2007).

As the focus of the research presented here concerns service supply stakeholder perceptions about customer adoption and use of MDS it was considered appropriate to review the literature on customer adoption and use of MDS. Research findings derived from the investigation of customer perceptions may inform the directions of the investigation of service supply stakeholder perceptions, and may provide useful reference points for the subsequent analysis.

2.1.1 Objectives

The literature review is based on the premise that MDS customers and providers “meet” at the point where service adoption and use occur, i.e., at the point where perceptions about service value, service quality and satisfaction are formed and customers make decisions about accepting (or not) the service value proposition and using the service. Therefore, the review considers studies of customer perceptions in relation to adoption and use of MDS with two-pronged aim: first, to identify the adoption models and the respective dependent adoption and /or use variable(s) investigated or proposed in relevant empirical and theory building research work, and second, to draw a picture of how the research reviewed conceptualizes and investigates the constructs of service value, service quality, and satisfaction introduced in Chapter 1.

2.1.2 Approach

The literature reviewed in this chapter represents prior research used and referred to throughout the work on the thesis; the literature/research review and synthesis articles listed in Table 2-1 provide helpful insights and ideas.

Table 2-1. Literature and research review articles

Author(s)	Title and notes
Pedersen and Ling (2002)	*Mobile end - user service adoption studies: A selective review* (over 50 studies, mostly 2000-2001)
Fouskas et al. (2005)	*A roadmap for research in mobile business* (an empirical study; identifies value as one of the future research dimensions)
Scornavacca et al. (2006)	*Mobile business research published in 2000- 2004: Emergence, current status and future opportunities* (530 studies)
Leppäniemi, Sinisalo, and Karjaluoto (2006)	*A review of mobile marketing research* (109 studies, 50 studied in more detail, 2001-2006)
Ngai and Gunasekaran (2007)	*A review for mobile commerce research and applications* (149 studies, 2000-2003)
J. V. Chen and Aritejo (2008)	*Service quality and customer satisfaction measurement of mobile value-added services: A conceptual review* (synthesizes prior work)
Dahlberg et al. (2008)	*Past, present and future of mobile payments research: A literature review* (73 studies, 1999 – 2006)
Donner (2008)	*Research approaches to mobile use in the developing world: A review of the literature* (200 studies, - 2007)
S. Rao and Troshani (2007); Troshani and Hill (2008)	*A selective review of mCommerce adoption and a proposed model* (towards an empirical investigation of all stakeholders including users)
AlHinai, Kurnia, and Smith (2010)	*The adoption of mobile commerce services by individuals: A Current State of the Literature* (100 studies, 2003-2009)
Y. Liu, Han, and Li (2010)	*Understanding the factors driving m - learning adoption: A literature review* (24 studies, 2000-2006)
X. Wu, Chen, Zhou, and Guo (2010)	*A review of mobile commerce consumers' behaviour research: consumer acceptance, loyalty and continuance (2000-2009)* (92 studies)
Varnali and Toker (2010)	*Mobile marketing research: The - state - of - the - art* (255 studies, 2000-2008)
Coursaris and Kim (2006); Coursaris and Kim (2011)	*A meta - analytical review of empirical mobile usability studies* (the second study is an extension of the first one, 100 studies, 2000 – 2010)
W.-H. Wu et al. (2012)	*Review of trends from mobile learning studies: A meta-analysis* (164 studies, 2003-2010; focus on use)
Larivière et al. (2013)	*Value fusion: The blending of consumer and firm value in the distinct context of mobile technologies and social media* (theoretical synthesis)
Slade, Williams, and Dwivedi (2013)	*Mobile payment adoption: Classification and review of the extant literature* (around 90 studies, 2002-2012)
Cheung (2014)	*A survey on the use of mobile devices for learning purposes* (synthesis of selected sources and an empirical investigation of technology use)
Gerpott and Thomas (2014)	*Empirical research on mobile Internet usage: A meta - analysis of the literature* (175 studies, 2001-2012)
Ström, Vendel, and Bredican (2014)	*Mobile marketing: A literature review on its value for consumers and retailers* (top 50 most cited studies, 2002-2011)
Dahlberg, Guo, et al. (2015)	*A critical review of mobile payment research* (188 studies, 2007- 2014)
Dennehy and Sammon (2015)	*Trends in mobile payments research: A literature review* (top 20 most cited studies, 1999-2014)
D. Johansson and Andersson (2015)	*Mobile e -Services state of the art and focus areas for research* (synthesis)
Mehmood (2015)	*Business models and strategies of m-commerce: A review* (15 studies, 2003-2011)
Ovčjak et al. (2015)	*Factors impacting the acceptance of mobile data services* (2004 - 2014, 80 studies)
Sanakulov and Karjaluoto (2015)	*Consumer adoption of mobile technologies: A literature review* (67 studies, 2005-201)
Shaikh and Karjaluoto (2015)	*Mobile banking adoption: A literature review* (33 studies, 2005– 2014)

The review draws in part on the researcher's prior work on the adoption of mobile technology and mCommerce (Petrova & Huang, 2011; Petrova & MacDonell, 2010), mBanking (Petrova & Yu, 2010), mPayment (Petrova & Wang, 2013), mLearning (Petrova, 2007; Petrova & Li, 2011), LBS (Petrova & Wang, 2011), mGaming (H. Lee et al., 2016; Petrova & Qu, 2007) (see Appendix A for a complete list of related publications). A comprehensive literature search carried out anew ensures the currency and credibility rate of the sources identified earlier (based on the citation index provided by Google Scholar).

The literature review includes journal articles (and some conference papers) published between 2002 and 2015. While relevant earlier work is cited in relation to the model development (Chapter 3), more recent results are also considered and further references to them are made in Chapter 7.

2.1.3 Literature scope

Ngai and Gunasekaran (2007) developed an mCommerce research classification framework that comprises five categories: mCommerce theories and research, wireless network infrastructure, wireless user infrastructure, middleware, and mCommerce cases and applications. With a reference to this classification the scope of the literature review presented in this chapter is positioned predominantly within the mCommerce theory and research category as it covers empirical and/or theory building studies (Figure 2-2). Mobile technology adoption studies such as Conci, Pianesi, and Zancanaro (2009) were also included in order to account for work where technology and service adoption is studied as a "bundle" (see, for example, the study of older customers' needs for LBS and mobile phones by Osman, Maguire, & Tarkiainen, 2003). For reference, a brief mobile technology review is provided in Appendix B1.

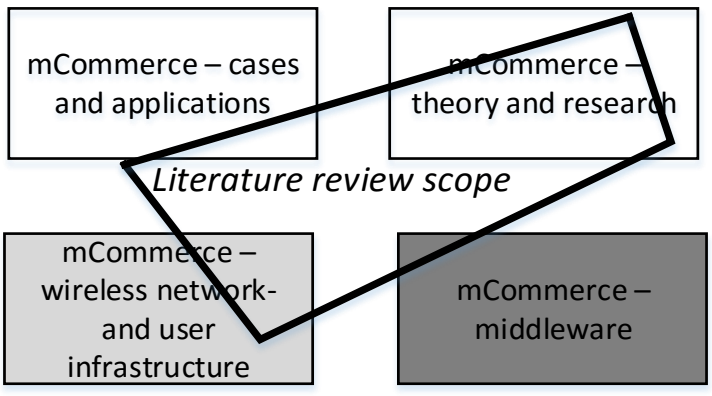

Figure 2-2. Literature review scope with a reference to Ngai and Gunasekaran's (2007) mCommerce research literature classification

2.1.4 MDS scope

In the extant literature MDS have been classified in a number of ways. As Verkasalo (2009) mentions a common earlier approach was to look at services from the perspective of the specific functionality offered to the MDS customer. For example, specific MDS were listed and used as the context for the investigation in (Carlsson, Hyvönen, Repo, & Walden, 2005) and in (Samtani et al., 2003).

Services are also classified in relation to the service use context, for example, its spatial and temporal dimensions (Balasubramanian, Peterson, & Jarvenpaa, 2002 - eight categories of services defined). Furthermore, Heinonen and Pura (2006) develop a framework of four contextual dimensions that include service use (service consumption type and service content), as well as interactions (social setting and relationship with the service provider).

Bouwman, Bejar, and Nikou (2012) classify mobile services in three broad categories: consuming services (e.g., mobile ticketing), participating services (e.g., group alerts), and producing services (e.g., sharing of location information). Consuming, or service area specific MDS include information, transaction, entertainment, Web 2.0, and communication services (Bouwman, Bejar, et al., 2012; Ngai & Gunasekaran, 2007; Ovčjak et al., 2015; Zarmpou, Saprikis, Markos, & Vlachopoulou, 2012). For example, mLearning and LBS are information services, mPayment and mobile ticketing are transaction services, while mGaming and mobile TV are entertainment services.

Information, transaction and entertainment services deploy a B2C model and add value by using a mobile channel, i.e., they comply with the MDS definition provided in Chapter 1. Therefore, the majority of the reviewed articles represent empirical studies that focus on customer adoption and use of a specific value-added mobile service (e.g., mBanking, in Zhou, Lu, & Wang, 2010). The review comprises theoretical and empirical studies where the investigation is concerned more generally with value – added services supported by mobile technology (as for example in Y. S. Wang et al., 2006) as there is a significant body of earlier work that refers to mobile service use and adoption including the use of MI or mobile technology for the provision of value – added services. However, studies that focus on using mobile devices for communication (e.g., Palen, Salzman, & Youngs, 2001) are excluded as being outside the scope of the review. Finally, the review has no specific restrictions about the study sample type and location.

2.2 Literature Review Summary

A total of 191 relevant publications (published between 2002 and 2015) were included in the selection of articles that were analyzed for the purposes of the literature review (Figure 2-3). Table 2-2Table 2-2 contains a list of the articles reviewed, in alphabetical order by the name of first author as formatted by EndNote X6 (template APA6th-AUTX6). The complete bibliographical data can be found in the References for the thesis.

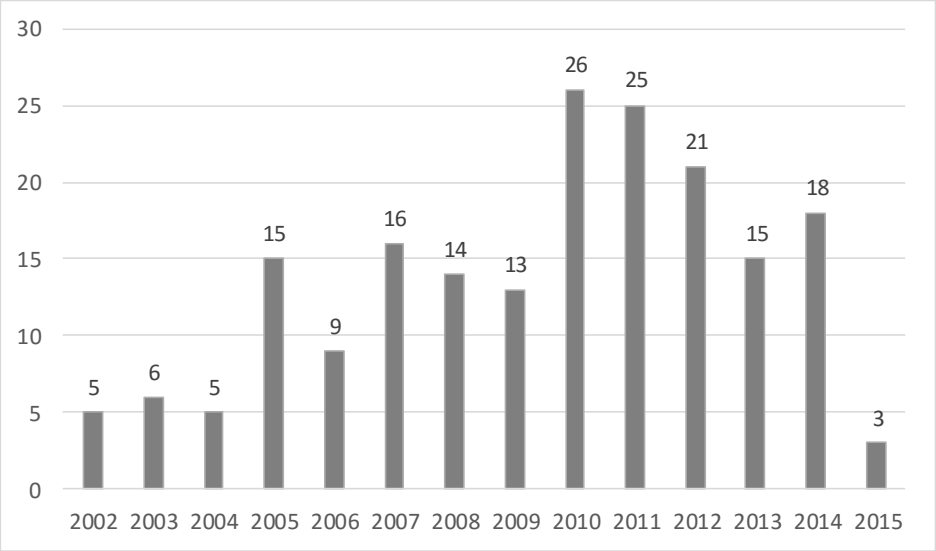

Figure 2-3. Number of reviewed articles per year

Each article was examined in terms of: (i) the context of the investigation, including: general mCommerce/general MDS/MI/mobile technology adoption and use, and adoption of specific MDS such as mBanking; (ii) the theory or model underlying the investigation; (iii) independent, intermediate and dependent variables and constructs; (iv) study location and sample size.

Table 2-2. Articles included in the literature review

ID	Source	ID	Source
S001	(Aarnio, Enkenberg, Heikkila, & Hirvola, 2002)	S101	(Liébana-Cabanillas, Sánchez-Fernández, & Muñoz-Leiva, 2014)
S002	(Akesson, 2007)	S102	(Lim & Kumar, 2008)
S003	(Akter, D'Ambra, et al., 2013)	S103	(H.-H. Lin & Wang, 2006)
S004	(Akter, Ray, & D'Ambra, 2013)	S104	(Y. Liu & Li, 2010)
S005	(Al-Debei & Al-Lozi, 2014)	S105	(Y. Liu & Li, 2011)
S006	(Al-Jabri & Sohail, 2012)	S106	(Y. Liu, Li, & Carlsson, 2010)
S007	(Amin, 2007)	S107	(López-Nicolás et al., 2008)
S008	(Amoroso & Magnier-Watanabe, 2012)	S108	(M. S. Y. Lee, McGoldrick, Keeling, & Doherty, 2003)
S009	(Anckar & D'Incau, 2002)	S109	(M.-K. Kim, Park, & Jeong, 2004)
S010	(Arvidsson, 2014)	S110	(Mallat, 2007)
S011	(B. Kim & Han, 2009)	S111	(Mallat, Rossi, Tuunainen, & Öörni, 2008)
S012	(B. Kim & Han, 2011)	S112	(Mallat, Rossi, Tuunainen, & Öörni, 2009)
S013	(B. Kim & Oh, 2011)	S113	(Mallenius, Rossi, & Tuunainen, 2007)
S014	(B. Kim, 2010)	S114	(McKenna, Tuunanen, & Gardner, 2011)
S015	(B. Kim, 2012)	S115	(Nysveen & Pedersen, 2003)
S016	(B. Yang, Kim, & Yoo, 2013)	S116	(Nysveen, Pedersen, & Thorbjørnsen, 2005)
S017	(Barkhuus & Dey, 2003)	S117	(O'Doherty, Hill, Mackay, & McPherson, 2010)
S018	(Bauer, Reihardt, Barnes, & Neumann, 2005)	S118	(Okazaki & Mendez, 2013)
S019	(Bell et al., 2006)	S119	(Oliveira, Faria, Thomas, & Popovič, 2014)
S020	(Bouwman, Carlsson, Molina-Castillo, & Walden, 2007)	S120	(Pagani, 2004)
S021	(Bouwman et al., 2009)	S121	(Pagani, 2006)
S022	(Bouwman, López–Nicolás, Molina–Castillo, & Hattum, 2012)	S122	(J. Park, Snell, Ha, & Chung, 2011)
S023	(C. Kim, Mirusmonov, & Lee, 2010)	S123	(Y. Park & Chen, 2007)
S024	(Carlsson et al., 2006)	S124	(Pedersen, 2005)
S025	(Carlsson et al., 2005)	S125	(Pousttchi & Goeke, 2011)
S026	(Chandra, Srivastava, & Theng, 2010)	S126	(Pousttchi & Wiedermann, 2007)
S027	(S. E. Chang, Hsieh, Lee, Liao, & Wang, 2007)	S127	(Pura, 2005)
S028	(Chan-Olmsted, Rim, & Zerba, 2013)	S128	(Püschel, Mazzon, & Hernandez, 2010)
S029	(Cheong & Park, 2005)	S129	(Qi et al., 2009)
S030	(Chitungo & Munongo, 2013)	S130	(Rai et al., 2013)
S031	(Chong, Darmawan, Ooi, & Lin, 2010)	S131	(S. Rao & Troshani, 2007)
S032	(Cocosila & Archer, 2010)	S132	(Rao Hill & Troshani, 2010)
S033	(Cruz, Neto, Muñoz-Gallego, & Laukkanen, 2010)	S133	(Revels, Tojib, & Tsarenko, 2010)
S034	(Cyr, Head, & Ivanov, 2006)	S134	(Riquelme & Rios, 2010)
S035	(D. J. Kim & Hwang, 2012)	S135	(S. Cho & Sung, 2007)
S036	(D.-H. Shin, 2007)	S136	(S. Lee et al., 2009)
S037	(Dahlberg & Mallat, 2002)	S137	(S. Yang, Lu, Gupta, & Cao, 2012)
S038	(de Vos, Haaker, Teerling, & Kleijnen, 2008)	S138	(S. Yang, Lu, Gupta, Cao, & Zhang, 2012)

ID	Source	ID	Source
S039	(Deng et al., 2014)	S139	(S.-G. Lee, Trimi, & Kim, 2013)
S040	(Deng, Lu, Wang, Zhang, & Wei, 2010)	S140	(S.-P. Lin, 2011)
S041	(Dickinger, Arami, & Meyer, 2008)	S141	(Samtani et al., 2003)
S042	(Dwivedi, Tamilmani, Williams, & Lal, 2014)	S142	(San-Martín, Prodanova, & Jiménez, 2015)
S043	(E. Y. Huang, Lin, & Fan, 2015)	S143	(Scharl, Dickinger, & Murphy, 2005)
S044	(Ervasti, 2013)	S144	(Schierz, Schilke, & Wirtz, 2010)
S045	(G. Kim, Shin, & Lee, 2009)	S145	(Sell, Walden, & Carlsson, 2010)
S046	(G.-H. Huang & Korfiatis, 2015)	S146	(H. Sheng, Siau, & Nah, 2010)
S047	(S. Gao, Krogstie, & Siau, 2011)	S147	(Shieh, Chang, Fu, Lin, & Chen, 2014)
S048	(S. Gao, Krogstie, & Siau, 2014)	S148	(Keng Siau, Sheng, Nah, & Davis, 2004)
S049	(Garry Wei-Han Tan, Ooi, Sim, & Phusavat, 2012)	S149	(Sim, Tan, Wong, Ooi, & Hew, 2014)
S050	(Garry Wei-Han Tan, Ooi, Leong, & Lin, 2014)	S150	(Singh, Srivastava, & Srivastava, 2010)
S051	(Gerpott & Kornmeier, 2009)	S151	(Sohail & Al-Jabri, 2014)
S052	(Gu, Lee, & Suh, 2009)	S152	(Suoranta & Mattila, 2004)
S053	(Gurtner, Reinhardt, & Soyez, 2014)	S153	(Swilley & Goldsmith, 2007)
S054	(H. Choi, Kim, & Kim, 2011)	S154	(Thakur & Srivastava, 2014)
S055	(H. Kim, Lee, & Kim, 2008)	S155	(Thong, Hong, & Tam, 2006)
S056	(H.-F. Lin, 2011)	S156	(Tojib & Tsarenko, 2012)
S057	(H.-W. Kim et al., 2007)	S157	(Turel, Serenko, & Bontis, 2010)
S058	(Ha, Yoon, & Choi, 2007)	S158	(Vlachos, Giaglis, Lee, & Vrechopoulos, 2011)
S059	(Hanafizadeh, Behboudi, Koshksaray, & Tabar, 2014)	S159	(W.-P. Kuo, Hsu, & Huang, 2011)
S060	(Head & Ziolkowski, 2012)	S160	(W.-T. Wang & Li, 2012)
S061	(Ho & Kwok, 2003)	S161	(Wei, Marthandan, Chong, Ooi, & Arumugam, 2009)
S062	(Hong & Tam, 2006)	S162	(Wessels & Drennan, 2010)
S063	(Hong, Thong, & Tam, 2006)	S163	(Y. C. Cho, 2008)
S064	(Hong, Thong, Moon, & Tam, 2008)	S164	(Y. H. Kim et al., 2013)
S065	(Hsu, Wang, & Lin, 2011)	S165	(Y. Lee, Kim, Lee, & Kim, 2002)
S066	(Hung & Jen, 2012)	S166	(Y. Lu et al., 2011)
S067	(I. Lee, Choi, Kim, & Hong, 2007)	S167	(Y. M. Shin, Lee, Shin, & Lee, 2010)
S068	(I. Lee, Kim, & Kim, 2005)	S168	(Y. S. Wang et al., 2006)
S069	(I.-L. Wu, Li, & Fu, 2011)	S169	(Y. S. Wang, Wu, & Wang, 2009)
S070	(Iqbal & Qureshi, 2012)	S170	(Y.-F. Kuo & Yen, 2009)
S071	(Islam, Khan, Ramayah, & Hossain, 2011)	S171	(Y.-F. Kuo et al., 2009)
S072	(J. Choi, Seol, Lee, Cho, & Park, 2008)	S172	(Ye et al., 2011)
S073	(J. Kim & Hwang, 2005)	S173	(Yu, 2012)
S074	(J. Lu, 2014)	S174	(Yuan, Liu, Yao, & Liu, 2014)
S075	(J. Lu, Liu, Yu, & Wang, 2008)	S175	(Zarmpou et al., 2012)
S076	(J. Lu, Yao, & Yu, 2005)	S176	(L. Zhang, Zhu, & Liu, 2012)
S077	(J. Lu, Yu, Liu, & Yao, 2003)	S177	(Zhao et al., 2012)
S078	(J. V. Chen & Aritejo, 2008)	S178	(Zheng, Li, & Jiang, 2012)
S079	(J.-H. Wu & Wang, 2005)	S179	(Zhou & Lu, 2011)

ID	Source	ID	Source
S080	(José Liébana-Cabanillas, Sánchez-Fernández, & Muñoz-Leiva, 2014)	S180	(Zhou, 2011a)
S081	(Jung, Perez-Mira, & Wiley-Patton, 2009)	S181	(Zhou, 2011b)
S082	(K. C. C. Yang, 2005)	S182	(Zhou, 2011c)
S083	(K. C. Lee & Chung, 2009)	S183	(Zhou, 2011d)
S084	(K. M. Lee, Yates, Clark, & El Sawy, 2010)	S184	(Zhou, 2011e)
S085	(K. Yang, 2010)	S185	(Zhou, 2012)
S086	(K.-Y. Chen & Chang, 2013)	S186	(Zhou, 2013a)
S087	(Khalifa & Cheng, 2002)	S187	(Zhou, 2013b)
S088	(Khalifa & Ning Shen, 2008)	S188	(Zhou, 2013c)
S089	(Kleijnen, de Ruyter, & Andreassen, 2005)	S189	(Zhou, 2013d)
S090	(Kleijnen, de Ruyter, & Wetzels, 2004)	S190	(Zhou et al., 2010)
S091	(Kleijnen, De Ruyter, & Wetzels, 2007)	S191	(Zolnowski, Weiß, & Bohmann, 2014)
S092	(Koenig-Lewis, Palmer, & Moll, 2010)		
S093	(Koenigstorfer & Groeppel-Klein, 2012)		
S094	(Kumar & Lim, 2008)		
S095	(L.-d. Chen, 2008)		
S096	(Laforet & Li, 2005)		
S097	(T. Laukkanen & Lauronen, 2005)		
S098	(Leong, Ooi, Chong, & Lin, 2011)		
S099	(M. Li, Dong, & Chen, 2012)		
S100	(Liang & Yeh, 2011)		

Based on the context of the investigation, articles are classified as one of the following: (i) Mobile services in general (GEN) - comprising work referring to mobile services and/or mobile technologies in general (e.g., mCommerce, MI, MDS, smart phones); (ii) Mobile information services (MIN) – mLearning, LBS, mAdvertising, mMarketing, mHealth; (iii) Mobile entertainment services (MEN) – mGaming, mobile TV, mobile news; (iv) Mobile transaction services (MTR)– mPayment, mBanking, mobile purchasing. Table 2-3 provides information about the number of reviewed sources and the respective year range.

Table 2-3. Number and year range of reviewed articles

	General (GEN)	Mobile Information Services (MIN)	Mobile Entertainment Services (MEN)	Mobile Transaction Services (MTR)
Number of articles	108	23	11	49
Year range	2002-2015	2003-2014	2004-2014	2002-2015

The complete tabulated summary of the literature review can be found in Appendix B2. Each table row corresponds to one publication and contains the source identifier, year of publication and authors, the investigation context type (one of GEN, MIN, MEN,

MTR), information about the adoption model(s), the independent, moderating and intermediate (mediating) variables, the dependent variable(s), and the study location and sample size (the abbreviations used are introduced below, and can be found in the table provided in the ABBREVIATIONS AND ACRONYMS front matter section). A one row sample is provided in Table 2-4.

Table 2-4. A sample row of the tabulated literature review summary

Year	Source ID	Authors	Context	Model	Independent and moderating variables	Intermediate (mediating) variables	Dependent variable(s)	Locations /Sample size
2007	S020	(Bouwman et al., 2007)	G E N	UTAUT	ATT, Barriers (Physical, Cognitive, Economic, Security)	AU, Perceived entertain-ment value, Perceived flexibility	Future use	Finland/484

Overall the literature reviewed shows that that there is a persistent research interest in the role of perceived service value, perceived quality, satisfaction as factors influencing MDS adoption, and actual and continued use. The summary table also shows that in a significant number of studies the investigation is guided by a research framework or a model that adapts or extends an existing model or a theory, initially developed for the study of mobile technology adoption. The next section provides a review of the most commonly used models. It is followed by two sections that summarize the literature review findings related to the dependent variable types, and findings that concern specifically perceived value, perceived quality, and satisfaction.

2.3 Frequently used adoption models

The most frequently used models and theories are described briefly below and summarized in Table 2-5. The table introduces variables included in each model, and their commonly used acronyms.

2.3.1 Theory of Reasoned Action, Theory of Planned Behaviour, and Decomposed Theory of Planned Behaviour

The Theory of Reasoned Action (TRA) suggests that an individual's behavioural intention (BI) to engage in a specific behaviour is influenced by their attitude (ATT) and subjective norms (SN). ATT represents the individual's personal beliefs; SN refers to the individual's perceptions about what other "important" people think about engaging in the intended behaviour (Dillon & Morris, 1996; Madden, Ellen, & Ajzen, 1992).

Table 2-5. Existing models used and/or adapted in work on MDS customer adoption

Model	Independent variables	Dependent variables
TRA	Attitude (ATT); Subjective norms (SN)	Behavioural Intention (BI) as a predictor of behaviour
TPB	ATT; SN; Perceived behavioural control (PBC)	BI as a predictor of usage (use) Behaviour (UB)
TAM	Perceives usefulness (PU); Perceived ease of use (PEU); External factors	BI as a predictor of Actual Use (AU)
DTPB	ATT decomposed as PU, PEU, Compatibility (COMP); SN decomposed as Peer references, and Superior references; PBC decomposed as self - efficacy (SE), Resource facilitating conditions, and Technology facilitating conditions	BI as a predictor of UB
TAM2	PU determined by SN, image (IMG), Job relevance, Output quality, and Result demonstrability; PEU; Experience (EXP) and Voluntariness (VOL) as mediating variables between SN and PU	Intention to use (IU) as a predictor UB
TAM3	PEU determined by (i) anchors: Computer SE, Computer anxiety, Computer playfulness, and Perceptions of external control (Facilitating conditions), and (ii) adjustment variables: Perceived enjoyment (PE), and Objective usability; EXP and VOL as mediating variables; EXP mediates multiple relationships	BI as a predictor of UB
UTAUT	Performance expectancy (determinant of BI); Effort expectancy (determinant of BI); Social influence (SI); Facilitating conditions (direct predictor of UB); Moderators: Age, gender, EXP, VOL	BI as predictor of UB
UTAUT2	Hedonic motivation (determinant of BI); Price value (determinant of BI); Habit (determinant of UB); Moderators: Age, gender, EXP	BI as predictor of UB
IDT	COMP; Trialability; Relative advantage (RE); Result demonstrability; Visibility; PEU; IMG; VOL	Rate of adoption
Domesticati on research	Focus on everyday life through: PE; Self-expression /expressiveness; Status/Fashion/Image; Gender; Age	BI, IU, AU
TTF	Task characteristics; Technology characteristics; Individual performance; Utilization	Task-Technology Fit as predictor of BI
Flow Theory	PE; Control; Concentration/Focus (as intrinsic motivators)	AU, Intention to continue (IC)
Satisfac-tion and Value models	Satisfaction (SAT)=[Information satisfaction + System satisfaction] → [PU + PEU] *(Wixom and Todd's model*); [Post-adoption PU + Confirmation of expectations] →SAT (ECT); [information quality + system quality + service quality(SQ)] → [SAT + IU + AU] by creating value (*Delone and McLean's model);* [service value (SV) + SQ + SAT} → BI; SQ → [SV+SAT]; Sacrifice (SAC) → SV *(Cronin et al.'s model)*	IU, Continuance intention (CI), IU,AU, BI

The Theory of Planned Behaviour (TPB) builds on TRA and aims to "predict and explain human behaviour in specific contexts" (Ajzen, 1991, p. 182) as a person's behavioural achievement also depends on their perceived ability to engage in a specific usage behaviour (UB). TPB extends TRA by adding perceived behavioural control to account for cognitive and situational beliefs about opportunity and resource availability that may impede or enhance behavioural performance (Ajzen, 1985); "control" may influence actual behaviour directly and indirectly (through BI) (Madden et al., 1992).

The Decomposed TPB (DTPB) expands the three TPB independent variables into constructs to incorporate variables that refer specifically to IT adoption and use: SN is represented as peer references and superior references, while control is decomposed into self-efficacy (SE), and resource and technology facilitating conditions (Taylor & Todd, 1995).The attitudinal beliefs are PU, PEU, and compatibility (COMP) – a possible antecedent of PU an PEU as well (Chau & Hu, 2001).

2.3.2 Innovation Diffusion Theory

The Innovation Diffusion Theory (IDT) aims to explain how individuals make decisions about adopting an innovative development. It is based on the work of Rogers (2010) that investigates how innovations are communicated and adopted (the first edition of his book was published in 1962). According to the model five perceived innovation attributes may influence the rate of innovation adoption: relative advantage (RE), COMP, complexity, trialability and observability. Moore and Benbasat (1991) expand and adapt the original model to consider specifically IT innovation adoption and use and define eight independent variables: (i) COMP); (ii) Trialability; (iii) RE (measured similarly to PU), (iv) result demonstrability; (v) visibility (visibility and result demonstrability replace Roger's observability); (vi) PEU (replaces complexity); (vii) image (IMG); (viii) VOL.

2.3.3 Technology Acceptance Model

The Technology Acceptance Model (TAM) explains user acceptance of IT systems, with a reference to TRA. According to TAM the two personal beliefs that affect the actual use (AU) of a system are its perceived usefulness (PU) in enhancing performance, and its perceived ease of use (PEU) , or the degree of effort needed to use the system (Davis, 1989). These two cognitive beliefs form ATT which drives intention to use (IU) and consequently - system acceptance. It is also postulated that: i) PU may affect BI directly, ii) PEU may affect PU, and iii) a number of "external variables" may influence both PU and PEU (Davis, Bagozzi, & Warshaw, 1989; Y. Liu & Li, 2011). In later work ATT is often dropped (Hong et al., 2006).

TAM is used widely although a number of pertinent limitations have been identified. These include insufficient precision when using self-reported AU (Legris, Ingham, & Collerette, 2003), and also that that PU and PEU may be worse predictors of AU, compared to BI (Turner, Kitchenham, Brereton, Charters, & Budgen, 2010).

The Technology Acceptance Model 2 (TAM2) extends TAM by explicitly including the determinants of PU (Venkatesh & Davis, 2000) – SN (also a direct antecedent of IU), image (IMG), result demonstrability, job relevance, and output quality. Experience (EXP), and voluntariness (VOL) are mediator variables. The Integrated Tech**n**ology Acceptance Model (TAM3) (Venkatesh & Bala, 2008) combines TAM2 and an earlier extension of TAM (Venkatesh, 2000). It includes PEU determinants - anchor variables representing the individual's general beliefs (SE, computer anxiety, computer playfulness and perceptions of external control - i.e., facilitating conditions), and adjustment variables which account for changes in user behaviour as a result of direct technology use experience (perceived enjoyment – PE and objective usability); EXP plays the role of a mediating variable.

2.3.4 Unified Theory of Acceptance and Use of Technology

The Unified Theory of Acceptance and Use of Technology (UTAUT) integrates variables from existing adoption models and theories, from motivational theories and models of personal computer utilization, and from models based on social cognitive theory (Venkatesh, Morris, Davis, & Davis, 2003). It is posited that performance expectancy, effort expectancy and social influence (SI) are direct determinants of BI (while ATT, SE and anxiety are not); BI and facilitating conditions are direct determinants of UB. Age, gender, EXP and VOL are mediator variables.

UTAUT is used to study individuals' adoption of technology in everyday life context, for example, in (Im, Hong, & Kang, 2011). A recent extension (UTAUT2) adds to it a consumer use context represented by three new independent variables: hedonic motivation, and price value (BI determinants), and habit – a determinant of UB (Venkatesh, Thong, & Xu, 2012). Three moderators (gender, age and EXP) influence a number of relationships.

2.3.5 Models including satisfaction, perceived value and perceived quality

While empirical results based on models drawing on TAM, TPB, DIT and other well tested theories provide some good insights with regards to initial acceptance, they may be not particularly well suited to explore continued use intentions (Liao, Palvia, & Chen, 2009; Turner et al., 2010). Several models that include satisfaction (SAT) as a predictor of use /continued use of technology have been developed. For example, in Wixom and Todd's (2005) model SAT (presented as information satisfaction and system satisfaction) influences IU indirectly, through PU and PE; information quality

and system quality drive information and system SAT, respectively. In Bhattacherjee's (2001) Expectation-Confirmation Model (ECM), SAT is the predictor of continuance intention (CI) and has two antecedents - post-adoption PU, and confirmation (of pre-adoption performance expectations - Premkumar & Bhattacherjee, 2008). ECM is extended to include PEU as an antecedent of CI in (Hong et al., 2006).

In consumer research perceived value is linked to SAT and the intention to continue with the same behaviour (C.-H. Lin, Sher, & Shih, 2005), and is influenced by perceived quality (Zeithaml, 1988). In the updated version of Delone and McLean's IS success model (2003) information, system and service quality (SQ) influence SAT as well as IU and AU and ultimately lead to "net benefits" (positive net benefits meaning value). Specifically in service environments, it is proposed that BI is influenced by perceived service value (SV), perceived service quality (SQ) and SAT while SQ is an antecedent of both perceived SV and SAT (Cronin et al., 2000).

2.3.6 Other perspectives on MDS adoption by customers

The models described above are still prevalent in the research on MDS adoption by customers (Ovčjak et al., 2015). However, there are also studies that incorporate a domestication research perspective, or elements of the Task-Technology Fit Model (TTF). Another strand is research that considers perceived satisfaction and/or a perceived value as adoption, use and intention to continue use antecedents.

2.3.6.1 Domestication research

Domestication research is concerned with the process of integrating technology in the individual's everyday life (Haddon, 2006). In MDS customer adoption, a domestication research perspective is normally used to add to/extend other models with variables such as self – expression/expressiveness, status, fashion, and image, PE, gender, and age.

2.3.6.2 Task-Technology Fit (TTF)

TTF posits that users may be willing to adopt a particular technology only if the technology fits both the task and the user (Goodhue & Thompson, 1995). The independent variables are task characteristics, technology characteristics, individual performance, and utilization.

2.3.6.3 Flow theory

Flow theory is concerned mostly with the behavioural experience of complete absorption creating a state of peak enjoyment (Nakamura & Csikszentmihalyi, 2009). Variables related to flow theory used in IS research include PE, intrinsic motivation, perceived control and concentration/attention focus (Koufaris, 2002).

2.4 Dependent Variables Related to MDS Adoption and MDS Use

In each of the empirical studies that were reviewed, the research model included one or more dependent variables in the following categories: (i) Attitude (6 articles); (ii) Intention (121 articles); (iii) Use (29 articles); (iv) Continued use (20 articles); (v) Value (5 articles); (vi) Quality (4 articles); (vii) Satisfaction (6 articles); (viii) Other (9 articles). The dependent variables are mostly modelled on the dependent variables used in TAM/ TRA/IDT and their extensions (in about 76% of the reviewed studies).

Table 2-6 provides a summary of the literature sources used, listed by their identifier that cross-references to Table 2-2; bracketed numbers indicate the number of relevant sources. Where a study includes two related dependent variables, e.g., Attitude → Intention to use, it is counted separately under each dependent variable category.

2.5 Service Value, Satisfaction, and Service Quality

As seen in Table 2-6 in 16 of the reviewed articles the respective research models investigated perceived value, satisfaction and perceived quality as dependent variables. In another 55 reviewed articles perceived value, satisfaction and perceived quality were included as independent variables, often in combination (Table 2-7). Table 2-8 contains a concise record for each of the 55 articles showing the independent and dependent variable's used in each.

2.6 Summary of Chapter 2

The chapter presents the findings of the literature review of 191 studies on customer adoption and use of MDS. The analysis has two specific objectives – to identify the dependent variables used in MDS adoption and use studies, and the independent and intermediate variables related to perceived service value, quality and satisfaction. The findings provide supporting information for the development of the study models as described in the next chapter of the thesis.

Table 2-6. Dependent variables representing MDS adoption and use

Attitude (6)	
Sources (2005-2015)	S010, S016, S046, S060, S082, S151
Variables	*ATT (6), Response to mobile ads (1)*
Intention (129)	
Sources (2002 – 20014)	S005, S007, S008, S011, S012, S013, S018, S022, S023, S025, S026, S027, S028, S029, S030, S031, S032, S036, S037, S038, S039, S041, S042, S045, S047, S048, S049, S050, S051, S052, S053, S055, S056, S057, S058, S059, S061, S062, S065, S066, S069, S070, S071, S073, S075, S076, S077, S080, S081, S085, S086, S087, S088, S089, S090, S091, S092, S094, S095, S098, S101, S104, S105, S106, S107, S108, S110, S111, S112, S113, S115, S116, S119, S120, S121, S123, S125, S126, S127, S129, S130, S131, S132, S133, S137, S138, S139, S140, S141, S143, S144, S147, S148, S149, S150, S152, S153, S154, S157, S160, S161, S162, S164, S166, S167, S168, S169, S170, S171, S173, S175, S176, S178, S179, S180, S181, S183, S185, S186, S187, S189
Variables	*Adoption Intention (3), BI (44), IU (43), Adoption (17), Usage Intention (1), Intention to adopt (5), Intention to switch MDS provider (1), Mobile Intention (MI) (5), Intention to accept (1), Loyalty intention (1), Purchase intention(2)*
Use (29)	
Sources (2002-2014)	S001, S006, S008, S020, S024, S025, S033, S037, S040, S053, S079, S084, S096, S104, S113, S114, S117, S122, S124, S128, S134, S136, S145, S156, S176, S178, S185, S190, S021
Variables	*AU (11), UA (6), Future use (4), Use (5), Service use (2), UB (1)*
Continued use (20)	
Sources (2006-2014)	S004, S014, S051, S054, S063, S064, S067, S074, S100, S118, S128, S138, S152, S155, S174, S177, S182, S184, S188, S003
Variables	*Continuance (2), Continuance Use (5), CI (7), IC(6)*
Value (5)	
Sources (2007-2013)	S002, S009, S044, S146, S159
Variables	*Mobile service value, Mobility value, mLearning value, Value (2)*
Quality (4)	
Sources (2008-2015)	S035, S043, S078, S158
Variables	*Perceived SQ, Mobile service, Mobile service quality, MI service quality*
Satisfaction (6)	
Sources (2002-2010)	S072, S083, S102, S135, S163, S165
Variables	*SAT (5), Loyalty, m-satisfaction, Preferred service*
Other (9)	
Sources (2003-2015)	S017, S019, S034, S068, S093, S099, S103, S109, S142
Variables	*Loyalty (2), Preference of MI to other channels, mLoyalty, Preferred service, Consumption experience, Word of Mouth (WOM), New IT-enabled service performance*

Table 2-7. A summary of the use of perceived value, satisfaction and perceived quality

Perceived value	Satisfaction	Perceived quality	Number of articles	Year range
X	X	X	2	2004-2008
X	X		7	2006-2013
X		X	3	2008-2011
X			18	2005-2014
	X	X	4	2010-2013
	X		9	2006-2015
		X	12	2005-2014

Table 2-8. Studies that include perceived service value, perceived quality, and satisfaction

Year	Source	Independent and moderating variables	Intermediate (mediating) variables	Dependent variable(s)
Perceived value, satisfaction, perceived quality				
2004	S109	SQ (Call quality, Value-added services, Customer support) as a predictor of SAT; Switching barrier (loss cost, move-in cost) s predictor of Switching barrier; Interpersonal relationship as a Switching barrier	SAT, Switching barrier	Customer loyalty
2008	S094	Service quality → Perceived value (economic and emotional) Age as a differentiator between two groups	SAT	Loyalty intention
Perceived value, satisfaction				
2006	S103	Perceived value, Trust, Habit	SAT	Loyalty
2007	S067	PU, PE, PEU, Perceived monetary value as influenced by Uncertainty avoidance, Individualism, Contextuality Time perception;	SAT	Continuance intention (CI)
2009	S171	SQ, Perceived value	SAT	Post-purchase intention
2011	S122	Basic Benefit, Innovative Benefit	(Utilitarian value, Hedonic Value)→SAT	Future to use
2012	S015	(PE, PEU, Perceived monetary value, Confirmation)→SAT Variety of use	CI; Habit	AU
2012	S156	Service ubiquity ; PEU; PE; Time convenience	Experiential value → SAT	AU
2013	S164	Perceived value; Engagement motivators (utilitarian, social, hedonistic motivations)	SAT	Mobile engagement intention
Perceived value, perceived quality				
2008	S055	Usefulness, Usability, System quality, SI, Ubiquitous Connectivity, Perceived Cost,	Perceived Value	BI
2008	S078	Tangibles, Reliability, Responsiveness, Assurance, Empathy	SERVQUAL for mobile value-added services	Mobile service quality
2011	S012	Information quality (Accuracy, completeness, currency, format) System quality (Accessibility, Navigation, Reliability, Timeliness) Perceived fee	Utilitarian value; Hedonic Value	Intention to adopt
Perceived value				
2005	S097	The results indicate that in the mobile fund transfer service, Safety Convenience; were perceived by the respondents as the most important values.	Location-free access seems to create positive value in the consumption of this service.	
2005	S127	Perceived value dimensions (monetary, convenience, social, emotional, conditional and epistemic value) The three values below had a significant, positive relationship with behavioural intentions Conditional value Convenience value Monetary value	Commitment most influenced behavioural intentions	BI
2006	S062	PU, PEU, Perceived service availability, Perceived monetary value, PE, Need for uniqueness, SI, Gender, Age		BI
2007	S020	ATT, Barriers (Physical, Cognitive, Economic, Security)	AU, Perceived entertainment value, Perceived flexibility	Future use
2007	S057	Benefit (PU, PE), Sacrifice (Technicality, Perceived fee)	Perceived value	Adoption
2007	S091	Time Convenience, User control, Service Compatibility, Risk, Cognitive Effort	Value M-Channel	IU

Year	Source	Independent and moderating variables	Intermediate (mediating) variables	Dependent variable(s)
2007	S110	Compatibility (high with digital content & services, high with small value purchases at POS, low with high value purchases) Complexity *(registration process, management of separate accounts burdensome, data input formats or codes or service numbers)* Costs Network externalities *(lack of wide merchant adoption, proprietary devices/services)* Trust Perceived security risk	Relative advantage (time and place independent payments, queue avoidance, enhanced payment instrument availability, complement to cash)	IU
2008	S064	Attitudinal beliefs (PU, PEU, PE) Perceived mobility Perceived monetary value Normative beliefs (SI, media influence)	ATT	IC
2009	S011	Interpersonal influences, External Sources' Influences	Utilitarian Value, Hedonic Value, Social Value	Adoption Intention
2009	S021	ATT	AU → (Entertainment value, Flexibility, Status)	Future use
2010	S084	Presence (physical, social, self), EXP of mobile service/application	User value (Enhanced social interaction, engaging user experience, rich personalization, great efficacy)	Increased use
2010	S157	(Escapism, Enjoyment)→Playfulness Value, Visual/Musical Appeal Value, Social Value, Value of Money	Overall Value of Hedonic Digital Artefact	BI to use in future, BI to positive Word-of-Mouth (WOM)
2011	S013	Utilitarian value; Hedonic value; Direct experience	Includes IC	BI
2011	S054	Extrinsic motivation (post-PU, post monetary value; Intrinsic motivation (post-PEU, post PE); Service type (utility)		Continued AU
2012	S008	Facilitating conditions Perceived value Perceived security and privacy Social influence Trust Perceived risk Attractiveness of alternatives	Behavioural intention to use, Perceived Ease of Use and Perceived usefulness impact on Actual Usage	BI & AU
2012	S137	Utilitarian value (PU, perceived mobility), Hedonic value (PE, concentration)	Use context	BI
2014	S005	Technological Influences, SI, Informational Influences	Utilitarian Value, Hedonic Value, Uniqueness Value, Epistemic Value, Economic Value	Adoption Intention of MDS
2014	S039	Perceived value, ATT, PBC,SN, Perceived physical condition, Resistance to change, Technology anxiety, Self-actualization need		BI
Satisfaction, perceived quality				
2010	S083	System Quality, Information Quality, Interface Design Quality	Trust	Adoption
2012	S177	SQ (Interaction, Environment, Outcome), Justice (International Procedural, Distributive)	SAT (Transaction specific; Cumulative	CI
2013	S003	(reliability, efficiency, privacy) = System quality (cooperation, confidence, care)=Interaction quality (hedonic, utilitarian) = Information quality Service quality= (System quality, interaction quality, information quality)	Service quality → SAT	Continuance
2013	S004	Perceived SQ, Perceived trust, PU, Confirmation	SAT	CI
Satisfaction				
2006	S063	PE, PEU, Confirmation	SAT	IC
2006	S121	Data connectivity, Technology Suitability, Workforce Efficiency, Workforce Efficiency → Workforce Productivity, SAT	Interest and evaluation	Adoption
2006	S155	Confirmation → PE, PEU, PU	SAT	Continued IT Use

Year	Source	Independent and moderating variables	Intermediate (mediating) variables	Dependent variable(s)
2010	S014	Confirmation (PU, PE, Perceived fee) Interpersonal influence, External sources influence, PBC	SAT SN	CI
2010	S133	PU,PEU,PE, Perceived Cost, Perceived Image	SAT	Usage Intention
2011	S182	PU; Expectation confirmation	PEU; SAT; Usage cost	CI Recommendation Complaint
2011	S184	PE, Attention focus; Performance expectancy, effort expectancy, SI facilitating conditions	SAT	Continuance usage
2014	S174	Perceived task technology fit, PEU, Confirmation, Perceived Risk, Gender	PU, SAT	Continuance intention
2015	S142	Perceived entertainment has higher importance for young adults Subjective norms are crucial for adults Moderator - Age	Satisfaction	WOM
Perceived quality				
2005	S029	Perceived playfulness, Contents quality, Service quality (SQ), Internet experience, Perceived price level, PU, PEU	ATT towards MI	IU MI
2005	S073	System Quality, Content Quality, Trust (security) Support, Mobility (device), Personalization, Use	mCommerce success factors	Adoption
2007	S027	Cost, Complexity of adoption process, Worry of security and privacy issues, Worry of quality of LBS information, Lack of cognition of LBS		LBS adoption
2007	S036	Perceived quality, Perceived availability, PU, PE , Social pressure	ATT	BI
2009	S136	(Relevance, Timeliness, Reliability, Scope), (Access, Usability, Navigation)	Information Quality, System Quality	Service Use Change
2010	S031	Perceived Advantages, PEU, PU, Perceived cost, Variety of service, SI, Trialability, SQ, Perceptions on 3G security		IU
2011	S181	Structural assurance *(means that there exist legal and technological structures to ensure payment security)* Information quality System quality Trust Propensity	Initial trust affects perceived usefulness, behavioural factors predict the usage intention of mPayment.	IU
2012	S160	Usability; Personalization; Identifiability; PE	Brand loyalty, Perceived quality, Brand awareness, Brand associations	Purchase intention
2013	S186	Perceived enjoyment Perceived control Attention focus Perceived access speed Perceived content quality	Flow experience has a significant effect on usage intention Perceived usefulness has a significate effect on usage intention Perceived ease of use has the largest effect on flow	IU
2013	S189	Perceived ease of use, Connection quality Content quality	Flow has a strong effect on usage intention Social Influence Usage cost; determine usage intention	IU
2014	S053	Convenience Perceived quality Enjoyment Perceived ease of use Perceived usefulness Moderator - Age	Convenience is more important and ease of use is less important for younger users than for older individuals	IU AU
2014	S147	Security and privacy, Signal Quality, Comprehensive customer service, Handset prices and transmission fees, Advertising, network Coverage, Transmission speed, service accessibility, Real-timeliness, usefulness		Adoption of mobile services

CHAPTER 3. STUDY MODELS

As stated in Chapter 1, the research aims to contribute to a better understanding of MDS adoption and use through the exploration of MDS supplier perceptions about customer demand for MDS in the context of the MDS market environment. The main research question of the study is: "What are the views of mobile industry stakeholders about customer demand for MDS?". The study sets two objectives – to develop a conceptual model and a research framework that considers the relationship between customer demand and MDS adoption, and to investigate empirically MDS supplier perceptions applying the framework. This chapter contributes to meeting the first objective; it proposes an MDS conceptual model based on the synthesis of selected prior work, and develops a research framework[10]. The position of the chapter in the overall research process is shown in Figure 3-1.

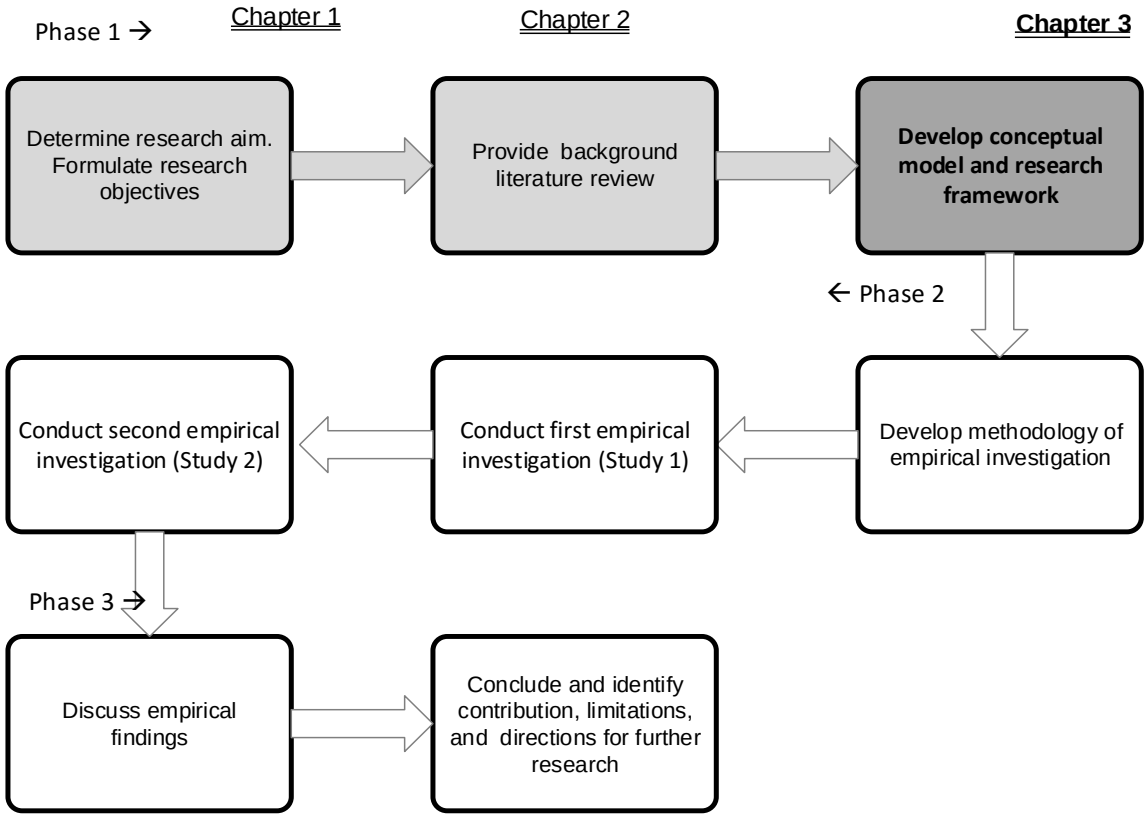

Figure 3-1. Research process path (Chapter 3)

[10] The models presented in this chapter were developed prior to commencing the empirical investigation; therefore, they do draw on research published prior to the start of the data collection in mid-2010. References to relevant work published later are made in the literature review (Chapter 2), and in the discussion (Chapter 7). The chapter draws extensively on the ideas and concepts presented and discussed in the published conference paper (Petrova & MacDonell, 2010), part of which was reproduced in the Participant Information Sheet (Appendix E).

3.1 MDS Provider and Customer Interactions

In studies that focus on MDS adoption from a customer perspective, customer adoption and use decisions are considered and explored with a reference to services that are already offered in order to draw theoretical conclusions about customer behaviour and highlight their practical implications. The literature reviewed in Chapter 2 provides numerous examples of empirical research that investigates MDS adoption and use from a customer perspective. In general, it is assumed that customers may develop first an intention to use an MDS, and then use it. Following initial adoption, they may continue to use the service, or may drop it.

However, adoption frameworks that include a service demand and a service supply perspective reflect the view that the success of mCommerce services and applications depends on the decisions and actions of both service supply stakeholders, and MDS customers (Pedersen, 2001; Pedersen, Methlie, & Thorbjornsen, 2002; Varshney & Vetter, 2002). For example, for a service to be on the market, a service supplier needs to make a decision first to launch it, based on their understanding of the targeted customer segment behaviour about the service. To quote Pedersen (2001), "…at the end of the supply side of the value chain, service providers must deliver end-user services that are in demand…" (p. 646). Furthermore, in order to develop and introduce the right offering service developers and providers need not only to be aware of their end-users' perceptions but to possess specific knowledge about the customer issues related to service adoption (Pedersen et al., 2002) (Heikkilä, 2002; Pedersen et al., 2002).

The Compass (Cooperation Model for Personalized and Situation Dependent Services) framework provides an example of how to approach MDS development and provision considering different stakeholder's perspectives (Amberg, Hirschmeier, & Wehrmann, 2004). The flow of services and information between cooperating suppliers (i.e., the service supply context) is represented by the Compass interaction model. The customer use context and the service system architecture are represented by the Compass situation concept and the Compass usage cycle, and the Compass architecture, respectively. To balance the framework and represent the service demand context also included is a Customer acceptance model that analyzes and evaluates user acceptance in order to improve the design of mobile services. Overall Compass aims to increase service supply stakeholder revenue through increased service use resulting from improved service efficiency and quality.

It is important to understand the value dimensions of all participants in the MDS adoption process, and how these are influenced by other participants in order to be able to draw conclusions about their respective roles in the process of creating service value (Y.-F. Kuo & Yu, 2006; Peppard & Rylander, 2006). Furthermore, it is important to take into account all relevant MDS supply stakeholders' views as well as customers' views when making decisions that influence the design and provision of a service as these decisions underpin the service value proposition (Ondrus, Bui, & Pigneur, 2005) and thus have an impact on service value creation. The MDS business model evaluation framework developed by S. Sharma and Gutiérrez (2010) illustrates the point: it is based on the premise that decisions made by service supply stakeholders are grounded in their perceptions about prospective customers, and about other stakeholders – e.g., what type of a customer may need a particular service, and how to price the service to achieve profitability given the complex service supply environment.

In addition, perceptions about customer intentions about a service that is already in use after initial adoption may influence decisions about continuing to offer the service as the profitability of companies involved in MDS provision depends on service viability (Hong et al., 2006). This is even more important as service discontinuation (i.e., initial MDS adopters stop using it) continues to remain at a relatively high rate (B. Kim, 2010; H. Kim et al., 2008; K. Siau, Lim, & Shen, 2001).

The discussion above suggests that throughout the process of MDS adoption and continued use, customers make decisions based on perceptions and experiences about services. Customer behaviour is embodied in actions based on these decisions as customers consider and trial a new service, then continue or stop using it (to trial a service means to try, or use the service occasionally - Carlsson et al., 2005). Through their actions MDS customers interact with mobile device vendors and other MDS supply stakeholders, and have an impact on the regulatory environment through participation in consumer groups (Camponovo & Pigneur, 2003).

On the other side, MDS providers make decisions about offering new services, and about continuing or discontinuing to support existing services, or developing them further based on perceptions about customers including experiences with post-adoption service use, and the service supply context which includes the service supply and the regulatory environments. In other words, customers and MDS providers influence each other's decisions and actions concerning a particular service even though the

interactions they are engaged in are not direct, rather they are manifested through the service offering. For example, a service that becomes not viable due to decreased use by customers may be "dropped" by the service provider; or a service may be offered in an improved format taking on board customer feedback.

Figure 3-2 shows a schematic representation of the interactions between MDS providers and customers that occur as part of the initial adoption and continued service use process. Service supplier decisions and actions (i.e., initial service offer and continued MDS provision) are represented by arrowed lines 1, 2, and 3 while decisions and actions related to customer adoption and continued use are shown by arrowed lines numbered 4, 5, and 6. For the sake of simplicity and because of the focus on MDS adoption rather than on mobile technology adoption the model assumes that customers interact mostly with service providers and that the interactions with other stakeholders such as the network operators, device vendors, content and service creators are part of, or are subsumed by the interactions with the MDS provider.

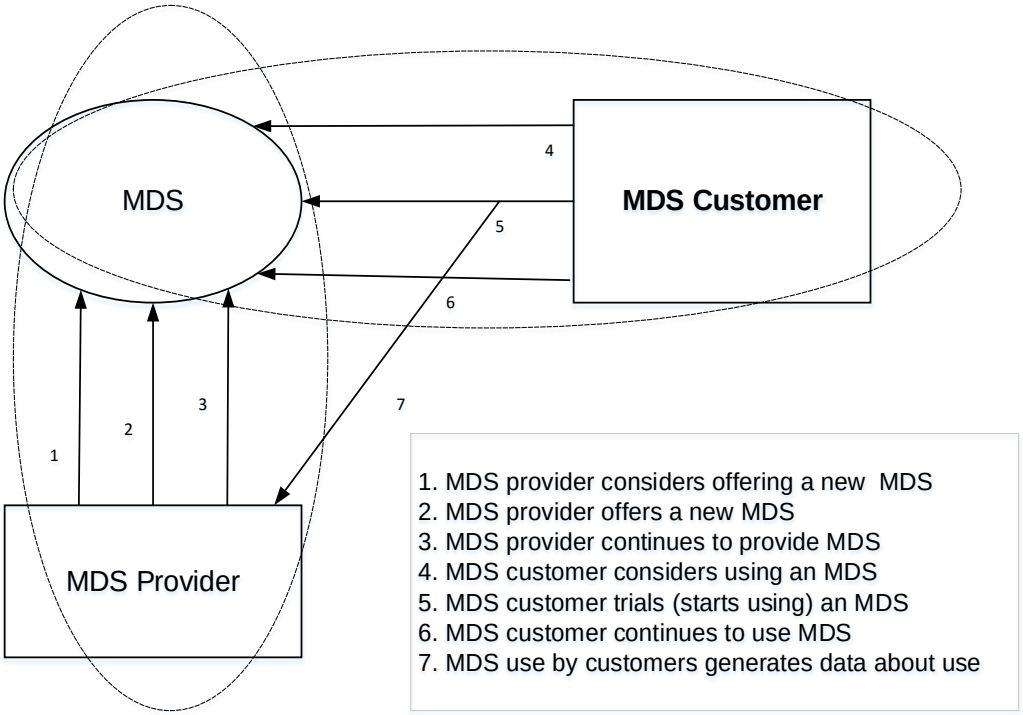

Figure 3-2. MDS provider and customer interactions

3.2 The Service Supply Perspective in MDS Research

This section considers and analyzes findings in selected prior theoretical and empirical work that relates to MDS supplier perceptions about customers and the service supply and regulatory environment, in order to derive research constructs facilitating further investigation. It is pointed out in earlier work that research with such a focus is

relatively scarce (Dahlberg et al., 2008; Okazaki, 2005b; Scornavacca et al., 2006; Varnali & Toker, 2010). For example, only three empirical studies of merchant adoption of mPayment are cited by Dahlberg et al. (vs 14 empirical investigations based on consumer perceptions). Similarly, among the large number of mobile marketing publications reviewed by Varnali and Toker only one explicitly includes a managerial perspective. Finally, Dahlberg et al. and Varnali and Toker cite four and seven theoretical studies, respectively that focus on legal and standard related issues in the supply and regulatory environment.

This section synthesizes selected literature findings relevant to the topic of investigation. First, it considers empirical work that explores service supply stakeholder perceptions, including empirical and theoretical studies of MDS adoption and MDS business models. Second, it reviews selected theoretical and empirical studies that consider MDS customer adoption from the service supply oriented framework of service value, service quality, and satisfaction. Although not directly related to the topic work that explores the role of perceived value, quality and satisfaction may provide useful references as it relates service adoption by customers to the service value propositions put forward by service suppliers.

3.2.1 Empirical studies of MDS supply stakeholders

Even though not voluminous there is some empirical and theoretical research that provides insights into the role of MDS supply stakeholder in MDS adoption. Table 3-1 summarizes 12 studies that explicitly consider the perceptions of service supply stakeholders in relation to MDS adoption.

The earliest study (Carlsson & Walden, 2002) is an investigation of the opinions of service providers from three countries (Finland, Hong Kong and Singapore) about the expected success or failure of a selection of mCommerce services. According to the experts, services that are flexible (available anytime/anywhere), save time, and provide up-to-date information are the most likely to be adopted by customers.

Table 3-1. MDS adoption – supply stakeholder perceptions

Source/MDS services considered	Customers	MDS supply context	
		Service supply environment	Regulatory environment
Carlsson and Walden (2002) (15 mCommerce services)	Flexibility(available anytime/anywhere); time-saving; up-to-date information		
Okazaki (2005a) (mAdvertising)	Branding strategy (significant adoption driver); Cultural barriers	Facilitating conditions (significant adoption prerequisite); Location based services; Security and costs (significant adoption barrier)	Regulatory control
Mallat and Tuunainen (2008) (mPayment)	Proliferation of mobile technology (adoption prerequisite); Increased impulse purchase, enhanced image (adoption drivers); Trust and security (adoption barrier)	Viable mobile payment infrastructure (adoption prerequisites); Lower cost and fees (adoption driver); High commissions and cost of implementation (adoption barriers)	Lack of standardized solutions, lack of charging models (adoption barriers)
Xinyan, Wei, and Tingjie (2009) (mPayment)	Customer demand; Adoption rate (main motivators to offer mPayment)	No infrastructure (a demotivating factor)	
Hayashi and Bradford (2014) (mPayment)	Customer shopping experience; Security of customer data	Cost of implementation; Customer data control; Transaction security	Fragmented mPayment market
Scornavacca and McKenzie (2007) (mMarketing)	Content; Acceptance; Richness (CFS ranked No 1, No 3, and No 4, respectively)		Permission (mMarketing CFS ranked No 2)
W. Li and McQueen (2008) (general)	Business environmental barriers to mCommerce (cultural influence) Customer-related barriers to mCommerce (Usefulness)	Customer-related barriers to mCommerce (Costs, Trust, Service quality Usability) Technological barriers (Security, Network infrastructure) Company-related barriers (Investment risk, Organizational readiness, Trust, Service Quality) Business environmental barriers (Market characteristics)	Business environmental barriers (Policies, regulations, legal issues; Country characteristics)
Akesson (2007) (mobile media content provision)	Convenience; Ubiquity; Localization; Personalization (service value drivers)		
Abu-El Samen et al. (2013) (mobile communications)		SERVQUAL	
Holzer and Ondrus (2009) (general)		Threats to MNOs: as network and financial infrastructure provider, and as application portal provider Opportunities to MNOs: Short term – revenue increase due to high data access cost and increased traffic; Long-term- increased volume and broader range MDS	
Holzer and Ondrus (2011) (general)		Trends in the mobile platform development market: Portal centralization, Technology openness, Device variety, Platform integration	
Ryu, Kim, and Kim (2014) (general)	Mobile application developer credibility	Mobile application developer satisfaction with mobile development platform	Need to regulate the mobile development platform market

Okazaki (2005a) explores the perceptions of senior executives in multinational companies about using mobile technology as an advertising channel to potential customers. With reference to customers the factors influencing executives' decisions are branding strategy (a top most significant driver which reflects executive's perceptions about how customers would respond to the brand advertised), and cultural barriers. Service supply related decision making factors include facilitating conditions (most significant prerequisite which signifies the need of an adequately developed infrastructure), location based services (in order to take advantage of the ability to personalise the service context with regards to the context), and security and cost of implementation (most significant barrier).

A broader perspective emerges from Mallat and Tuunainen's (2008) study which analyzed business managers' attitudes towards adopting mPayment at the merchant's point of sale; eighteen decision making factors (similarly classified as prerequisites, drivers and barriers) are identified and included in a framework that explains mPayment adoption by merchants. For customers, an adoption prerequisite is access to mobile technology; expected increase in impulsive purchasing, and enhanced image are adoption drivers, while expected trust and security issues are adoption barriers. For the service supply context, a viable mPayment infrastructure is a prerequisite; lower transaction costs are a driver while high cost of implementation is a barrier. Also a barrier is the lack of standardization (this factor refers to the regulatory environment).

A parallel investigation of a group of customers and a group of merchants and their demand for mPayment (customers), and motives for participation (merchants) with a reference to six specific use scenarios is described in the study by Xinyan et al. (2009). The findings indicate that merchants' perceptions about consumer demand and expected adoption rate represent the most fundamental motivation and decision making factors while perceptions about the infrastructure as underdeveloped is a de-motivator.

An empirical investigation of the views of brick-and-mortar retailers about mPayment attributes is reported in the study by Hayashi and Bradford (2014); the authors find that merchants expect customers to enjoy the mPayment experience (which would make mPayment beneficial to merchants), and are aware of the issues that may cause concern to customers (e.g., security of customer data). However, the lack of an mPayment solution market leader ("fragmented mPayment market") is perceived as a concern.

Scornavacca and McKenzie (2007) investigated managers' perceptions of the critical success factors (CFS) of SMS based marketing. Their findings confirm the need for campaign managers to both understand client needs and goals, and know how to use mobile technology in order to achieve them as the top two factors. These two factors as well as the factor ranked fourth, relate to respondent perceptions about customer needs and attitude (service content and service interactivity, and service acceptance, respectively). The comparison to a CFS framework drawn mostly from the literature on customer adoption of mMarketing shows a certain lack of alignment as three (out of 12) factors found critical in customer adoption studies are not perceived as important by the respondents, most importantly – cost. Furthermore, the three CFS at the top of the ranking outweigh significantly the remaining six factors.

In a similar setting W. Li and McQueen (2008) developed a country level framework that comprises four categories – customer-related barriers, company-related barriers, technological barriers, and business environmental barriers to mCommerce adoption The framework is validated by investigating a group of experts' perceptions. The findings indicate that barriers related to investment, collaboration and cooperation decisions that are made by supply side stakeholders (e.g., merchants, MNOs, banks) may have a "larger influence" on mCommerce adoption compared to other factors.

In the study by Akesson (2007) service supplier perceptions about mobile media provision were explored with reference to a four-dimensional mCommerce value proposition framework proposed in an earlier work (its four value drivers are ubiquity, localization, personalization, convenience). The findings extend the framework by adding a fifth dimension (socialization). A further exploration of the perceptions of the potential service customers shows that localization, personalization, socialization, and convenience affect positively the acceptance of mobile media as a service; service ubiquity is perceived not as a value driver but as a service prerequisite as it is an essential MDS characteristic.

Examining the findings of these studies it can be seen that in all eight of them, perceptions about customer needs and behaviour, and perceptions about the context in which the service is offered influence participants' decisions about investment in service development. In addition, the findings also show that customer and service provider opinions and views about the importance and role of some of the adoption factors investigated may differ.

A comparative study, Abu-El Samen, Akroush, and Abu-Lai's (2013) work explores the perceptions of customers (mobile phone subscribers), and managers employed at the country's local MNOs; the comparison framework represents a modified version of the original SERVQUAL framework (Parasuraman, Zeithaml, & Berry, 1988). Although the study is concerned with communication services and is therefore, outside the scope of this thesis it is included here because of its interesting insights into how different the views of the two participant groups are. For example, customers value both service reliability and service outcome tangibility which are two of the three important aspects of service quality from a customer perspective; on the other hand, managers do not differentiate between them and perceive them as just one of the three important aspects of service quality (managerial perspective). Similarly, managers believe that responsiveness-assurance, and empathy are the other defining aspects of service quality while customers do not consider them important. The lack of alignment indicates that investment and operational decisions made by MNOs may be misinformed.

The next two articles consider a specific stakeholder group – application developers. Four current trends related to mobile application development are identified. These include portal centralization (i.e., a limited number of app stores), technology openness, device variety, and development platform integration (Holzer & Ondrus, 2011). For application developers, benefits include easier access to customers and lower distribution cost as a result of portal centralization, lower development cost and more job opportunities due to technology openness, more technical features (due to device variety), and easier development process (due to platform integration). The benefits seemingly outweigh the drawbacks (less freedom due to portal centralization, and higher customization cost because of device variety).

In the second study, the authors adapted variables form models used in customer adoption studies (Ryu et al., 2014). They modelled application developer satisfaction with the mobile application development platform as a predictor of developer loyalty to the platform, and also of developer credibility. Platform convenience, and perceived market opportunity and compatibility (modelled on PEU, and PU respectively), perceived platform SDK (software development kit) quality, and platform provider fairness are the factors that influence satisfaction and credibility. The empirically validated relationships contribute to the understanding of the mobile platform market and its need, in particular, the need for regulation in terms of compatibility, interoperability, and interconnectivity.

Finally, the brief analysis of the current MNO sector in (Holzer & Ondrus, 2009) provides a perspective on the changing role of MNOs. The authors highlight the increased competiveness of the service supply environment including network and financial infrastructure provision, and the rise of a small number of application portal providers who have achieved dominance. They conclude that MNOs have both short- and long-term opportunities to benefit from the increased volume and range of MDS, although they will need to compete with other market entrants.

3.2.2 MDS business models

The literature on MDS business models provides references to customer demand as seen by the businesses involved in MDS development and provision, and to the service supply context. A selection of studies were reviewed, analyzed and summarized applying the same approach as in the preceding subsection (Table 3-2).

Methlie and Pedersen's (2007) framework and their earlier model (Pedersen & Methlie, 2004) suggest that service provider decisions about extrinsic service features (i.e., features that are determined by the context in which the service is offered), and intrinsic service features (i.e., the service features related to the service design, meeting perceived customer needs) influence customer anticipations about future service value, as well as the perceptions about service value the customer forms while and after the service has been used. The framework provides a useful reference model as it contains constructs representing the service supply context (such as revenue sharing models, and service infrastructure), and constructs representing the service provider expectations about customer gratification (i.e., the service value proposition strategy).

The MDS business models and frameworks proposed by Buellingen and Woerter (2002), Haaker, Faber, and Bouwman (2006), de Reuver, Bouwman, and Haaker (2009), J. Johansson et al. (2012), and S. Sharma and Gutiérrez (2010) are supported by empirical findings, while research frameworks for the study of the processes involved in MDS value creation draw exclusively on prior research (Methlie & Pedersen, 2007; Pedersen & Methlie, 2004). The studies focusing specifically on mobile apps based their analyses both on subjective expert opinions such as market entrepreneurs (J. Johansson et al., 2012), or app developers (Bergvall-Kåreborn & Howcroft, 2013), and on objective app use data (G. Lee & Raghu, 2014).

Table 3-2. MDS business models and frameworks

Source and MDS services considered	Customers	MDS supply context	
		Service supply environment	Regulatory environment
(Pedersen & Methlie, 2004); Methlie and Pedersen (2007) (six mobile services considered)	Service attributes and PBI drive perceived and anticipated value; Mobile specificity (drives service value proposition)	Revenue model, governance form, service strategy. Revenue sharing, service infrastructure	
Buellingen and Woerter (2002) (general)	Data/IT security: Personalization; User-friendliness (mobile service use success factors)	Transmission rates (service use success factor).	
Haaker et al. (2006) (six services); de Reuver, Bouwman, and Haaker (2009) (general)	Expected customer value (underpins the business viability model): acceptable quality of service delivery, customer target group, value proposition)	Expected network value (underpins the business viability model): sustainable network strategy, acceptable division of roles and acceptable risks (the last two influence acceptable profitability).,	
S. Sharma and Gutiérrez (2010) (mobile data access service considered)	Value proposition and user centricity; Responsiveness to market trends	Interface; ROI arrangements, organizsing model, responsiveness to business model dynamicity collaborations and partnerships.	
J. Johansson et al. (2012) (a mobile app considered)	Value proposition, target market	Value chain, value network, pace of change (technology and industry characteristics).	Regulatory constraints
Bergvall-Kåreborn and Howcroft (2013)	Capturing and creating value for customers	Key actors and stakeholders (power imbalance).	Embeddedness
G. Lee and Raghu (2014) (300 apps)	Seller-level and app-level decisions	Ranking of apps (top charts)	

Four specific success factors that serve as prerequisites to the MDS viability are identified (Buellingen & Woerter, 2002). Two of them relate to perceptions about customer requirements (data/IT security, personalization), while the other two relate to the MDS supply context (transmission rates and user-friendliness).

Haaker et al.'s more in-depth service viability framework (2006); it posits that service viability can be achieved by balancing the expected customer value and the expected network value. Development and investment decisions related to the expected customer value are grounded in perceptions about customers (acceptable quality of service delivery, customer target group, value proposition), while decisions about expected network value reflect assumptions and projections about the MDS supply context

(acceptable profitability, sustainable network strategy, acceptable division of roles, acceptable risks).

In a related later work, acceptable role division (including partner selection, orchestration of activities and collaboration management), and acceptable risks (including pricing, and the division of investments, costs and revenues between partners) are identified as the two important success factors driving acceptable business profitability (de Reuver et al., 2009). The authors predict that "…in the near future, clashes between different visions about how roles are to be divided among actors will become more relevant, mainly due to new technological developments in the mobile web services domain…" (p. 12). Similarly, business decision evaluation criteria that are based on assumptions about customers refer to value proposition, user centricity, and responsiveness to market trends (business model dynamicity). Furthermore, evaluation criteria that are based on an assessment of the service supply context include service interface and service organizing model, ROI arrangements, and collaborations and partnerships (S. Sharma & Gutiérrez, 2010).

J. Johansson et al. (2012) propose a framework for designing "simple" business models – for services such as mobile applications available from mobile service platforms (application stores). Such services are developed within a short development cycle in an open innovation context, and often have a short life cycle as well. The model is supported by the findings of a longitudinal case study of the business model of an iPhone application and includes the findings of the analysis of data collected through interviews with mobile service entrepreneurs. The framework includes two new key mechanisms (contingency aspects and core resources) that interact with the traditional characteristics of the business model (value proposition, target customers, value chain/network, revenue/cost/profit). More specifically the contingency aspects (pace of change of technology and service industry, and regulatory constraints) highlight the dynamicity of the service supply environment and influence decisions about how to respond to change by involving appropriate core resources.

Bergvall-Kåreborn and Howcroft (2013) present an in depth analysis of the Apple Inc. business model that highlights the controlling role of Apple in app development and distribution. While the Apple digital development platform provides opportunities to enhance the consumer value of their apps, Apple as its owner keeps a "tight grip" on the network of actors involved in the app development and distribution industry (e.g., app

developers who act as sellers, and customers-buyers), and effectively blocks smaller developer firms who may aspire to gain entry. Furthermore, the centralized control exercised by Apple may disadvantage customers even further as in the current competitive and saturated market financial returns (for developers) are not high; even the successful one are affected negatively by the pressure to generate new mobile products while Apple capitalizes on its ability to "crowdsource", i.e., to source app development to a worldwide network of software developers while avoiding the risks associated with in-house development.

Finally, G. Lee and Raghu (2014) analyze app survival and success using sales performance data gathered from the Apple platform – maintained app charts. They show that developer app portfolios that diversify across the Apple platform selling categories are considerably more likely to achieve high sales performance. In addition, other app-level service features such as maintaining an ongoing feature and price updates may increase customer demand and the apps longevity.

3.2.3 Perceived value, perceived quality, and satisfaction

As perceived service value, quality, and satisfaction may have an impact on customer adoption and use decisions (Cronin et al., 2000) a number of the studies in the reviewed literature include these constructs in their respective research models and investigate their relationship to both pre- and post-adoption customer intentions and behaviour (Table 3-3).

Perceived value is based on perceptions about intrinsic service features. Decomposed as conditional, convenience, monetary, emotional, and social, perceived value is found to be a strong predictor of customer loyalty (i.e., a strong commitment to continue MDS use) (Pura, 2005). Ervasti (2013) provides a detailed taxonomy of perceived value dimensions, distinguishing between service values (e.g., service functionality, that includes service quality and performance, and localization), and customer values (e.g., hedonic, social). Furthermore, generalized perceived service value dimensions – utilitarian (functional), hedonic and social value, are identified as antecedents of intention to use MDS in (B. Kim & Han, 2009). They are explored further as potentially influencing the firm's customer segmentation strategies (W.-P. Kuo et al., 2011), and in terms of the relationships between hedonic and utilitarian value, service use context, and intention to use, in (S. Yang, Lu, Gupta, & Cao, 2012).

Table 3-3. Service value, quality and satisfaction

Source/MDS services	Customers	Service supply environment
Perceived service value		
Pura (2005) (LBS)	Perceived conditional, convenience, emotional, social value	Perceived monetary value
Ervasti (2013) (general)	Customer values (social, hedonic, stimulation and self-actualization)	Service values (functional, localization, personalization)
B. Kim and Han (2009) (general)	Perceived utilitarian and hedonic value	Perceived utilitarian value
(W.-P. Kuo et al., 2011)(information and entertainment services)	Functional, social, and hedonic value	Functional value
S. Yang, Lu, Gupta, and Cao (2012) (general)	Perceived hedonic and utilitarian value	Perceived utilitarian value
(Hong et al., 2008) (general)		Perceived monetary value
H.-W. Kim et al. (2007) (general)	Perceived value (usefulness, enjoyment)	Perceived value (technicality, fee)
Turel et al. (2010) (ringtone download service)		Value for money
Perceived service quality (also in relation to perceived service value)		
Vlachos et al. (2011) (general)	e-Quality of mobile services	e-Quality of mobile services
(E. Y. Huang et al., 2015)(general)	Perceived value	Mobile service quality (M-S-QUAL)
S. Lee, Shin, and Lee (2009) (general)		System quality Information quality
B. Kim and Han (2011) (general)	Perceived hedonic and utilitarian value	Information quality and system quality; Perceived utilitarian value
D. J. Kim and Hwang (2012)	Mobile value tendencies (utilitarian or hedonic)	Information quality, design quality and connection quality; Utilitarian mobile value tendencies
H. Kim et al. (2008) (general)	Perceived value	System quality
Y. M. Shin et al. (2010) (general)		Access quality
Satisfaction (in relation to perceived service quality and also to perceived service value)		
S. Cho and Sung (2007); J. Choi et al. (2008); (K. C. Lee & Chung, 2009) (general)	Satisfaction	Service quality, information quality, interface design quality
Y. H. Kim et al. (2013) (general); H.-H. Lin and Wang (2006) (17 mCommerce categories)	Perceived value Satisfaction	
Hong et al. (2006) (MI as an mCommerce channel); B. Kim (2010) (general)	Satisfaction	Service performance
(Kumar & Lim, 2008);(Lim & Kumar, 2008)	Emotional value Satisfaction	Economic value Service quality
Y.-F. Kuo et al. (2009) (general)	Service value Satisfaction	Service quality
(J. Park et al., 2011) (general)	Hedonic and utilitarian value Satisfaction	Utilitarian value

Perceived monetary value also influences customer intention to continue MDS use (Hong et al., 2008). Furthermore, service value drivers may be specific to the type of service. Service usefulness, fee, enjoyment, and technicality determine perceived value as an influence on the intention to use MI as an mCommerce channel (H.-W. Kim et al.) while service appeal, playfulness, and value for money drive customer decisions about future mobile ringtone purchase as shown in Turel et al.'s (2010) study.

Vlachos et al. (2011) found that in the case of mobile services, perceived service quality is a second-order factor, based on perceptions about service efficiency (i.e., ease of use and usefulness), service outcomes (i.e., functional and emotional benefits), and customer care (i.e., personalization and privacy protection). A measurement scale for mobile service quality predicting perceived value and loyalty intentions (MS-QUAL) was developed and validated (E. Y. Huang et al., 2015). The MS-QUAL measurement scale is based on the well-known measurement scale for electronic service quality ES-QUAL (Parasuraman, Zeithaml, & Malhotra, 2005).

Perceived service quality is measured mostly by perceptions about service performance at the time of using the service thus reflecting the quality of the service provision (e.g., network performance). Therefore service quality is referred to as a supplier-side variable ; conversely, demand-side variables capture personal customer attributes (S. Lee et al., 2009). This study considers information quality and system quality as predictors of changes in post-adoption use. Information quality represents intrinsic service characteristics as it relates to the service content (relevance, timeliness, reliability, and scope) and is therefore, an indicator of the service developer's perceptions about customer needs. System quality represents extrinsic characteristics of the context in which the service is offered (access, usability, and navigation) and reflects service developer and provider's understanding of the service supply context.

Information quality and system quality as predictors of utilitarian and hedonic value respectively are used in the study of adoption intentions by B. Kim and Han (2011). Somewhat similarly, service quality is considered along the dimensions of information quality, design quality, and connection quality, in relation to the customer's mobile value tendencies (utilitarian or hedonic) (D. J. Kim & Hwang, 2012). Both system quality (as antecedent of perceived value), and perceived value (as a predictor of intention to use) are included in the research model for studying post-adoption customer

behaviour model proposed by H. Kim et al. (2008). A more specific construct, namely, access quality, is considered as an antecedent of perceived usefulness and hence of intention to use (Y. M. Shin et al., 2010).

Finally, the attitude towards a service formed as a result of customer experiences while using the service may be included in research models as a "satisfaction" construct. Ultimately satisfaction draws on perceptions about quality (S. Cho & Sung, 2007; J. Choi et al., 2008; K. C. Lee & Chung, 2009) and value (Y. H. Kim et al., 2013; H.-H. Lin & Wang, 2006) and is therefore, considered in studies that investigate intentions to continued service use. For example, Hong et al. (2006) and later B. Kim (2010) validate empirically the influence of satisfaction (based on confirmed expectations about the service performance) on customer intention to continue MDS use. Satisfaction as a factor in post-use and loyalty decisions is linked to perceived value and (directly or indirectly) to perceived service quality in several studies (Kumar & Lim, 2008; Y.-F. Kuo et al., 2009; Lim & Kumar, 2008; J. Park et al., 2011).

As seen in the summary provided in Table 3-3, most of the work on the role of perceived value in the processes related to initial adoption and use of MDS investigates both the role of customer attitudes and beliefs, and factors related to the service value proposition. Studies that include perceived quality as a construct tend to include variables representing service content and service delivery characteristics, thus linking explicitly customers to the service supply environment (as service content and delivery characteristics are the result of the collaboration and cooperation of the service supply stakeholders). Satisfaction is considered in the context of continued service use/ intention to continue/loyalty, and is derived from perceptions about service quality/performance, service value, or both.

3.3 Research Constructs Related to MDS Provider and Customer Interactions

To facilitate further investigation, the research construct emerging from the discussion above that captures MDS service provider perceptions about customers and the relevant MDS context can be included in the interaction process model in Figure 3-2 as a variable capturing MDS provider decisions. Similarly, research constructs developed and validated in prior research (Chapter 2) can be used to represent customer decisions (Figure 3-3).

More specifically interactions 1, 2 and 3 (“MDS provider considers offering a new MDS”, “MDS provider offers a new MDS”, and “MDS provider continues to provide an MDS”, respectively) suggest that MDS service provider decisions are based on their knowledge and understanding of the customer market as part of the ecosystem within which a service is offered (i.e., within the context of the relevant service supply and regulatory environments).

In other words, the model presented in Figure 3-3 assumes that MDS provider anticipations and perceptions about customer demand influence MDS provider decisions related to offering and promoting a new service. This implies that MDS provider perceptions about customer needs, expectations, requirements and behavioural patterns determine the service characteristics, and its pricing. Furthermore, service provider decisions are influenced by service provider understanding of the specific service supply context (i.e., the service supply chain interactions and the relevant regulatory environment).

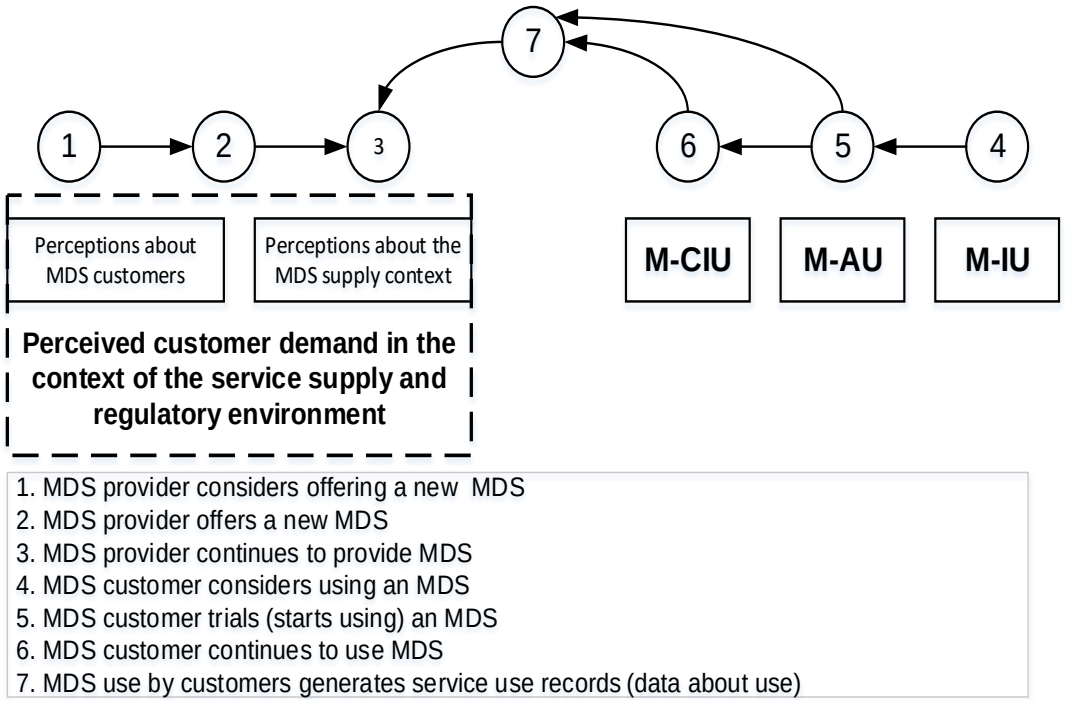

Figure 3-3. A model representing MDS customer and MDS provider decisions

Ultimately these factors determine the service value proposition, both in the case of investing in the development and launching a new service, and in the case of considering the viability of an existing service and making decisions about its future. Additional input into decisions concerning ongoing service provision are supported by independently gathered objective service use data (e.g., number of new customers), and

customer feedback data such as service reviews (D. Kang & Park, 2014). This last factor is represented by interaction 7 – "MDS use by customers generates service use records – data about use".

The definitions of the constructs related to customer decisions about service use draw from the literature on customer adoption and use of MDS reviewed in Chapter 2, and link the model to the extant research in the area. More specifically M-IU (mobile intention to use) represent interaction 4 ("MDS customer considers using an MDS") is defined as the customer's likelihood to engage in an online transaction using an MDS (following J.-H. Wu & Wang, 2005). In the literature reviewed intention to use mobile services and its antecedents are studied with regards to the implications for service development (Nysveen et al., 2005); it is also considered as one of the predictors of MDS actual use by customers (Carlsson et al., 2006).

The interaction that corresponds to actual customer use in the model in Figure 3-3 is interaction 5 ("MDS customer trials an MDS") is represented by M-AU (mobile actual use). M-AU is defined as the (self-reported) frequency of using MDS in a given period of time following (J.-H. Wu & Wang, 2005); in the literature reviewed actual service use is the ultimate dependent variable that represents user behaviour. Predictions about actual service use by customers and insights into the factors that influence decisions about actual use may influence service provider decisions related to launching and offering a service in the market (Pedersen, 2005). However, Bouwman et al. (2007) show that actual service use may be a predictor of customer intention to continue use.

A variable labelled M-CIU (mobile continued intention to use) represents interaction ("MDS customer continues to use MDS"). M-CIU is defined as the self-reported intention to continue to use MDS in the future (Bouwman et al., 2009; B. Kim, 2010; Thong et al., 2006). The emphasis on continued MDS use in more recent studies relates to its potential impact on service viability and business profitability (Hong et al., 2008; S. Sharma & Gutiérrez, 2010).

Finally, any type of actual use normally generates data that can be stored and analyzed in order to investigate use patterns (Interaction 7). An example where MI usage is monitored, and data are gathered and explored in order to identify customer service preferences is provided in the longitudinal study by I. Lee et al. (2005).

3.4 A Conceptual Model for the Study of Perceived Customer Demand

This section proposes a conceptual model for the study of perceived customer demand (Figure 3-4). The model components represent perceptions about customer needs and requirements (customer lifestyle requirements and customer expectations about the service quality), perceptions about the service and the regulatory environment, and perceptions about the role of the defining characteristics of MDS – support for customer mobility (mobility value).

3.4.1 Perceived customer needs and expectations

Perceived customer demand captures service provider views that underpin the service value proposition. In general MDS adoption and use may be influenced by gender, age, socio-economic status (e.g., Karjaluoto, Riquelme, & Rios, 2010; O'Doherty et al., 2010; Y. S. Wang et al., 2009) which define the population segment envisaged as a potential MDS customer base. Furthermore, the perceived requirements and expectations of the targeted customers influence provider decisions about intrinsic service features such as service design (Methlie & Pedersen, 2007). According to Pedersen (2001) the MDS customer engages with a service both as a service consumer, and as a technology user. The perceived requirements and expectations of the MDS customer are considered next from the perspective of these two roles.

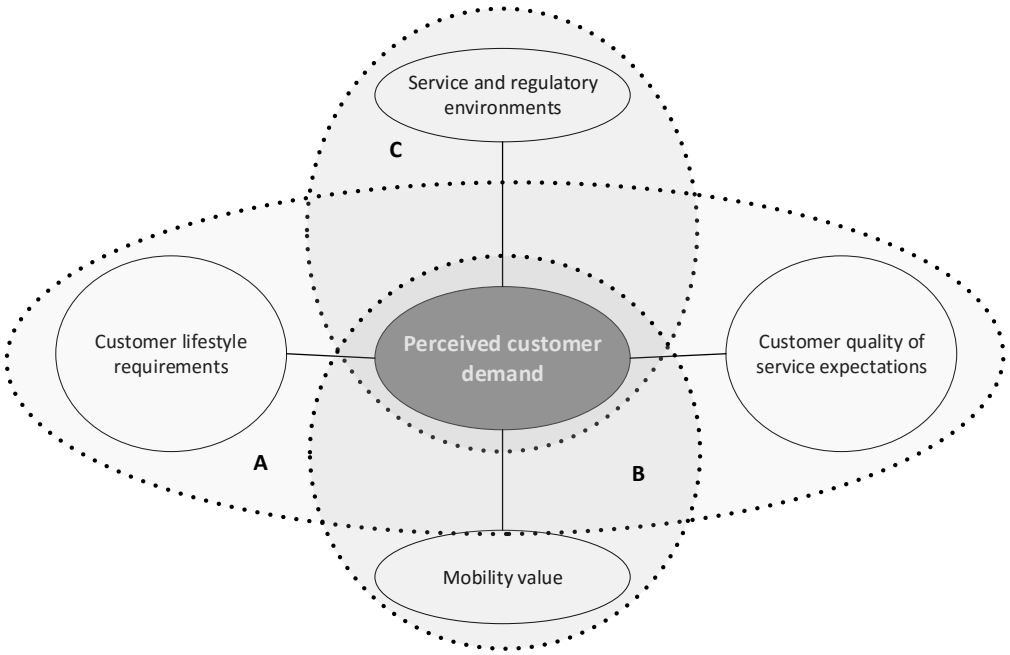

Figure 3-4. Conceptual model for the study of perceived customer demand

Customer lifestyle requirements (of the MDS customer as a service consumer) refer to "lifestyle" which is understood as an intervening system of cognitive structures that link situation-specific product perceptions to personal values (Brunsø, Scholderer, & Grunert, 2004). Thus customer lifestyle requirements are related to the overall assessment of the value-adding potential of the service and depend on personal beliefs and attitudes. For example, a service designed to help the elderly will not be accepted by the target customer segment unless it is perceived as needed (Mikkonen, Väyrynen, Ikonen, & Heikkilä, 2002).

In the reviewed literature lifestyle requirements are studied through the construct of perceived service value (e.g., Hong et al., 2008; B. Kim & Han, 2009; H.-W. Kim et al., 2007; Kleijnen et al., 2007; Pura, 2005) and its antecedents. Other constructs include: perceived enjoyment (e.g., B. Kim & Han, 2009; S. Rao & Troshani, 2007),

- Self-efficacy (Y. S. Wang et al., 2006),
- Personal innovativeness (Y.-F. Kuo & Yen, 2009; J. Lu et al., 2005; K. C. C. Yang, 2005) and service awareness (O'Doherty et al., 2010),
- Perceived service convenience (Varnali & Toker, 2010) and perceived service usefulness (e.g., Nysveen & Pedersen, 2003; Y. S. Wang et al., 2006),
- Perceived service content personalization (Ho & Kwok, 2003), content richness and functionality (Haaker et al., 2006; S. Lee et al., 2009; López-Nicolás et al., 2008; S. Rao & Troshani, 2007),
- Perceived cost (H.-W. Kim et al., 2007; H. Kim et al., 2008), perceived privacy (Barkhuus & Dey, 2003; Burghardt, Buchmann, Müller, & Böhm, 2009),
- Perceived trust (Chandra et al., 2010; G. Kim et al., 2009), perceived compatibility with the customer's daily routine (Bell et al., 2006; Frank, Bolliger, Mattern, & Kellerer, 2008; H. Kim et al., 2008; Palen et al., 2001), and
- Perceived service affordability including the cost of access to the data network (Y.-F. Kuo & Yen, 2009; Y. S. Wang et al., 2006).

Quality of service expectations (of the MDS customer as a mobile technology user) relates to perceptions about overall service performance as a function of its architecture and the performance of the connecting mobile technology infrastructure. In the reviewed literature quality of service expectations are studied through constructs such as service quality (H. Kim et al., 2008; S. Lee et al., 2009; H.-H. Lin & Wang, 2006; Y. Liu, S. Han, et al., 2010) and its antecedents, and satisfaction, confirmation and their antecedents (Thong et al., 2006). Relevant factors are:

- Connectivity (B. Kim, 2010; Z. Liu, Min, & Ji, 2010) and service performance (Zhou et al., 2010),
- Ease of use including the perceived ease of learning how to use a service (e.g., Pagani, 2004; J.-H. Wu & Wang, 2005),
- Complexity (Kleijnen et al., 2007),
- Service design aesthetics (Cyr et al., 2006), and
- Service appeal (Turel et al., 2010).

3.4.2 Service supply and regulatory environment

Service provider views about the service industry environment are especially important as the success of new MDS depends strongly on service supply stakeholder partnership and collaboration (Dell'Era, Frattini, & Ghezzi, 2013). Service provider views about the MDS supply context affect decisions about extrinsic service features (i.e., how the service is built, deployed and offered) (Methlie & Pedersen, 2007). Variables and constructs relevant to the service supply environment that have been used in MDS adoption/business model studies include:

- MDS interface design (Y. E. Lee & Benbasat, 2003),
- Facilitating conditions (Okazaki, 2005a; Zhou et al., 2010),
- Customer situation or use context (I. Lee et al., 2005; Mallat et al., 2008; Pura, 2005), network performance (S. Lee et al., 2009) including device and protocol interoperability (Cucurull, Martí, Navarro-Arribas, Robles, & Borrell, 2009),
- Bandwidth availability (Bouwman et al., 2007; I. Lee et al., 2007; M. S. Y. Lee et al., 2003; Pagani, 2004),
- Device features and functions (Carlsson et al., 2006; Constantiou et al., 2007; Kane, Jayant, Wobbrock, & Ladner, 2009; Mallat et al., 2008),
- Connectivity (Basole, 2004; H.-W. Kim et al., 2007; B. Rao & Minakakis, 2003), transmission rates (Buellingen & Woerter, 2002),
- Service availability across different mobile subscriber networks (Lyytinen & Yoo, 2002),
- Seamless handover when the customer is mobile (Lyytinen & Yoo, 2002; Q. Z. Sheng, Benatallah, & Maamar, 2008),
- Trust branding and loyalty (e.g., Cyr et al., 2006; G. Kim et al., 2009; H.-H. Lin & Wang, 2006; Okazaki, 2005a; Pura, 2005),
- Service provider image (Mallat & Tuunainen, 2008) and credibility (Y. S. Wang et al., 2006), and

- Revenue sharing models and ROI arrangements (Mallat et al., 2008; S. Sharma & Gutiérrez, 2010).

Service provider views about the service industry environment are especially important as the success of new MDS depends strongly on service supply stakeholder partnership and collaboration (Dell'Era et al., 2013).

One of the concerns highlighted in the literature refers to the need for standardization (mPayment) (Mallat et al., 2008). Other relevant constructs (from the literature on MDS customer adoption) are privacy – the service provider needs to comply with customer privacy protection laws when the service requires access to personal data and customer permission to use them (Scornavacca & McKenzie, 2007), and cost of access to the data carrier network (Y.-F. Kuo & Yen, 2009; Y. S. Wang et al., 2006); lack of regulatory control affects service price and affordability (Okazaki, 2005a). Au and Kauffman (2007) point out that the regulatory environment affects decisions made by stakeholders (including customers) in the mPayment market as it regulates the terms and conditions for participation in the mPayment ecosystem– for example, financial incentives for merchants, and transaction security guarantees for customers.

The importance of the issues related to the regulatory environment are emphasized by Dahlberg et al. (2008) and also by Jenkins (2008). The role of the regulatory environment as a general enabling environment for the adoption of mobile technologies in developing countries is highlighted by Donner (2008). Examples include services such as mBanking (Porteous, 2006), and mHealth (Kaplan, 2006).

3.4.3 Mobility value (support for customer mobility)

Ubiquity and convenience are two of the characteristics of mobile technology that give mCommerce a competitive advantage over traditional eCommerce (Clarke III, 2001). These specific capabilities (termed "mobile specificity" in Methlie & Pedersen, 2007) make it possible to create "wireless value" value (i.e., value brought by the convenient and efficient use of the technology - Anckar & D'Incau, 2002). The use of personal mobile devices enables the provision of unique mCommerce services that both can meet current customer mobility-related needs and can enhance customers' everyday life routines (Carlsson & Walden, 2008). MDS are location and time independent and are able to adapt in order to accommodate changes in service use context, such as specific needs related to the customer's situation (Mallat et al., 2008; McKenna et al., 2011; Samtani et al., 2003). Therefore, the three main dimensions of mobility value can be

described as: (i) inherent mobility (within parameters determined by the mobile technology and the mobile connection); (ii) personalization (the service provider's ability to deliver context-sensitive service content, for example, location-aware services, or time-critical services); (iii) customer's situation significance (mobile services are integrated with customer lifestyle as they are used in the context of routine everyday activities).

In the reviewed literature mobility related value has been studied both through general and specific concepts (Dholakia & Dholakia, 2004; Varnali & Toker, 2010). These include ubiquity (Akesson, 2007; Hong & Tam, 2006; Mallat et al., 2008; Pedersen, 2005), service customization according to the customer's location (B. Rao & Minakakis, 2003; S. Rao & Troshani, 2007), increased reachability (C. Kim et al., 2010), instant connectivity (H. Kim et al., 2008), and timeliness (e.g., Y. M. Shin et al., 2010).

3.4.4 Model significance

It is posited that perceived customer demand reflects MDS service provider perceptions about customer adoption behaviour, and service provider views about the context in which the service value proposition is made. Both practice and research provide evidence that the service value proposition may not be always aligned with customer perceptions about service value (Akesson, 2007; Ondrus, Lyytinen, & Pigneur, 2009). Furthermore, the different service supply stakeholders cooperatively involved in MDS design and provision may operate within their own (different) sets of assumptions about perceived customer needs and requirements including the benefits of mobility support, and service viability.

Given the suggested link between stakeholder decisions and stakeholder perceptions about customer demand it may be expected that a higher level of alignment of service supply stakeholder expectations and customer expectations, as well as a higher level of alignment of the views of the cooperating stakeholders, may lead to offering services that are more likely to be adopted and are potentially viable. Therefore, insights from empirical investigations of perceived customer demand as conceptualized above may contribute to a better understanding of the MDS value creation process.

3.5 Research Framework

The main research question was formulated in Chapter 1 as "What are the views of mobile industry stakeholders about customer demand for MDS?" Drawing on the conceptualization of perceived customer demand in Figure 3-4, a three-pronged research framework for the investigation of perceived customer demand for MDS is proposed (Figure 3-5). It shows the three perspectives of the enquiry (customer expectations and requirements, mobility related service value, and supply and regulatory environments), each aligned with a specific research question.

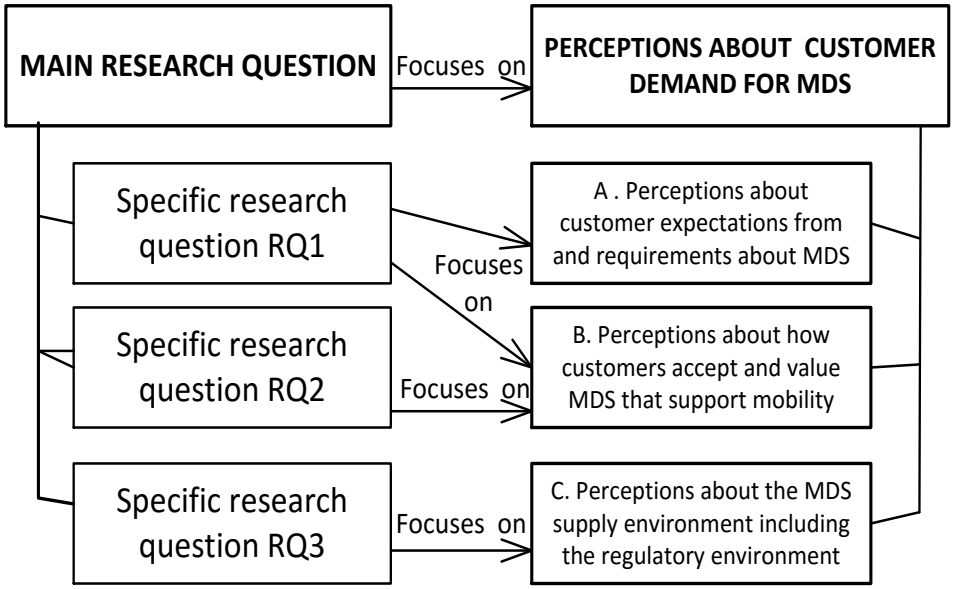

Figure 3-5. Research framework

Perceived customer demand signifies supply stakeholder knowledge and understanding of both existing and potential customers (namely, their quality of service expectations, and lifestyle related requirements). In other words, perceived customer demand reflects the supply stakeholder perspective on what customers need, want, expect, and get from MDS. The first specific question explores stakeholder perceptions about customers:

RQ1. What are mobile industry stakeholder views about customer expectations, requirements, and attitude drivers?

As the name implies and following from the MDS definition provided in Chapter 1, the use of mobile technology is the identifying characteristic of MDS. The 24/7 data network access, the ubiquitousness of the mobile device and the ability to recognize the customer's geographical location is especially conducive to developing services

supporting customer mobility. The second specific question (RQ2) puts an explicit emphasis on the value provided by such services:

RQ2. What are mobile industry stakeholder views about the value of customer mobility support features of MDS?

Finally, it was shown earlier that in the case of MDS added value is created as a result of multiple interactions across a complex supply chain and it may also depend on the specific regulatory and legislative regime, i.e., that MDS suppliers operate as part of a service ecosystem. The third specific research question (RQ3) explores stakeholder perceptions about the context in which MDS supply occurs:

RQ3. What are mobile industry stakeholder views about the mobile service supply and regulatory environments?

3.6 Summary of Chapter 3

The models proposed in this chapter relate the research topic and aim to the relevant literature, and provide a theoretical foundation for the empirical investigation that follows. The chapter conceptualizes perceived customer demand, decomposes the main research question into three specific research questions, and develops a research framework. The next chapter develops and presents the methodology of the empirical investigation.

CHAPTER 4. EMPIRICAL INVESTIGATION: DESIGN AND METHODS

As stated in Chapter 1 the research sets out to investigate mobile industry stakeholder perceptions about customer demand for MDS in the context of the MDS market environment. Its main research question is "What are the views of mobile industry stakeholders about customer demand for MDS?". To address the main research question two objectives are set – to develop a conceptual model and a research framework that considers the relationship between perceived customer demand and MDS adoption and use, and to investigate empirically MDS supplier perceptions applying the research framework. This chapter contributes to the second study objective by developing the empirical study methodology.

The research framework developed and discussed in Chapter 3 unpacks the main research question into three specific research questions:

RQ1. What are mobile industry stakeholder views about customer expectations, requirements, and attitude drivers?

RQ2. What are mobile industry stakeholder views about the value of customer mobility support features of MDS?

RQ3. What are mobile industry stakeholder views about the mobile service supply and regulatory environments?

A methodology for the empirical investigation guided by the three specific research questions is developed and presented in this chapter. The chapter describes the research design of the study, and elaborates on the methodological approaches used. It presents and justifies the research strategy and method, describes the data collection and data analysis approaches, and discusses research quality including the dimensions of research trustworthiness and practice, and formative and summative validity. The position of this chapter in the overall research process is shown in Figure 4-1.

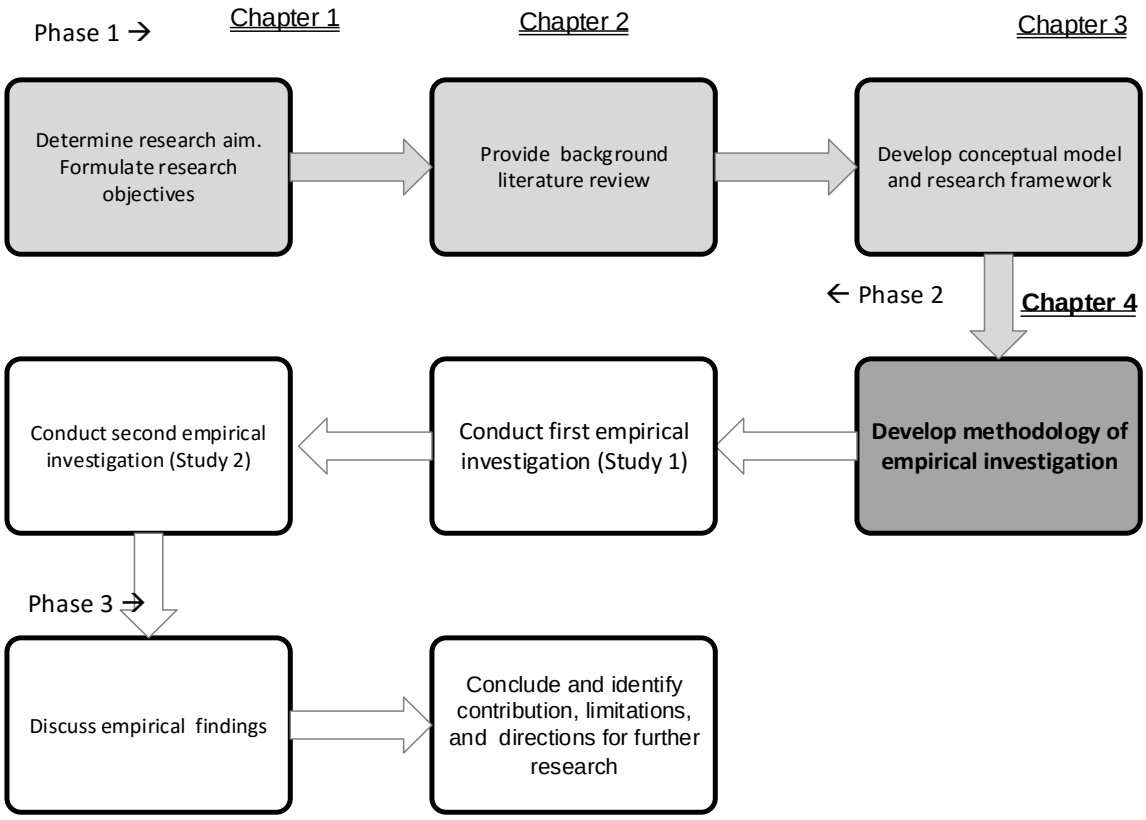

Figure 4-1. Research process path (Chapter 4)

4.1 Research Approach

It is common to distinguish between positivistic and phenomenological research as the two main research orientations in the disciplines of social science, and in business research (see, for example, Bryman & Bell, 2007, p. 28; Collis & Hussey, 2003, pp. 42-54; Patton, 2002, pp. 13-14; Schutt, 2009, p. 16). The first approach generally seeks to identify the causes of a phenomenon and while quantitative research methods are normally used a positivist research may also involve qualitative data analysis. As the name implies the second approach is concerned with understanding a phenomenon from the frame of reference of the research participants and is generally associated with applying qualitative research methods; thus the terms qualitative research and phenomenological research are often used interchangeably.

A qualitative approach normally involves a less structured research design and therefore, it may be better suited to studying phenomena in dynamic situations (Johnson & Christensen, 2012, p. 378) where due to internal or external changes the data may reveal unexpected but relevant findings. A qualitative approach is also appropriate for studies that are exploratory in nature and focus on participant perspectives in order to develop an understanding of the issue under investigation (Creswell, 2007, pp. 38-40).

In this study a qualitative approach is chosen as the study matches the essential characteristics of qualitative research as identified for example, by Collis and Hussey (2003, p. 55); it aims to achieve an understanding of a phenomenon (how mobile industry stakeholders perceive customer demand) from the view point of the research participants, or following a "from the ground up" (Creswell, 2007, p. 19) logic; it does not test an existing theory, rather it captures "what people say…as a product of how they perceive the complexity of their world" (Burns, 2000, p. 11). The data gathered are subjective and the sample is relatively small; the study findings emerge through a process of interpretation.

Creswell (2007) points out that a qualitative study needs to identify at the onset its underlying philosophical assumptions as these guide the research design and process including its epistemology, ontology and research procedures (p. 16). From an epistemological perspective the research presented is broadly interpretivist (Myers, 2009, p. 40) as data and their meanings inform the theory generated. The theory provides a better understanding of emergent meanings. Myers notes that generalization (in interpretivist research) depends on the researcher and the research method. The researcher's approach to generalization in this study is aligned with the notion of empirical generalization as discussed by Bryman and Bell (2007, p. 14). The study develops a systematic explanation of the findings (Weitzman, 2000) that lead to theoretical implications that add an MDS supply lens to the study of MDS customer adoption and use.

From a social ontology perspective, the research applies a constructionist approach, as discussed in (Bryman & Bell, 2007, pp. 22-26; Patton, 2002, pp. 96-103). Constructionism "asserts that social phenomena and their meanings are …accomplished by social actors" (Bryman & Bell, 2007, p. 23). Constructionism is concerned with "constructing knowledge about reality" according to Shadish (1995), as cited in Patton (2002, p. 96) while Crotty (1998) adds that knowledge construction is based on the "collective generation and transmitting of meaning" (as cited in Patton, 2002, p. 97). In this study knowledge about the phenomenon under investigation is built through interpreting and analyzing the collection of mobile industry stakeholder perceptions who are the study participants or "actors", to use Bryman and Bell's term.

Finally, the research methodology includes both a deductive and inductive approaches to data coding and interpretation and follows a highly iterative process gradually

developing an “increasingly detailed” (Creswell, 2007, p. 19) knowledge about the phenomenon. An overview of the research design based on Myers’ (2009, p. 23) generic representation of a qualitative research project design is shown in Figure 4-2. It is discussed in more detail further in the chapter.

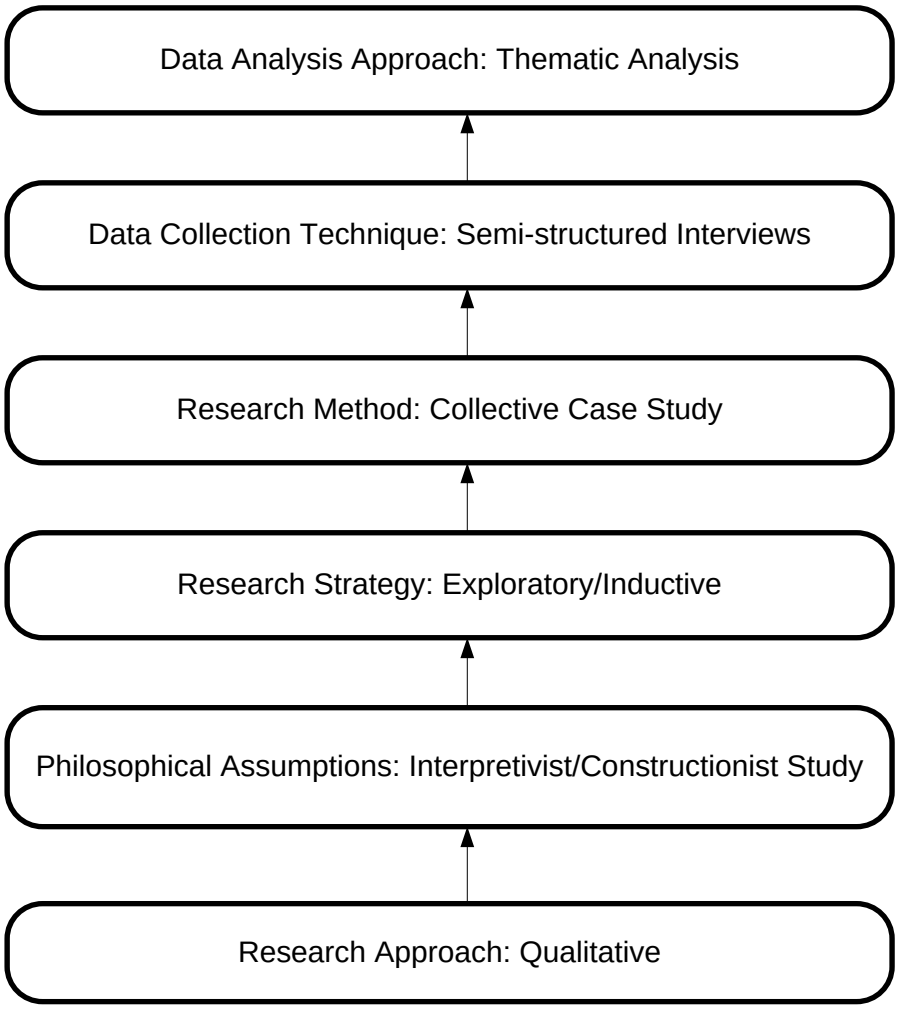

Figure 4-2. Research design (empirical investigation). Adapted from “Qualitative Research in Business & Management”, by Myers (2009, p. 23)

4.1.1 Research strategy

As the study explores stakeholder views and opinions in order to identify the characteristics of customer demand from a stakeholder perspective it can be classified as an exploratory one according to Schutt’s (2009, p. 14) classification. Schutt adds further that “exploratory research is by nature inductive” (p. 47). Thomas (2006) describes inductive research as “a systematic procedure for analyzing qualitative data in which the analysis is likely to be guided by specific evaluation objectives” and identities three main purposes underlying the inductive approach: (i) to condense and summarize the raw data, (ii) to establish “transparent” and “defensible” links between objectives and findings, and (iii) to “develop a model or theory about the underlying structure…evident

in the text data" (p. 238). Furthermore, an appropriate overall approach for an exploratory study is the inductive strategy outlined in (Bryman & Bell, 2007, p. 7). While the investigation is guided by specific research questions formulated (deduced) as a result of the analysis of previous research, the themes emerging from the findings after a process of analysis and reduction are further interpreted in order to address the main research question and the objectives to the study.

Following the above, an inductive research strategy was adopted in the study. First, the "core meanings" (Thomas, 2006, p. 241) that were evident in the data and were justifiably related to the specific research objective were identified and coded; the codes were then organized into categories and later into themes. The data coding followed a predominantly inductive pattern (with an initial deductive coding as explained in Section 4.3).The themes were described and organized into a thematic map that was analyzed to address the specific research questions and seek evidence that may explain further the relationships identified (Eisenhardt, 1989).

4.1.2 Research method

As Bryman and Bell (2007) point out, an inductive research strategy is normally associated with a qualitative research method (p. 14). Ethnography, case study research, grounded theory, and phenomenology are some of the main qualitative research methods of enquiry identified in the literature (e.g., Collis & Hussey, 2003; Creswell, 2007; Johnson & Christensen, 2012; Myers, 2009; Patton, 2002). Creswell and Patton also consider narrative research while Collis and Hussey, and also Myers include action research in the list. To summarize the salient research method characteristics, ethnography and action research include observations or interventions in the field; narrative research provides an account of chronologically connected events or actions while phenomenology is concerned with human experiences connected to a shared phenomenon. In grounded theory a general explanation is generated as a result of systematic data analysis. In case study research the focus is on exploring a particular issue through one or more cases, though new concepts and meanings may also be generated (Bryman & Bell, 2007, pp. 63-64).

The study presented here is exploratory – it first addresses a series of "what" questions and then interprets the findings further in order to explain the phenomenon studied (Tellis, 1997). According to prior research (e.g., Eisenhardt, 1989; Järvinen, 2000; Myers, 2009; Onwuegbuzie & Leech, 2006) case study research is one of the suitable

qualitative research methods for such a study. Case study research can involve multiple organizations, with empirical evidence often gathered from interviews with participants (Myers, 2009, p. 76). Myers also points out when conducted with the purpose of exploring a phenomenon, the research can take an interpretivist form (p. 72).

The study presented here adopted case study as a research method as the empirical data sources were positioned within organizations that belonged to the mobile service industry and/or were part of the mobile service value chain. Representatives of these organizations were interviewed in order to collect data from the sample, and the data were analyzed and interpreted. Furthermore, the study was designed as a collective case study following Stake (2000), as cited in Onwuegbuzie and Leech (2007); a collective case study is a form of multiple case study that involves a number of individual cases. Each case study contributes data to a collection of data that can be analyzed as a whole in order to investigate a phenomenon. The approach allows to identify sub-groups of cases within a sample, to conduct comparisons based on the themes emerging from the data (cross case analysis as described in Creswell, 2007, p. 75), and to produce general findings across the sample "without too much regard for the unique context of the…cases" (Bryman & Bell, 2007, p. 65).

4.2 Data Collection

The research was concerned with the views of the supply chain stakeholders. Therefore, the research participants were selected to represent the main stakeholders in the mCommerce value chain. In order to allow the researcher to report on "multiple perspectives that range over the entire spectrum of perspectives" (Creswell, 2007, p. 122) the identified stakeholders were: mobile business service providers, mobile data service providers, mobile network operators, mobile device and platform providers, mobile application designers, mobile content aggregators. It was needed to build a participant sample able to provide meaningful and relevant information despite the significant number of stakeholder types. Purposive sampling, which is a non-probability sampling technique used widely in qualitative research (Creswell, 2007, p. 125), was considered suitable as it would allow the researcher to select participants whose expertise and background were relevant to the research and who could provide the rich information needed for an in-depth investigation (Patton, 2002, p. 230). In addition, purposive sampling is seen as the most feasible method of sampling when a specific group of subjects are targeted (Al Thunibat, Nor Azan Mat, & Sahari, 2011), despite its potential to limit the generalizability of the findings.

4.2.1 Sampling

Purposive sampling has been used in related research. For example, Loonam and O'Loughlin (2008) explored the service quality of online banking as an electronic service using purposive sampling to include participants based on their expertise (users vs non users); W.-P. Kuo et al. (2011) investigated the effect of mobile service users segmentation on value perceptions in a sample of participants selected on the base of their user behaviour ("monotony" users vs "variety users"). Similarly, S. H. Chang and Pan (2011) who studied mobile multimedia messaging service adoption, and Kim H. Kim et al. (2008) who investigated post-MDS adoption customer behaviour selected only those participants who matched the requirements of their respective research models. Furthermore, a review of the literature showed that purposive sampling had been deployed in related discipline studies where the investigation had aimed to provide a holistic view of factors influencing service technology adoption – such as eCommerce technologies adoption (Kurnia, Alzougool, Saadat, & Alhashmi, 2009).

4.2.1.1 Sampling method

Considering the philosophical assumptions of the study, its approach, strategy and method, and also related prior research work, the study presented here adopted purposive sampling in order to recruit participants matching the definitions of the stakeholder types discussed earlier. Participants were recruited from amongst employees of organizations and/or companies involved in mobile service and/or application design, development and provision (e.g., banks, software houses, learning institutions, mobile network operators /providers). They represented one or more of the stakeholder types introduced in Chapter 1 (refer Figure 1-1). The individual participants were selected to be in positions of knowledge, expertise and ability to provide input to the strategic and operational planning processes within their respective organizations/companies. Typical job positions included managers and design and development project leaders. All potential participants approached were seen as able to give informed answers to questions related to customer demand, the roles of MDS designers and providers, the regulatory environment, and other pertinent topics.

4.2.1.2 Sampling strategy

The study deployed a mixed purposive sampling approach as it implemented two of the specific purposive sampling strategies suggested by Creswell (2007, p. 127), and also discussed in depth by Patton (2002, pp. 230-246): maximum variation (heterogeneity)

sampling and emergent (opportunistic) sampling. A particular strength of maximum variation sampling is that it allows to identify important shared thematic patterns emerging from diversity (Patton, 2002, p. 235) while emergent sampling refers to the flexibility of purposive sampling that allows to enlarge the initially planned sample as an opportunity arises during the research process itself (Patton, 2002, p. 240).

The strategy choice and mix were determined by the nature of the research and by the reality of the research process. Maximum variation purposive sampling was chosen as the participants needed to represent stakeholders across the mobile service supply chain. Also the researcher took the opportunity to extend the research in a country different from her country of residence. While the researcher who normally resides in New Zealand and has access to New Zealand based potential participants she was also able to conduct a data gathering exercise in Bulgaria in 2010-2011 where she travelled to as an invited visiting scholar.

A preliminary examination of the telecommunications infrastructure, mobile phone penetration and mobile service use in both countries showed similarities showed that similar factors were relevant to both countries, and to draw participants from amongst mobile service supply chain representatives first in Bulgaria (Study 1, 2010-2011) and later in New Zealand (Study 2, 2011-2013). The case of each country is described in more detail in the chapters presenting Study 1 and Study 2 (Chapter 5 and Chapter 6, respectively).

The research aimed to obtain insights into how industry participants perceived customers, other industry stakeholders, and mobile service value rather than to generalize to a specific population. A sampling strategy such as the one described in this sub section may increase the opportunity to understand the phenomenon as the two samples contained a similar mix of stakeholders types, the same research question guided the two investigations, and the same research approach was applied Onwuegbuzie and Leech (2007).

4.2.1.3 Sample size

Some authors tend to “prescribe” a sample size for different qualitative research design types, e.g., Creswell (2007, pp. 126-128) and also Mason (2010). However, as Taylor and Bogdan (1998) point out, the question about the size of the participant sample is

often left open–ended and answered towards the end of the research rather at the beginning (p. 93).

A number of factors may influence decisions about sample size, among them the practicality of analyzing large amounts of data (Atran, Medin, & Ross, 2005); a smaller sample size makes it more feasible to extract rich data (Onwuegbuzie & Leech, 2007). The interviewing skills of the researcher may also affect the sample size as an experienced interviewer may need a smaller sample size to elicit the information needed (Guest, Bunce, & Johnson, 2006). As a guide, the sample should be big enough to allow achieving data saturation, or redundancy (Onwuegbuzie & Leech, 2007). Data saturation is reached when adding more participants or other data gathering units does not bring in new information (Mason, 2010). According to Lincoln and Guba (1985), as cited in Patton (2002, p. 246), in qualitative research saturation is a criterion often used to determine the final sample size. H. Rubin and I. Rubin (1995), as cited in Schutt (2009, p. 173) suggest that in addition, to saturation, data collection should continue till the researcher feels it provides "an overall sense". According to Ritchie, Lewis, and Elan (2003), as cited in Mason (2010), the sample tends to be larger when drawn from a heterogeneous population.

Creswell (2007, p. 128) suggests four to five participants for a case study. However, given the research method (collective case study) and the sampling strategy (maximum variety), and also following Patton's (2002) recommendation to specify a minimum sample size "based on expected reasonable coverage of the phenomenon" (p. 246), the study set a theoretical minimum sample size of ten participants at each of the two locations, or 20 participants overall. The minimum sample size reflected the number of stakeholder groups identified earlier, assuming that at each location, at least two participants would be recruited from each of the five different stakeholder groups shown in the middle layer of the supply and demand model in Figure 1-1 (e.g., MADs, MCSPs, MCSAs, EMSPs, and MSCDs).

The minimum sample size was compatible with the smallest acceptable sample size of 15 participants (for any qualitative research design) that was suggested by Bertaux (1981), as cited in Mason (2010). However, taking into account Onwuegbuzie and Leech's (2007) recommendation to ensure that there are more than two participants from each potential grouping, a tentative sample size of 15 participants was recommended for each of the two locations (30 participants overall). The recommended

sample size is consistent with the observations made by Mason (2010) about sample size trends in qualitative studies undertaken as PhD research: between 20 and 50 data gathering units overall, with 20-30 data units in grounded theory studies, and 30-50 data units in ethnographic studies.

In this study the actual sample size was determined in the field considering saturation effects and field-related data gathering limitations and constraints. A total of 25 participants were recruited and interviewed: 12 participants in Study 1 and 13 participants in Study 2. In both studies, participant background data were used to determine their primary stakeholder type (Table 4-1). Notably, each sample comprised a number of participants whose primary stakeholder type was one of MCSP, MSCD, and MAD (refer Table 1-1). As a primary stakeholder type, MCSA was represented by one participant only, in Study 1. However, five Study 2 participants were also involved in MDS aggregation (i.e., they had MCSA as secondary stakeholder type). Furthermore, none of the participants had EMCS as their primary stakeholder type. However, in each study three of the participants were also involved in provisioning enabling MDS (i.e., they had EMCS as secondary stakeholder type). More details about the participant profiles and backgrounds can be found in the relevant sections of Chapter 5 (Study 1) and Chapter 6 (Study 2).

Table 4-1. Summary of Study 1 and Study 2 participant samples

Primary Stakeholder type	Study 1	Study 2
MAD (mobile application developer)	5	4
MSCD (mobile service content developer)	3	5
MCSP (mobile customer service provider)	3	5
MCSA (mobile customer service aggregator)	1	-
Total number of participants	12	13

4.2.2 Data gathering

One of the main data collection methods in business and management case study research is semi-structured interviews (Myers, 2009, p. 8). Semi-structured interviews normally start with a set of pre-formulated questions but allow new questions to be added in the process of the interview as prompted by the interviewee responses (p. 125). This method is adopted as a primary method of data gathering in the study presented. Semi-structured interviewing provides means to organize data for subsequent analysis without limiting the options to explore in depth the knowledge and the opinions of the participants. As the study gathers data from participants representing a broad range of stakeholders, there is a need "to be flexible…responding to the direction in which the interviewees take the interview" (Bryman & Bell, 2007, p. 474).

4.2.2.1 Interview guide

Creswell (2007, p. 133) states that interview questions need to be informed by the research topic and to "narrow down on" the research question. Similarly, Bryman and Bell (2007, p. 485) indicate that interview questions are formulated to reflect the interview topics which in turn relate back to the research question guiding the investigation.

The interview guide used in this study was developed iteratively following the approach described in (Bryman & Bell, 2007, p. 485). At the start a tentative interview guide was proposed as part of the application for ethical approval. The initial version of the interview guide subsequently developed contained 21 open-ended questions on four topical areas: position, mobile product, value proposition, and value chain (Appendix C1, Table 1). The questions in the last three areas were informed by the main research question formulated in Chapter 1, and by three specific research questions into which it was decomposed (Chapter 3). A helpful practical reference was provided by Tilson, Lyytinen, Sorensen, and Liebenau (2008). In their study senior representatives of various wireless industry stakeholders were interviewed in order to investigate the configuration of the emerging actor-networks in two countries. Tilson et al.'s interview guide contains six groups of questions, four of which are relevant to the research (namely, individual, identifying actor network, technology, and national diffusion questions); they were used as a starting point when developing the interview guide.

The interview started with some probing questions, with questions becoming more direct towards the end of the interview; such sequencing is recommended by Bryman and Bell (2007, p. 486) in order to avoid influencing the direction of the interview. The interview guide complied with the typology of questions that can be asked in an interview as suggested in (Patton, 2002, p. 350): five questions collecting background information, seven questions requesting answers based on the participant knowledge, and nine questions asking the participant to provide a value judgment or an opinion (value judgment – six questions; opinion – three questions).

Pilot testing the interview guide in a session with a representative of a New Zealand telecommunications company exposed a number of deficiencies. First, the number of questions was relatively large, with possibly insufficient time for the interviewee to elaborate on all questions; second, some questions seemed to repeat each other, thus becoming a source of potential confusion. Finally, some questions were perceived as

inherently too complex to be answered in an interview context. The testing of the interview guide prompted a critical examination which was performed applying the framework of general rules suggested by Collis and Hussey (2003, p. 178). It became clear that the initial design needed to be simplified; the value-laden questions that implied the possible answers needed to be reworded or removed, the repetitive questions needed to be either removed, or, if retained for cross-checking purposes, to be reworded in order to avoid creating the impression that the same question was being asked twice. The overall number of questions needed to be reduced with the interview guide still covering the same topics.

Subsequently the questions found redundant were removed and questions on the same topic were grouped together. All questions were edited in order to improve their clarity. The final version of the interview guide contained 17 specific questions and one "other comments" question (No 18). Out of the 18 questions six explored the participant background and involvement with MDS while the remaining 13 were knowledge/opinion/value judgment questions. Table 4-2 shows (tentatively) the relationship between each of the non-background interview questions to the specific research questions; it can be seen that each interview question was expected to be able to solicit responses relevant to more than one specific research question, depending on the direction of each specific interview.

Table 4-2. Interview questions vs specific research questions

Interview Question	Specific research questions		
	RQ1	RQ2	RQ3
7	X	X	
8	X	X	
9	X	X	
10	X		X
11		X	X
12	X	X	X
13	X		X
14	X	X	
15		X	X
16		X	X
17	X	X	

This interview guide (Appendix C1, Table 1) was used to gather data in Study 1; a Bulgarian translation was used if the participant preferred to conduct the interview in Bulgarian (Appendix C1, Table 2). As explained in Chapter 5 the interview guide was revised prior to commencing Study 2 (Appendix C2).

4.2.2.2 Interview protocol

The study collected data from participants using a standardized open ended interview protocol. This method facilitates analysis where comparisons are sought, and minimizes the interview length (Patton, 2002, p. 346). In standardized qualitative interviews all interviewees are asked the same questions and in the same sequence. This method provides a degree of consistency across the interviews (Johnson & Christensen, 2012, p. 204) and was chosen as it suited the purposes of the analysis (to compare perceptions across stakeholder groups) and allowed efficient use of the participants' time.

Furthermore, the method ensured the consistency of the process as it may reduce the variation among interviewers where more two or more interviewers were involved (Patton, 2002, p. 346) (as explained further below, in Study 1 a research assistant conducted some of the interviews). However, the method may also constrain the "naturalness" of the questions and the answers (Patton, 2002, p. 349); this limitation can be overcome by asking follow-up questions and inviting participants to elaborate further on points made (as done in this case).

4.2.2.3 Data collection procedure

In both data collection rounds participants were recruited following the procedure outlined in the application for ethical approval to Auckland University of Technology Ethical Committee (AUTEC). This also complies with Schutt's (2009, p. 348) guidelines for conducting ethical qualitative research: participation is voluntary, participants are informed about the research, they are invited to sign a consent form, identification details are not recorded in the interview transcript in order to protect participant privacy, participants have the right to decline answering a question (e.g., if they consider it sensitive). A copy of the AUTEC letter of approval and the participant information sheet is provided in Appendix D and Appendix E respectively.

At the start of each interview the interviewer presented first an overview of the questions, as recommended by Patton (2002, p. 358) for interviews where some questions were not singular (i.e., referred to more than one idea). Hard copies of the set of questions were made available during the interview and were used as a guide.

In Study 1 interviews were recorded manually using note taking. Due to constraints related to the timing of the interviews some interviews were conducted by a research assistant (a native Bulgarian speaker who was also fluent in English). The research

assistant had previous experience in interviewing and was sufficiently conversant with the topic area; they had access to the project documentation contained within the application for ethical approval and a background document that served as a project brief (Appendix F).

The Study 1 interviews were conducted either in Bulgarian, or in English depending on the preferences of the interviewee; in the latter case the respective transcripts needed to be translated into English. According to Temple and Edwards (2002), in cross-language research choosing a translator other that the researcher helps avoid imposing the researcher's own framework on the interview text. Therefore, the interviews originally recorded in Bulgarian were translated not by the researcher but by the research assistant following the instructions of the researcher. As the researcher was fluent in Bulgarian she was able to verify that the transcripts were "translated verbatim and in full" (Patton, 2002, p. 392). In Study 2 all interviews were conducted by the researcher, recorded digitally and transcribed by a professional service. The language used was English.

In both studies interview transcripts were initially preserved in electronic form as Microsoft® Word documents and then were transferred to Microsoft® Excel spreadsheets. The transcripts were indexed to include a unique identifier related to the identity of the interviewee; each transcript contained the interviewee answers with a reference to the original interview question, thus helping to preserve the "chain of evidence" between the case study participants, the interview protocol and the study database, as recommended in Yin (2009, p. 123).

4.3 Data Analysis

Data analysis in qualitative research can be viewed as a process that includes preparing and organizing the data and reducing them through extensive coding (Creswell, 2007, pp. 148-155). Creswell highlights the iterative nature of the analysis; the spiral is used as a metaphor for the analytic process which starts with organizing the data into a manageable collection, continues with reading and taking notes, and moves on to describing, classifying and interpreting. Gradually a research account is developed that represents and often visualizes the findings. A more practical guide to conducting qualitative data analysis and managing large volumes of data that can be used across a range of qualitative methodologies is provided by Collis and Hussey (2003). It is based on a general analytic framework found in earlier work (Miles and Huberman, 1994 as cited in Collis & Hussey, 2003, pp. 263-264) and places an emphasis on methodological

rigour and systematic process. The study's approach towards data coding and analysis (Figure 4-3) is loosely modelled on Creswell's (2007) model with input from Miles and Huberman's framework. The spiral gradually thickens to show how through repeated reading, interpretation and coding, a new understanding is derived that provides the foundation for the subsequent development and positioning of the new theory against the extant research (Eisenhardt, 1989; Gregor, 2006).

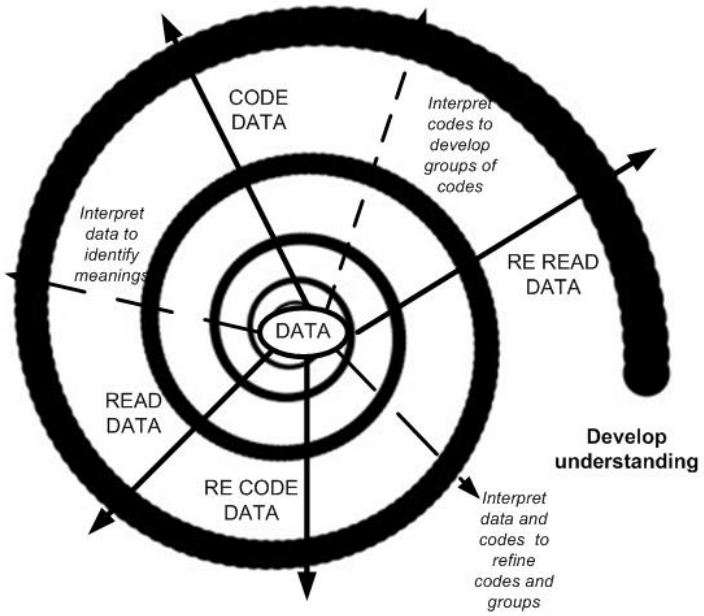

Figure 4-3. Data analysis approach. Adapted from "Qualitative inquiry and research method: Choosing among five approaches", 2nd ed. (p.154), by J. W. Creswell, 2007, Thousand Oaks, CA: SAGE

4.3.1 Method of analysis

Classifying and interpreting the data is at the heart of the analytical process – a process which "transforms data into findings" (Patton, 2002, p. 432). As a study's findings are ultimately discussed in the light of the study's objectives and aim, it is important to choose a classifying and interpreting method that matches the purpose of the study (Patton, 2002, p. 434).

Patton (2002, p. 453) describes an inductive analysis approach which he considers appropriate for exploratory studies; it allows the analytical categories and themes to emerge as the researcher "comes to understand patterns that exist in the phenomenon being investigated" (p. 56). Furthermore, the approach is consistent with "categorical aggregation" – one of the forms of case study analysis recommended by Stake (1995), as cited byCreswell (2007, p. 163); in categorical aggregation the researcher seeks instances in the data "hoping that issue-relevant meanings will emerge".

Thematic analysis is one of the older and more established qualitative data analysis methods (Aronson, 1994) that can be applied either inductively or deductively (Braun & Clarke, 2006). In thematic analysis the patterns and the themes emerging from the data are identified through a process of interpretation and coding, then described and interpreted further in relationship to the research topic (Boyatzis, 1998 as cited in Braun & Clarke, 2006).

In more recent research this understanding of thematic analysis has been transferred to some of the forms of qualitative content analysis and that is why the definitions of thematic analysis and content analysis found in the literature reviewed here have much in common. For example, Hsieh and Shannon (2005) define qualitative content analysis as "a research method for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes and patterns" (p. 1278). Furthermore, Elo and Kyngäs (2008) point out that it is a flexible method that can be used either in a deductive of inductive way.

Inductive thematic analysis was chosen as the method of analysis in this study as it was well aligned with the general approach to data analysis adopted. As an inductive method, according to Braun and Clarke (2006), it can be used in a constructionist context which made it compatible with the philosophical assumptions of the study. It also allows to identify themes emerging across the data set as a whole. As suggested by Creswell (2007, p. 75) this is particularly important in case study research.

4.3.2 Process overview

The thematic analysis process followed in Study 1 and in Study 2 was a highly iterative step-by-step sequence of specific activities that adapted and applied documented thematic analysis procedures used in empirical investigations described in the literature, with a reference to relevant qualitative content analysis work. The process was informed by the recommendations and practical approaches found in prior work, such as Frith and Gleeson's (2004) description of the inductive thematic analysis procedure, Graneheim and Lundman's (2004) qualitative content-related concept definitions that enhanced the trustworthiness of the research, and Mayring's (2000) visual representation of inductive category development. The primary objective was to proceed systematically and "preserve the construction of inference" as recommended by Spiggle (1994, p. 497).

The sequence of steps followed the spiral model depicted in Figure 4-3 and was modelled on the series of stages and phases suggested by Fereday and Muir-Cochrane (2008), and by Braun and Clarke (2006). The data were first read in order to get a sense of "the data and whole" (Elo & Kyngäs, 2008, p. 110). Next the data were organized and systematically coded based on interpretation. The process was iterative and aimed to achieve data reduction; code definitions were reviewed and refined to account for similar codes, related codes were identified and grouped together as "super codes", super codes were further aggregated into categories and sub-categories to capture similarities, and themes emerging from the meanings were identified.

The analysis was completed over a significant period of time as it involved reading and re-reading the data, and continually re-organizing them as new codes and super codes emerged; the researcher engaged into a meaningful "interplay with the data" (Patton, 2002, p. 489) as she familiarized herself with, and developed a better understanding of them. A detailed step –by step description of the data analysis procedures as they were conducted in Study 1 and Study 2 is provided further in the text, and in Chapter 5.

4.3.3 Coding

In qualitative data analysis developing an interpretation is achieved through coding. Inductive analysis implies that coding is data driven, e.g., codes are generated inductively, by examining the data directly (Johnson & Christensen, 2012, p. 525). Braun and Clarke (2006) also note that inductive thematic analysis is data driven. However, they point out that it cannot be entirely free of deduction or of theoretical assumptions (for example, the assumptions related to the research question as formulated). Their comments resonate with an earlier recommendation made by Taylor and Bogdan (1998) – that even in inductive analysis it is needed to develop at least a brief initial "story line" as a foundation of the analysis (p. 151). Similarly, Johnson and Christensen (2012) comment that in qualitative research practice it is common to employ both deductive, or pre-existing codes, and inductive codes (p. 526).

The study presented here applied both deductive and inductive coding. First, deductive coding was used as a way to explore the data so that the researcher could achieve a general understanding of them; Y. Zhang and Wildemuth (2009) for example, recommend the use of concepts derived from existing theories or empirical studies at the very beginning of the analysis. The initial deductive coding was followed by subsequent iterative inductive coding which allowed to develop a more detailed view of

the meaning of the data without limiting the analysis to a set of predefined codes about which Creswell (2007) warns (p. 152).

More specifically in Study 1 a highly iterative four stage process that drew on prior work (e.g., Mayring, 2000) was followed. At the start data were coded deductively using a set of pre-defined codes that drew on the research topic. This helped organize the data and build the researcher's confidence as an initial understanding of the data was gained. The analysis continued with interpreting and coding the data inductively. Overall, a range of coding and classification methods were used, e.g., structural, attribute, and in vivo coding, and code mapping and landscaping (Saldaña, 2012, pp. 84-86; 62-72; 92-94). Relationships between codes were identified by applying pattern coding (Gibson & Brown, 2009, pp. 86-93; Miles, Huberman, & Saldaña, 2014). The themes emerging around related codes were organized into thematic networks (Attride-Stirling, 2001).

In Study 2, the categorical code classification derived from the data analyzed in Study 1 was used to code and organize the data The approach was similar to the data driven directed content analysis described by Hsieh and Shannon (2005) which can be used to create an initial broader mapping of the data set and prepare it for further analysis. The emerging themes were identified and defined following a process similar to the one carried out in Study 1. A detailed description of the coding stages, including a justification of each of specific coding methods can be found in the relevant sections of Chapter 5 and Chapter 6.

In both studies the process of extracting meanings and creating code descriptions, codes and categories, and identifying themes followed an explicitly outlined sequence of steps. It was documented in significant detail as recommended by Collis and Hussey (2003, pp. 264-265) and showed clearly how the overarching themes were derived using a systematically built and comprehensive coding scheme to map the data. By imposing a rigorous coding discipline in maintaining and updating the codes and their descriptions. and the respective coded data sets, it was possible to preserve traceable links between meanings, descriptions, codes, categories, themes, and the original data.

Support for the use of an appropriately selected software tool for the analysis of large amounts of textual data can be found in the literature. Authors highlight their role in increasing the effectiveness and the efficiency of the analysis process (e.g., Lewins & Silver, 2007), and the support provided for systematic organization, coding and analysis

(e.g., De Wet & Erasmus, 2005). While powerful when applied to categorizing and organizing data, such tools may at times have a negative impact on identifying relationships and overarching themes as data may be become too fragmented, with meanings distorted due to lack of "contextual unity" (Maxwell & Miller, 2008, p. 474). In addition, using a software system may shift the attention to the software rather to the data (Saldaña, 2012, p. 26). Therefore, with a relatively small sample a manual coding approach may be as efficient as a machine-based one and may lead to a better understanding of the data.

Based on the above it was decided to code manually the data in Study 1 so that the researcher could refine the analysis process while getting familiar with the data, and to consider using a software system to support the data analysis process in Study 2. The tool chosen for Study 2 was NVivo by QSR International[11]; the decision was based on its established reputation as a tool developed by researchers for researchers (Bazeley, 2007), with later versions featuring advanced querying and reporting functions. Additionally, NVivo was available at and supported by the researcher's university.

4.4 Research Quality

It has been pointed out that the quality of interpretivist research is "largely based on the acceptance of the scientific community" (Lacity & Janson, 1994, p. 146), and is ultimately a function of the quality and the plausibility of the analysis (Bryman & Bell, 2007, p. 64; Myers, 2009, p. 78). Thus quality is judged by how well the data support the theoretical construction and how well the theory is generated out of the findings. Seale (1999) states that "relevant methodological accounting …can assist readers in evaluating the quality of the conclusions" (p. 177), i.e., the reader of the research report decides whether to trust (or not) the research account based on their perceptions about the goodness of the research evidence, and the soundness of the report's logic. Furthermore, the reader may find the study useful if they could envisage transferring the study findings to another setting (Patton, 2002, p. 581), or any "generalizing" from one context to another (Myers, 2009, p. 40). Next, the research quality of the study presented here is examined next from the perspectives of research rigour, research practice, and formative and summative validity.

[11] http://www.qsrinternational.com/products_NVivo.aspx

4.4.1 Research trustworthiness

Research trustworthiness, or rigour, is a common term used in the literature to signify research quality (e.g., Patton, 2002, p. 546; Seale, 1999, p. 45). “Rigorous research” can be defined as research that aims to generate a theoretical contribution, follows a scientific enquiry method, and meets scientific quality standards such as validity and reliability (Myers, 2009, p. 13). In qualitative research, validity is concerned with how accurately the findings represent what is really happening, while research reliability (authenticity) refers to making similar interpretations on different occasions and/or by different observers (Collis & Hussey, 2003, p. 58).

According to Collis and Hussey (2003) qualitative studies are generally characterized by their relatively high validity and relatively low reliability (p. 55). However, Myers (2009) argues that while positivist case study research quality can be judged by “paying attention to …construct validity, internal validity, external validity and reliability” (p. 75) as suggested by Yin (2009, pp. 40-45), in interpretivist case study research (which is the method followed by the study presented here) quality assessment need not be guided by the same design criteria of validity and reliability (p. 76). A more detailed discussion on other perspectives in qualitative research validation and evaluation can be found for example, in (Creswell, 2007; Patton, 2002; Seale, 1999).

More specifically Patton(Patton, 2002) identifies five alternative frameworks for judging the quality and credibility of qualitative enquiry (p. 544): traditional scientific, social construction/constructivist, artistic/evocative, critical change, and evaluation standards/principles. As pointed out, a social construction/constructivist perspective is appropriate for the evaluation of the research design of interpretivist/constructionist empirical studies. Within this perspective the emphasis is placed on the trustworthiness of the research as reflected by its credibility, authenticity, confirmability, dependability, and transferability. These are naturalistic enquiry quality dimensions that are based on the criteria originally proposed by Lincoln and Guba in 1985 and later extended by Lincoln and Guba, 1985; Guba and Lincoln, 1889; 1994 as cited in Seale (1999, pp. 44-46).

Applying qualitative research rigour indicators and measures suggested by Miles et al. (2014), Myers (2009), and Bryman and Bell (2007) of the credibility, authenticity, confirmability, dependability, and transferability of the research design and the specific outcomes are discussed in detail in each of the chapters presenting the two empirical

studies (Study 1 – Chapter 5; Study 2 – Chapter 6). A further evaluation of the overall transferability of the findings and of their implications is included in Chapter 7.

4.4.2 Research practice

Creswell (2007) proposes eight practice-oriented strategies than can be used to enhance a study's trustworthiness and suggests that a qualitative research methodology needs to engage with at least two of them (pp. 202-204). Based on an extensive examination of the extant literature,Tracy (2010) develops eight "big-tent" research quality hall marks (each supported by a good practice reference framework), and identifies guiding research design principles for planning and conducting a qualitative study. Similarly, Gibbert and Ruigrok (2010), who review contemporary research practice in case study research, recommend to enhance research procedure rigour and findings credibility by discussing and reflecting on the concrete research actions.

The subsections below describe briefly the specific practical approaches towards enhancing research quality that are implemented in the study presented here. The first six research practice points were adapted from Creswell's (2007) validation strategies (pp. 207-209), and Creswell's discussion of research reliability (p. 210) with references to other relevant sources; the last point is based on Hult et al.'s (2008) critical discussion of data equivalence.

4.4.2.1 Triangulation

Myers (2009, p. 10) defines triangulation as doing "more than just one thing in a study". In qualitative research triangulation aims to enhance the credibility and generalizability of qualitative data and results (Flick, 1992). Triangulation allows to strengthen the analysis by testing the data for consistency and by interpreting differences in order to understand better the nature of the phenomenon under investigation, thus adding to the confirmability and transferability of the research (Collis & Hussey, 2003, p. 123; Marshall & Rossman, 1989; Schutt, 2009; Seale, 1999).

This study applies systematically the "triangulation of sources" approach as described by Patton (2002, pp. 559-560): (i) Data are gathered in two separate rounds, with participants representing the same mix in terms of participant category but are based in two different locations; (ii) The study compares the views of the participants within each sample and across the samples, with the samples involving more than one representative of the emerging participant groupings; (iii) The study uses a combination

of two purposeful sampling strategies (maximum variation sampling and opportunistic sampling); (iv) The coding scheme developed during the first empirical investigation study is applied to ("tested" in) the second one; (v) The study settings are described using information from the Web sites of the organizations to which the participants belong; and (vi) Information from independent sources such as industry research reports and industry media reports is used to support the analysis.

4.4.2.2 Internal and external feedback

Peer feedback contributes to the overall rigor of the investigation. Creswell (2007) notes that a peer reviewer (a "debriefer") can engage in an "external check of the research process" (p. 208). Thomas (2006) also mentions that the findings can be enhanced by asking people with specific interest in the area to comment on the interpretations and the conclusions.

The research presented here (conducted as part of the researcher's PhD work) was checked internally by two of her PhD supervisors who played the role of "debriefers" and contributed to the research rigour by reviewing and questioning the research design and implementation. Furthermore, three Bulgaria-based academics were interviewed and the data collected were used to cross-check the inferences made in Study 1 (as explained in Chapter 5). In Study 2, a member check was carried out (see Chapter 6).

4.4.2.3 Inductive analysis

Inductive analysis is a rigorous data analysis method; as Seale (1999) notes that the inductive data analysis approach helps the researcher "to be systematic…and …to modify one's theories in the light of new evidence" (p. 85). Patton (2002) also suggests that following a continuing inductive data analysis process that revolves around comparing alternative emerging patterns and refining conclusions enhances the credibility of the research (pp. 553-544).

As already mentioned earlier, the study presented here deployed thematic analysis – a flexible method that allows both dominant patterns and contradicting findings to be identified and plausible interpretations to be developed, supported by the data. The codes, the categories and the themes were revisited and revised as part of several iterative cycles, and it were the data that shaped the interpretations.

4.4.2.4 Researcher-related factors

According to Patton (2002) the "self" may affect research credibility (p. 552). Patton points out that researcher-related factors such as training and experience may affect the way the research is conducted, e.g., the way data are collected, analyzed and interpreted (p. 571). Creswell (2007) adds that researcher bias caused by the assumptions of the research and the orientations of the researcher may influence the research design and methodology decisions (p. 208) and thus affect its credibility.

The researcher prepared for the work by completing an earlier qualitative research project (involving semi-structured interviews) in partnership with an experienced researcher (Fielden & Petrova, 2007). Furthermore, the research assistant who conducted some of the interviews received specific and directed training. Researcher bias was addressed by providing details about the study background in the research report, by solidly grounding the research design and methodology in the literature, and by thoroughly describing how participants were selected and interviewed and how data were analyzed and interpreted.

4.4.2.5 Rich descriptions

Although qualitative studies are context bound and thus limited when making generalizations based on the findings (Patton, 2002, p. 583), rich ("thick") descriptions may contribute to the trustworthiness of the study including the transferability of the findings (Creswell, 2007, p. 209) as they may provide a means to "generalize from one setting to another" (Collis & Hussey, 2003, p. 62). Rich descriptions give the reader of the research report sufficient information about the settings that have been studied and enables them to make a judgment about how the study findings may be applied to other settings. In the study reported here the study settings are described in detail in the next two chapters; furthermore, the process of analyzing and interpreting the data is extensively documented and thoroughly explained.

4.4.2.6 Inter coder agreement

Creswell (2007) approaches research authenticity (using the term "reliability") from a practical perspective and provides an illustrative example of how to address the issue: using multiple coders helps to keep an external check on the interpretive and subjective coding process, while following a formal inter coder agreement policy ensures that the interpretation of the participant responses remains stable across multiple coders (pp. 209-211).

The study presented here involved more than one coder and a systematic review of the inter coder agreement level. To assess coding reliability, the study adopted the percent of matching codes across coders as a measure of the inter coder agreement level (A). Coding and codes were revisited iteratively in order to address issues identified during the review of coding outcomes, including the value of A.

The minimum value of A was determined in relationship to the range of acceptable values of PRL (proportional reduction of loss) – a qualitative research reliability indicator proposed by Rust and Cooil (1994). The authors suggest that PRL values of 70% and higher indicate an acceptable level of coding reliability with the lower levels suitable for early and mostly exploratory studies, while higher values are to be sought in "advanced" studies where qualitative data analysis outcomes are used to support decisions.

In addition, Rust and Cooil (1994) provide tables with-pre calculated values of PRL that can be used a s a guide. As seen in Table 4-3 in the case of two coders and a 70% match (i.e., A=70%) the RPL value is 63% for two coding categories. The RPL value increases as the number of categories grows. Similarly, in the case of three coders (where A is calculated as a proportion of the pairwise matches compared to the total number of possible matches), at A=70% the respective PRL is 82%. An example of using PRL in research practice can be found in Webb and Mohr's (1998) exploratory study of perceptions and attitudes towards a specific form of marketing, where the participant sample was very diverse. Data were coded using six coding categories and three coders, with A set at minimum of 70%.

Table 4-3. Examples of PRL values (in percent)

Number of coding categories	Two coders			Three coders		
	A=70%	A=75%	A=80%	A=70%	A=75%	A=80%
2	63	71	77	82	88	93
3	74	79	84	90	93	96
4	77	82	86	92	95	97
5	79	83	87	93	95	97

A – inter coder agreement level (percent of matching codes across coders)

Source: Rust and Cooil (1994, Tables 3, 4, 5, and 6)

In Study 1, the participant sample was expected to be relatively more homogenous compared to the one described in Webb and Mohr's work (1998). While in Webb and Monk's study the participants varied widely in terms of age, education, and occupation, all Study 1 participants worked in or were the mobile service industry sector. In addition, a very limited number of coders (the researcher and someone else) were

expected to be deployed. Furthermore, a larger set of coding categories (ten deductively determined codes, as explained in detail in Chapter 5) were planned to be used at the start of the coding process, with an unknown number of inductive codes to emerge from the data later. As the aim of the research was to derive a theory explaining the phenomenon under investigation rather just to explore participant perceptions, a relatively conservative match value (A=80%) was considered appropriate as the minimum acceptable level of inter coder agreement.

The specific inter coder protocols followed in Study 1, the outcomes in terms of inter coder agreement level and other reliability indicators, and the decisions made, are all described and discussed in Chapter 5. In Study 2, where the coding scheme developed in Study 1 was applied and modified, the researcher felt more confident in her interpretations as she was very familiar with the code definitions. Therefore, rather than employing an independent coder, the researcher sought the professional advice of an external qualitative research expert who examined the coding and the coded data close to the midpoint of the inductive coding process. The expert provided written feedback and recommendations; the protocol used to complete and refine the coding is described in Chapter 6.

4.4.2.7 Data equivalence

Hult et al. (2008) who examine critically business research conducted in different cultural and language contexts point out that empirical bias may occur if the research design fails to support cross cultural and/or language data equivalence, i.e., ensuring that the research design elements "have the same meaning, and can be applied in the same way, in different cultural contexts" (p. 1027). According to the authors, lack of evidence of data equivalence signifies insufficient research rigour as it reduces the study's overall trustworthiness and may affect negatively reader confidence in the study findings. Based on extensive literature review, Hult et al. define three data equivalence types (also with reference to qualitative research): construct equivalence, measurement equivalence, and data collection equivalence. For each type the authors propose a set of data equivalence criteria and develop practical data equivalence guidelines.

The study design and methodology meets the criteria for construct equivalence which is about data gathered in different contexts representing the same phenomenon. While the study groups of participants at the two different locations were characterized by their own culture and language, they were also representatives of the strongly

internationalized mobile service value chain. For example, mobile telecommunication and data services are provided through cooperative and profit sharing models that span the globe; mobile software developers work on platforms available to the global community. As a result, participants can be seen as sharing a common understanding about the phenomenon under investigation, even though they may belong to two different cultural contexts. Potential language issues were addressed by conducting the interviews in the language preferred by each individual participant.

As data gathering was conducted in two languages, there was a need to check the study's translational equivalence (a type of measurement equivalence which was particularly relevant). Translation equivalence was ensured by the researcher in two ways: first, the translated transcripts were verified by the researcher; second, while using the English translation of the transcripts to interpret data as part of the analysis process, the researcher also verified the interpretation against the Bulgarian original.

The study also meets to a high degree the criteria for data collection equivalence. The two data collection rounds followed the same sampling strategy (purposive sampling), the sample size was comparable across the two locations, and interviews were conducted following the same protocol. However, with interviews recorded manually in Study 1 and digitally in Study 2, the size of the Study 2 data set was significantly larger and the data may be seen as potentially "richer" compared to the Study 1 data.

4.4.3 Formative and summative validity

A.S. Lee and Hubona (2009) introduce the concepts of formative and summative research validity as a top-level approach towards evaluating research quality. Formative validity refers to the process by which a theory is formed and includes the research design decisions, while summative validity (which the authors consider more important) refers to the overall result of the research process. In this study the quality of the research design was ensured by embedding "quality control checks" in the research practice as discussed above. Following a quality controlled practice is a necessary condition to obtaining trustworthy outcomes as also emphasized in Sheffield's (2005) V-model for knowledge validation; the V-model balances the "action plan" (i.e., the research design) and the "plan in action" (e.g., the research practice). Summative validity was methodologically supported by developing research procedures that adhered to the main principle of interpretive research, namely, continuous iterative

reading of the data and revisiting interpretations in order to improve, modify or altogether replace them (Klein & Myers, 1999).

4.5 Summary of Chapter 4

The chapter introduces the research design of the empirical investigation. It identifies the philosophical assumptions guiding the research (an interpretivist and constructionist study that explores stakeholder perceptions about customer demand for MDS), and describes its research design approach (a collective case study that deploys purposive sampling and inductive thematic analysis using both deductive and inductive coding in order to identify emerging themes and relationships). The relevant aspects of the research design and methods that contribute to the research rigour are also discussed. The two chapters that follow present the process and outcome of the two subsequent empirical investigations.

CHAPTER 5. STUDY 1

As stated in Chapter 1 this research sets to investigate mobile industry stakeholder perceptions about customer demand for MDS in the context of the MDS market environment. Two objectives were set as a means to address the main research question: first, to develop a conceptual model and a research framework that considers the relationship between perceived customer demand for MDS and MDS adoption and use, and second, to conduct an empirical investigation applying the research framework. This chapter contributes in part to meeting the second objective of the research by presenting Study 1whcih was the first of the two empirical studies conducted. The chapter's position within the research process is shown in Figure 5-1.

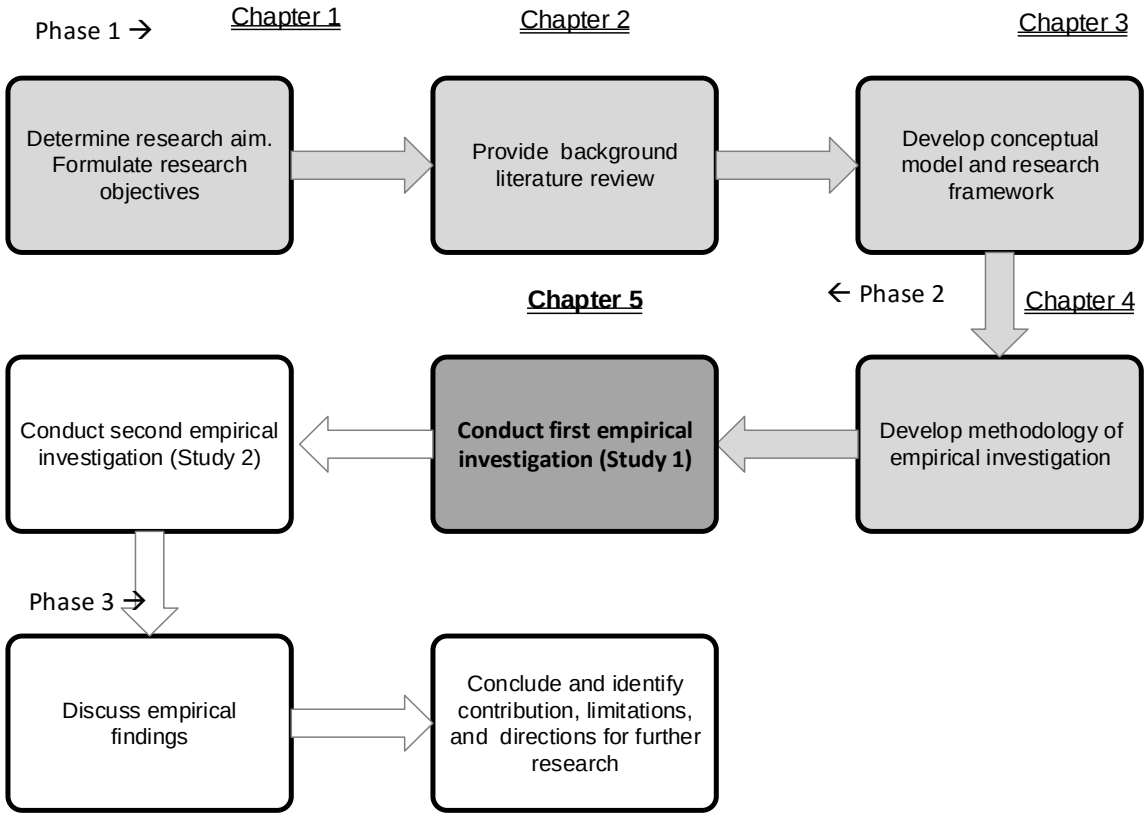

Figure 5-1. Research process path (Chapter 5)

Study 1 was based on the research framework proposed in Chapter 3 and followed the research methodology developed in Chapter 4. The chapter provides a complete and detailed account of the empirical investigation. It includes a synopsis of the relevant mobile service industry sector (i.e., the study context), a description of the study sample and participant background, a step-by step description of the data analysis process, and a discussion of the findings. A number of examples illustrate and support the interpreting and the coding of the data including a grounded in prior research

justification of each particular approach. The outcomes of each step of the process (i.e., the iteratively developed set of codes organized as a hierarchy, the coded data set, and the resulting data mapping) are comprehensively presented. The last part of the chapter is dedicated to identifying and describing the emerging themes and creating thematic networks which are discussed in the light of the specific research questions formulated in Chapter3.

5.1 Study 1: Setting

The data for Study 1 were gathered during the period 2010-2011 in Bulgaria (population: 7.4 million in 2010[12]). At the time the country was characterized by a significant degree of mobile phone penetration; according to a report generated at the web site of the International Telecommunications Union (ITU)[13] by the end of 2009 the number of mobile subscribers in Bulgaria exceeded 10 million, with an estimated mobile device penetration rate of 138.9% (one of the highest penetration rates in the European Union (EU)[14].

The mass penetration of mobile devices creates a potential mass market for customer oriented services delivered across the mobile network (C. Chen, Watanabe, & Griffy-Brown, 2007). This signifies more possibilities for growth within the mCommerce value chain (Barnes, 2002; Kauffman & Techatassanasoontorn, 2005) in areas such as mPayment (Teo, Fraunholz, & Unnithan, 2005); MNOs may also start looking for offering value-added data services in order to maintain suitable return on investment (Knutsen, Constantiou, & Damsgaard, 2005).

At the time of the study there were three MNOs in the country (Vivacom, Globul and M-Tel), with no active MVNOs (Whalley & Curwen, 2012). Despite the competitive mobile market, the two largest mobile operators dominated the space. The estimated market share of each company was 13.1%, 37.5%, and 49.4% respectively[14]. According to the data provided in the public domain (company websites), in 2010 Vivacom had an estimated number of 1.6 million subscribers, Globul had 4.3 million subscribers, and M-Tel had 4.9 million subscribers[15], with an overall penetration rate of 141%[16].

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[12] http://www.indexmundi.com/bulgaria/population.html
[13] http://www.itu.int/ITU-D/ICTEYE/Indicators/Indicators.aspx#
[14] http://ec.europa.eu/information_society/policy/ecomm/doc/implementation_enforcement/annualreports/15threport/bg.pdf
[15] http://www.vivacom.bg, http://www.globul.bg, http://www.mtel.bg
[16] http://en.wikipedia.org/wiki/List_of_mobile_network_operators_of_Europe

While all three companies were established and continued to operate predominantly as mobile data carriers, with time they added some MDS to their portfolios[15]. For example, in 2006–2007 Vivacom started developing and providing mobile services such as mobile games, mobile entertainment, and mPayment. In 2006 Globul launched i-Mode as a mobile business platform and started developing a mobile wallet and other mPayment services in partnership with software development company Sirma Group. M-Tel introduced two mobile bill payment services: m-Tell Quick Pay (in 2007)[17] available to customers of banks belonging to the Borika group, and MPAY (in 2008).

In 2007 all three companies partnered with a consortium of companies (Bulgarian Telecommunication Company, EBG.BG, Voicecom, Interactive Media Service, Antima, and Telelink) which offered mobile parking service in the capital Sofia[18]. Also around that time a new company called SEP Bulgaria obtained a licence to build an mPayment system called "System for Electronic Payments", or SEP (Tairov, 2014). The company partnered with several Bulgarian banks and with Globul and Vivacom to develop and offer mobile payment services including mBanking, and also authentication services[18,19] .

A number of new and existing software houses (e.g., ZARIBA, XS Software, Masterhead Studios, and others) developed mobile services such as mobile games and other mobile entertainment applications[20] and sold them as applications that are MNO-independent. Experiments with using mobile technology in the area of education in Bulgaria started as early as 2002–2003 (Georgiev, Georgieva, & Trajkovski, 2006); a strong research and development group in mobile learning was established at the University of Russe (Georgiev, Georgieva, & Smrikarov, 2004; Georgieva, Smrikarov, & Georgiev, 2010). A comparative study across eight EU countries conducted in 2008–2009 found a growth of interest among Bulgarian educators towards using mobile games in adult education (Demirbilek, 2010).

With a reference to MDS supply as represented in Figure 1-1 (Chapter 1) it can be concluded that the mobile services industry sector in Bulgaria at the time of the study was represented predominantly by MNOs who also acted as MCSPs and EMSPs (offering EMS such as mPayment) and also as MCSAs (for example, providing user

[17] http://paper.standartnews.com/en/article.php?d=2007-08-02&article=5980
[18] http://www.kpmg.de/docs/cee_mobile_payments_0701.pdf
[19] http://www.sepbulgaria.com/48/en/157.html
[20] http://gdsbulgaria.com/en/Studios

authentication), and by MADs (developing content for some types of MDS – e.g., games). A more minor but still visible role was played by organizations involved in mLearning who acted both as MCSPs and MSCDs. In addition, to associating with MNOs in supporting mPayment, some banks had also started to develop mBanking services (e.g., Bulbank[21], Piraeusbank[22]).

The mobile telecommunications industry sector in Bulgaria was regulated (starting in 2002) by the Communications Regulation Commission (Pook, 2008). The legislative framework that governed the mobile services and applications industry included several relevant acts, most importantly: (i) the Electronic Communications Act which ensures competition across the mobile network and virtual mobile network operator sector, fair distribution of frequencies, unhindered customer access to mobile services, and compliance with EU directives in the area of telecommunications; (ii) the Consumer Protection Act that provides a framework for the protection of personal customer information and the protection of customer rights when acquiring, using, and discontinuing the use of services, including MDS (such as the right to be informed about services and the right to be protected against risks when using services[23]); (iii) the Electronic Commerce Act, which regulates the activities of eCommerce service providers, including those providing MDS, to ensure compliance with the Customer Protection Act[24]; and (iv) the Funds Transfer and Electronic Payment Instruments and Payment Systems Act that regulates the provisioning of payment using electronic channels including mPayment systems (Datamax, 2008) . In addition, the country's legislature was moving towards developing a comprehensive EU-compliant framework for the support of services delivered through electronic communication and information channels, including the adoption of the mobile wallet as a universal mPayment instrument (Marinova, 2012).

The analyses above showed that at the time of the study the mobile services landscape in Bulgaria was structured similarly to the model in Figure 1-1, with mobile services delivered to customers by mobile industry stakeholders involved in mCommerce/mBusiness type of transactions, or acting as mobile infrastructure

[21] http://www.unicreditbulbank.bg/bg/Bulbank_Mobile/Promo/index.htm
[22] https://www.piraeusbank.com/Bulgaria/Pages/mobilebanking_bg.aspx
[23] http://ofisconsult.eu/dokum/Zakon_Zashtita_potrebiteli.pdf
[24] http://ec.europa.eu/internal_market/media/docs/elecpay/natimpl/bulgaria/e_commerce_act_bg.pdf

providers. However, a specific characteristic of the mobile services industry at this location was the strong involvement of MNOs in MDS design and provision. In order to facilitate this involvement MNOs had added to their organizational structure appropriate departments acting in one or more of the roles associated with the upper supply layer in Figure 1-1 (e.g., MAD, MSCD).

5.2 Study 1: Data Gathering

This section presents the study sample and the interview process, and identifies the sample characteristics with reference to the study methodology and the research model.

The study participants were recruited from amongst employees of companies and organizations that were involved in mobile service design, development and provision. The analysis presented below was based on information derived from participant responses to the first six interview questions. The researcher's notes from the field regarding the companies where participants were recruited from were also used. The response data were preserved as originally recorded (i.e., in English and in Bulgarian). Where appropriate the text in Bulgarian was translated. Both versions were retained (Appendix H).

5.2.1 Recruiting and interviewing participants

In order to recruit participants, the researcher used her personal contacts. She also sought to be introduced to potential participants within organizations involved in mobile services design and provision. A total of 13 organizations were approached. Fifty-two individual invitations were issued, of which 13 were accepted. As a result, 12 participants from eight organizations were recruited (one potential participant withdrew). Due mostly to the difficulties related to gaining access to potential participants the sample size did not reach that the recommended sample size of 15 participants, but met the minimum sample size requirement of ten participants as set in Section 4.2. Table 5-1 provides all participant identifiers (used further in the text as a reference to a particular participant[25]), and shows details about the interview process (interviewer identity and interview language).

[25] The participant identifier includes a reference to the recruitment process and to the actual participation: e.g., P1R2 means that the participant was the first one scheduled to be interviewed, while chronologically his/her accepting the invitation reply was the second one in the sequence of all such replies received.

Table 5-1. Participant and interview details

Participant	Organization	Interviewer	Interview language
P1R2	ORG1	K. P.	BG
P2R4	ORG2	K. P.	EN
P3R8	ORG3	K. P.	BG
P4R9	ORG4	K. P.	BG
P5R10	ORG5	K. P.	BG
P6R11	ORG5	K. P.	BG
P7R12	ORG6	K. P.	BG
P8R15	ORG2	K. P.	EN
P9R16	ORG2	A. A.	EN
P10R17	ORG2	A. A.	EN
P11R18	ORG7	A. A.	EN
P12R19	ORG8	K. P.	EN

All interviews were held at the participants' business premises following their preferences. The interviews lasted on the average 45 minutes. The interviewers took notes. Most of the interviews (nine) were conducted by the researcher (K. P.) with three interviews conducted by the research assistant (A. A.) as the researcher was not available on site. While this arrangement did not allow the researcher to explore personally the topics with the three interviewees, the researcher was confident that A. A. had been able to conduct the interviews at a sufficient depth; as mentioned earlier, A. A. had had previous experience with interviewing and was familiar with the study. In addition, A. A. was thoroughly briefed by the researcher on how to follow the interview protocol. To ensure understanding, a mock interview was conducted with the researcher acting as an interviewee.

Finally, six interviews were conducted in Bulgarian (BG) and six were conducted in English (EN) following interviewee preferences. The English and the Bulgarian version of the interview questions can be found in Appendix C1. The interviews conducted in Bulgarian were translated into English by A. A. The researcher (fluent in Bulgarian) verified all translations in order to ensure that no data were lost and/or distorted.

5.2.2 Participant profile

Table 5-2 contains a summary of the participant profiles which were created using the participant responses to the first six interview questions (which explored their background), augmented by the researcher notes made during the recruitment process. The workplace organizations/companies where participants worked were categorized applying the EU definitions[26] for small and medium enterprise (as shown in the second column of the table). Nine participants were employed by companies that that could be

[26] http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/sme-definition/index_en.htm

defined as a “large company/organization” (staff above 250) while three worked for a companies that were “small” (staff between 50 and 250).

Table 5-2. Participant organization, role, and background.

Participant	Organization type/size	Role	Background (experience and expertise)
P1R2	ORG1. Educational institution (large)	Senior lecturer – mobile learning development and implementation	Computer systems and technologies
P2R4	ORG2. Mobile operator & service provider (large)	Division manager – mobile products	Product development, customer profiling, segmentation, CRM
P3R8	ORG3. Software house (medium)	Chief application developer (specialized software)	Web design, 3G apps, quality control
P4R9	ORG4. Mobile operator & service provider (large)	Senior business analyst and service provider to customers	Software development, project management, database administration
P5R10	ORG5. Software house (medium)	Senior service engineer (“service creation”)	Menu driven mobile application design and development, software testing
P6R11	ORG5. Software house (medium)	Senior developer/ business analyst	User requirements solicitation, programming, training
P7R12	ORG6. Software house (large)	Senior Java software developer	Online gambling platforms, banking software, mobile games and mobile applications
P8R15	ORG2. Mobile operator & service provider (large)	Senior expert – new mobile service development	Telecommunications
P9R16	ORG2. Mobile operator & service provider (large)	Senior expert – new product development	Telecommunications; project management; macroeconomics
P10R17	ORG2. Mobile operator & service provider (large)	Senior expert – new mobile applications	Telecommunications; resource management
P11R18	ORG7. Mobile operator & mobile service provider (large)	New application developer	Telecommunication and ICT industry;
P12R19	ORG8. Bank (large)	Manager and project manager. Mobile applications (mBanking)	Product development, customer care, marketing

All 12 participants were employed by companies or organizations that were engaged in mobile service and/or application design and provision, with four participants working in software development companies, six – in telecommunication companies, and one each in an educational institution and a bank. The sample included participants involved in MCS (e.g., mLearning, mBanking, mobile gambling), and in EMS (mPayment). It could be seen from the table that the sample matched the mobile service industry profile as described in Section 5.1.

All participants identified themselves as being employed in middle to top level managerial positions, or in expert positions; they had background experience and expertise in one or more of the areas of software development, telecommunications, and management. The data indicated that the sample matched the participant profile

characteristics as described in Section 4.2, i.e., all participants were involved in the decision making processes at their respective place of employment and were knowledgeable about the area of the investigation. Therefore, participants should be able to contribute well informed opinions while responding to the interview questions.

Next the participant background data were coded applying an approach similar to what (Saldaña, 2012) describes as “attribute coding”, in order to identify participant roles as stakeholders in the mobile service value chain. Attribute coding is used to interpret meanings that are not deeply embedded in the data but are easily discernible, in order to provide a context for the subsequent analysis and interpretation of the data (p. 70).

In this case the stakeholder types introduced earlier were used as attributes. The coding allowed for multiple roles as the descriptions given by participants indicated that most of them were engaged in more than one role. The role codes (Table 5-3, columns 2, 3, and 4) occurred as follows: mobile service content developer (MSCD) – eight participants; mobile application developer (MAD) – five participants; mobile customer service provider (MCSP) – five participants; enabling mobile service provider (EMSP) – three participants; mobile customer service aggregator (MCSA) – two participants.

The coding allowed the identification of a potential grouping with the sample juxtaposing MADs to the rest of the stakeholder types. It could be seen that while two of participants engaged as MADs were also involved in developing content for some of the applications they were building, none of the MAD participants were involved in activities related to service design, development and provision activities. Conversely almost all of the non-MAD participants were acting in more than one role (e.g., they could be involved in developing content for a mobile service thus acting as an MSCD, at the same time responsible for providing the service to customers – MCSP).

The emerging grouping split the sample into two participant classes: a relatively smaller class of “application developer” and a larger “service provider” class. The application developer class (referred to further as ID class) was defined as comprising the five participants engaged as MADs while the service provider class (IS class further in the text) was defined as comprising the seven non-MAD participants.

The ID class was characterized by the relatively narrow focus of the participants on application development and providing content for some specific applications such as interface systems for other applications. It comprised five participants employed by four

companies. Four participants worked in software development companies: one was employed by a large software house (ORG6), while three participants worked for two medium size software houses (one in ORG3 and two in ORG5). The fifth participant worked in the software development arm of a mobile operator (ORG7, a large company). Although the knowledge and expertise of these participants was mostly in software development, they were also knowledgeable about the specific content areas of the applications they were developing and the customer requirements and needs related to these.

Table 5-3. Participants as stakeholders

Participant	Stakeholder type – main	Stakeholder type(s) – secondary		Class identifier
P1R2	MSCD			IS1
P2R4	MCSP	MSCD	EMSP	IS2
P3R8	MAD			ID1
P4R9	MSCD	EMSP		IS3
P5R10	MAD			ID2
P6R11	MAD			ID3
P7R12	MAD	MSCD* (occasionally)		ID4
P8R15	MCSP	MSCD	MCSA	IS4
P9R16	MCSA	MSCD	MCSP	IS5
P10R17	MSCD	MCSP		IS6
P11R18	MAD	MSCD* (occasionally)		ID5
P12R19	MCSP	EMSP		IS7

The IS class was characterized by a broader range of participant stakeholder profiles (content development, service provision, aggregation). It comprised seven participants employed by five different companies (all large). Five were employed by MNOs (four worked for ORG2, one worked for ORG4), one was with an educational organization (ORG1), and one was with a bank – ORG8). These participants had background in project management and in ICT, and significant expertise in specific areas such as banking, education, marketing and customer relationship management.

5.3 Study 1: Preparing the Data

Prior to commencing the analysis, the data were checked in order to ensure that all text could be read and understood. Next, the translated interviews were verified (by the researcher) using the original transcript. Finally, all responses to questions 7-18 were transferred to an MS Excel spreadsheet with the text in Bulgarian retained for further reference. The spreadsheet contained participant responses grouped according to the interview question number, with each response tagged with the participant identifier (as shown in Table 5-3, column 1).

Questions 7–17 were answered by all participants with two exceptions: (i) Participant P11R18 was not comfortable with talking about their organization (Question 16), and (ii) participant P2R4 indicated that they had already addressed this question briefly in answers to other questions and asked the interviewer to move on to the next question. Two participants added further comments (Question 18). The tables in Appendix H (Table 2 to Table 13) contain all interview data in English and in Bulgarian where applicable), grouped by interview question.

5.3.1 Organizing the data prior to coding

First, the researcher explored the interview data to check the expected mapping of answers to interview questions onto the perspectives of the research framework and the specific research questions RQ1, RQ2, and RQ3 (Chapter 3). Reading the data confirmed that normally an answer to an interview question would contain information that could be associated with more than one specific research question or perspective. To illustrate, Table 5-4 shows how the responses of the first three interviewees could be linked to the research perspectives/questions.

Table 5-4. Research perspectives and related responses (first three interviews).

Perspective	Related interview questions	Related content
A (RQ1)	7, 8, 11, 14, 17, 17	Customer requirements and expectations
B (RQ1, RQ2)	7, 9, 10, 11, 14,17	Mobility related service value in innovative services
C (RQ3)	10, 12, 13, 15, 16	Supply and regulatory environments

As the data set was reasonably large the researcher attempted to organize them in a more manageable way before commencing systematic reading and interpreting. Based on the participant classification that was derived from analyzing and interpreting responses to the first six interview questions (as described earlier in Section 5.2) the data set was split into two data domains (ID and IS). Each domain contained the respective ID and IS participant responses to interview questions 7–18. In terms of text, the data domain IS was larger than the data domain ID (the word count of the text in the ID and IS data domains was about 2300 and 3600 words, respectively).

The number of participants in each class (five and seven in data domains ID and IS respectively) was sufficiently large to satisfy the recommendations about the number of participants in emerging groupings mentioned earlier in Section 4.2 (i.e., more than two participants in an emerging group).

5.3.2 Determining the data coding unit

At the next step the data in each domain were read in order to prepare for the subsequent coding. It was established that the transcribed responses contained either complete sentences or self-contained phrases referring clearly to the interview question asked. An interview question could be answered in one or more sentences or phrases with the word count in sentences varying from small sentences of 5–6 words to some exceptionally long sentences (50–60 words). Compound sentences could potentially have multiple meanings; however, splitting them into smaller units may have led to losing some of the underlying meaning due to loss of context – see, for example, part of the response to interview question 15 by participant P7R12 (Appendix H, Table 10):

> *Specifically, when talking about gambling, in most countries this is clearly regulated and developers have to conform with the given regulations.*

Here the second part of the utterance ("developers have to conform…") could be misinterpreted if it were separated from "when talking about gambling".

Boyatzis recommends using a sentence, a whole paragraph, or a whole response as a coding unit when coding data collected through interviews (1998, p. 64). However, "lumping" large amounts of text together may lead to a superficial and even biased coding, especially at the early stages of the analysis (Saldaña, 2012, p. 24). To achieve a balance, it was decided to use complete sentences as data coding units but to apply more than one code in the case of multiple meanings. Support for using "sentence" as a coding unit can be found in (Graneheim & Lundman, 2004) and also in (Westbrook, 1994).

Each sentence in each response to interview questions 7-18 was assigned a unique data unit number (DUN). There were 93 data coding units within the ID data domain (ranging from DUN 1 to DUN 93) and 191 data coding units within the IS data domain (ranging from DUN 94 to DUN 284). Further in the thesis the quotes from Study 1 data are referenced by the corresponding DUN and the participant ID. The location of a quote within the data can be found using Table 1 in Appendix H which cross-references each DUN to the data table that contains the relevant response.

5.4 Study 1: Data Analysis Process Overview

During the data analysis a multiple step iterative process was followed. The analysis process framework applied was constructed with input from the literature that informed

the data analysis methodology described in Chapter 4, and also from (Jick, 1979) and (Lackey & Gates, 1997).

The framework consisted of four stages; each stage involved iterative coding both within the stage and back to a preceding stage in order to allow for interpretation and coding to be revisited and refined. As the process advanced, the definitions of the codes and the themes were gradually finalized. Relationships between codes and themes were identified and interpreted in the context of the study topic and objectives. The framework is shown in Table 5-5, with the stages described briefly below.

5.4.1 Stage 1

According to Pope, Ziebland, and Mays (2000) deductive coding can be used as a means to organize the material for the inductive coding to follow. It ensures as well that all data units and all parts of them are analyzed which is normally applicable to studies with a set objective and relatively structured data collection. As the study presented here met both criteria (i.e., it was guided by a set objective and the data collection was built using participant responses to the same set of interview questions), at the first stage of the analysis the data in both data domains were represented with a reference to a small set of broadly defined theory driven codes.

Table 5-5. Data analysis stages

Stage	Objective	Description
1	Developing and applying deductive codes	An iterative process. Involves theory driven deductive code development, testing and refining the deductive codes, and reading and re-reading the data in order to apply them. The coding is visually represented (Data map 1).
2	Developing, applying and organizing inductive codes	A highly iterative process. Includes intensive data driven code development and building a coding scheme based on the data in the ID data domain. Data are read and examined systematically as code definitions emerge and code labels are created. Super codes are developed (a super code is a code that subsumes several related codes). The super codes and codes are organized in categories and sub-categories. The coding is visually represented (Data map 2).
3	Completing the inductive coding	A highly iterative process. The data in the IS data domain are read, re-read and interpreted in order to identify meanings that are coded using the codes and super codes developed at the previous stage (as applicable). Emerging new codes and super codes are defined, categorized and added to the existing coding scheme. The ID data domain is revisited and the coding is checked against the updated coding scheme. The coding is visually represented (Data map 3).
4	Identifying and developing emerging themes	An iterative process. Data and codes are examined searching for relationships between super codes that can be interpreted as themes emerging from the data. As themes are defined data may be re-read and reinterpreted; themes are reviewed, and may be redefined and renamed during the iterations. The emerging themes are analyzed in order to identify relationships between them, and organized into a network (Data map 4).

5.4.2 Stage 2

At this stage the data in the ID domain were coded interpretively based on deriving meanings from the coding units; an initial set of data driven codes were defined and given labels. The data and the initial set of codes were examined further in order to identify: (i) meanings that were almost identical and therefore, could be coded in the same way; and (ii) related meanings coded differently that could be combined together. In the case of almost identical meanings one of the data driven codes was retained, the other code was dropped. In the second case and as also suggested in (Mayring, 2000; P. Zhang & von Dran, 2001) a new data driven code called "super code" was created by combining the definitions of the underlying initial codes, and attached to the relevant data unit. The resulting hierarchy of codes (referred to as Codes-S1) was examined further; groupings of codes and super codes were identified and used to define provisionally emerging analytical categories and sub-categories. The coded data set was preserved electronically (further referred to as CodedData-S1).

5.4.3 Stage 3

At this stage the data in the IS data domain were interpreted and meanings were extracted and coded by applying (where applicable) existing Stage 2 codes and super codes. New codes and new super codes were added to the coding scheme as they emerged. The process was highly iterative and ended up with a revised coding scheme that represented the codes, super codes, sub-categories and categories derived from the interpreting meanings in the Study 1 data set, and a completely coded data set.

5.4.4 Stage 4

The coded study data were systematically reviewed in order to define emerging themes by searching for relationships between the codes. Data patterns were identified and recorded in order to document the theme development and to preserve the data supporting each theme. The analysis was extended to include a final revision of the emerging themes and the relationships between the themes. This analysis led to the identification of the overarching "global" themes and their respective thematic networks.

As shown above the data in the two domains into which the whole data set was split were coded and interpreted applying the same method, with some variations: the data in the IS domain were coded (Stage 3) applying the coding scheme created during the inductive coding of the data in the ID domain (Stage 2). Coding the two domains

separately was modelled in part on approaches to triangulation discussed by Jick (1979) and also by Lackey and Gates (1997). For example, Lackey and Gates split the data into three separate data sets and analyzed each set using a different method combining the findings later in order to identify converging (supported by data across all sets), and/or diverging (specific to a set) concepts. In addition, interpreting the data in stages provided a "within-method" strategy for testing the reliability of the coding and the findings (Jick, 1979). In particular, the examination of the findings helped identify themes that converged across the two data domains; emerging from the data set as whole such themes signify that participants had the same or very similar views on a specific topic. Conversely themes that showed divergence, or inconsistencies demonstrated potential differences between the views of the participants from the two groups (or across the whole sample). The sections following provide the details.

5.5 Study 1: Deductive Coding (Stage 1)

Braun and Clarke (2006) note that developing a deductive coding scheme and applying it to the data may help guide the subsequent inductive coding and the interpretation of the emerging themes. Mayring (2000) also points out that applying deductive categories could be useful in connecting the theory and the text; for example, Graneheim and Lundman (2004) sorted interview texts into categories applying predefined key phrases in order to identify visible (manifest) content.

According to Saldaña (2012, pp. 84-87) keywords and key phrases deduced from the research context (i.e., from the topic of enquiry and the research question) can be used code the text applying "structural coding". The aim is to structure the data into relatively large segments that can later be analyzed in more depth applying other qualitative techniques such as thematic analytics. Following Saldaña and the work cited above, a process to develop and apply deductively derived codes was designed and implemented. As shown in

Figure **5-2** it was modelled on the sequence proposed by Mayring (2000).

The research framework (introduced in Chapter 3) was used to define relevant keywords and key phrases expected to identify manifest content areas within the data corpus. For example, according to the model customers may have expectations for the technical *quality* of the service (e.g., bandwidth, area coverage, user interface). The *quality of the service* (RQ1) depends on the contributions of all actors in the supply chain who

therefore, operate within a *complex* context (RQ3) including relevant *laws and regulations* (RQ3). Furthermore, customers require a service that provides clear *value* (RQ1). However, requirements may depend on multiple factors (e.g., age, socio-economic status, location), which makes the customer population very *segmented*. Value expectations and requirements may be influenced by a comparison with the *same or similar service already available* (RQ1) on other channels; therefore, in some cases customer requirements could be met by reworking an *existing service* (RQ1, RQ3) rather than by introducing an *innovative mobile one* (RQ2, RQ3).The complete set of deductively determined codes is shown in Table 5-6.

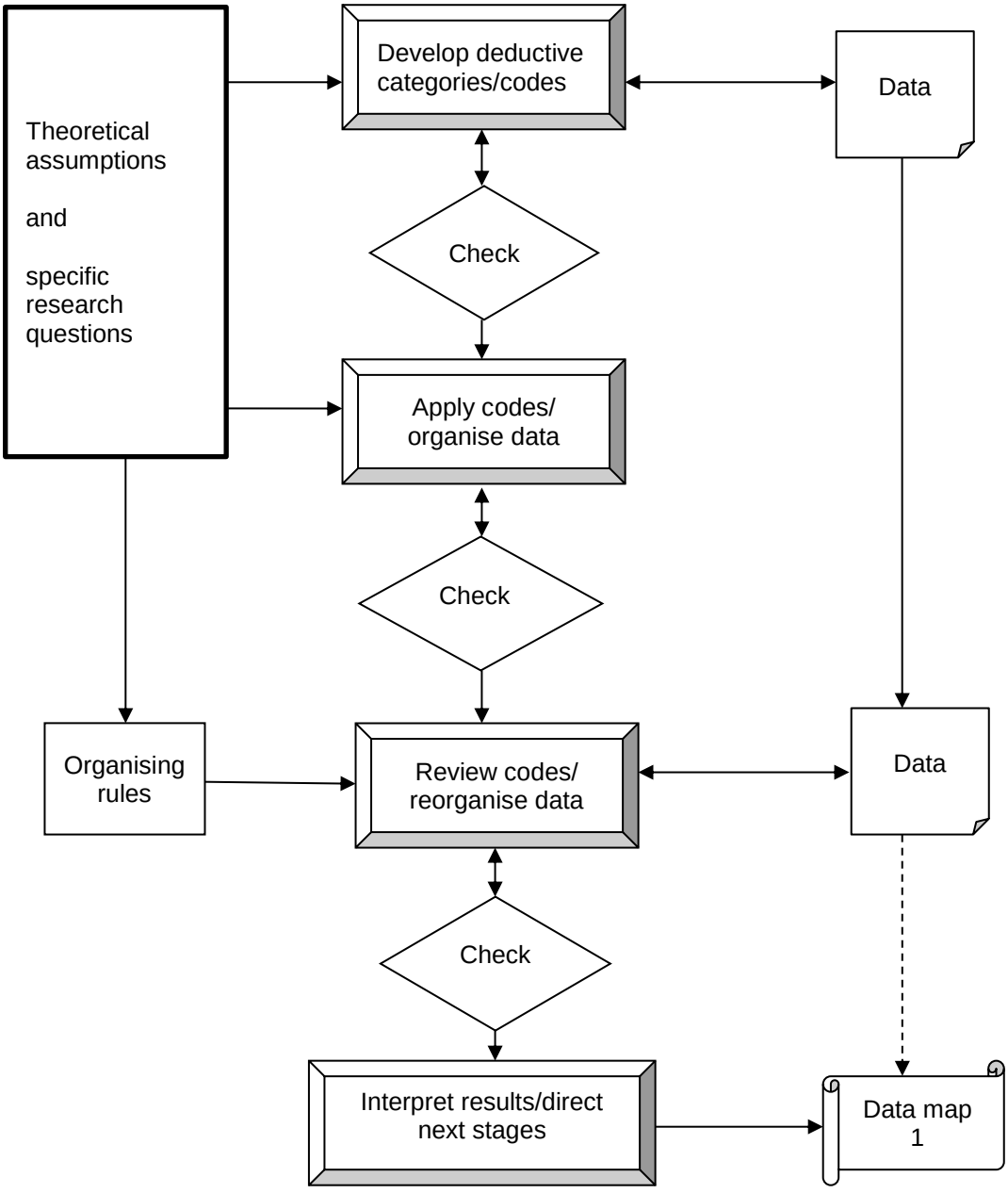

Figure 5-2. Generating deductive codes (Stage 1)

5.5.1 Code reliability

To test the reliability of the codes developed so far, parts of domains ID and IS (responses to questions 10, 12, 13, 15 and 16) were coded independently by K. P. (the researcher) and by her [then] primary supervisor. Another part (responses to questions 7, 8, 11, 14, 17, 18) was coded independently by the researcher and by another PhD student (referred to as O. A.).

The comparison of the results showed that all codes were applicable. However, only REGULATORY ENVIRONMENT formed an explicit self-contained content area with all coders agreeing on which data units belonged to that code. With the remaining nine codes the coders diverged in approximately 30% of the cases, with a number of the coding units coded with two or more codes (INNOVATION was the most consistently applied code across the coders). Overall, the initial set of theory-driven codes was of limited use as it did not help identify manifest content areas. In addition, it was not deemed sufficiently reliable as the value of A was below the 80% threshold set earlier (in Chapter 4).

Table 5-6. Keywords (deductively determined codes)

Code label	Code description
COMPLEXITY	Refers to relationships across the supply chain
SATURATION	Refers to the market where customers are “spoilt” for choice
EXISTING	Refers to the relationship between existing service channel and the mobile channel for the same or similar service
SERVICE QUALITY	Refers to customer requirements about the quality of the service.
SEGMENTATION	Refers to the split of the market into customer groups with specific service requirements (e.g., age related)
VALUE	Refers to the “value for money”’ that the customer expects.
LIFESTYLE	Refers to customer expectations of the service meeting their everyday needs
REGULATORY ENVIRONMENT	Refers to the contextually relevant and applicable laws and regulations that may influence service provision
MOBILITY	Refers to customer requirements and expectations related to supporting mobility
INNOVATION	Refers to the innovative nature of mobile data services

The researcher discussed the outcomes of the test coding with the two coders. It was agreed that the code definitions were difficult to apply to the data units as they were too specific and detailed.

5.5.2 Codes revisited

The deductive codes and their definitions were revisited and changes addressing the issues identified above were made. The existing codes REGULATORY ENVIRONMENT and INNOVATION were retained. COMPLEXITY and SERVICE QUALITY were renamed as SUPPLY and SERVICE respectively, and their definitions

were broadened (Table 5-7) with SUPPLY subsuming SATURATION, and EXISTING, SEGMENTATION and SERVICE subsuming VALUE, MOBILITY, and LIFESTYLE. Thus the overall number of deductive codes was at this stage reduced to four.

Table 5-7. Revised set of deductively determined codes

Code	Abbreviation	Definition
REGULATORY ENVIRONMENT	REG	Apply if the data coding unit talks about regulations, laws
SUPPLY	SUP	Apply if the data coding unit talks about the supply chain (this includes network operators, service providers, service designer, programmers, software developers, other – but not CUSTOMERS)
SERVICE	SER	Apply if the data coding unit talks about customers or users
INNOVATION	INN	Apply if the data coding unit talks about innovation

The reliability testing was repeated on a portion of the data (to the responses to interview questions 7, 8, 11, 14, 17, 18), with the researcher and O. A. performing the coding. The comparisons of the results showed that the revised set of codes were applied in the same way close to 90% of the data coding units. As the value of A was well beyond the lowest acceptable value (80%), it was deemed satisfactory and the set of codes was used at the next step of the analysis.

5.5.3 Applying the deductive codes

The data units in the two data domains (ID and IS) were coded independently by the researcher and by O. A., following the rules in Table 5-8. Data domain ID was coded first as it was the smaller of the two in terms of number of units (it comprised 93 units while the ID data domain comprised 184 units). Having in mind the earlier observation that a number of data coding units (large sentences) contained more than one "meaning" it was decided to allow associating more than one deductive code with a data coding item. This decision was supported by Spiggle's (1994) suggestion that if a portion of text was found to "exemplify different categories of interest" it should be labelled with multiple category codes (p. 493). Using two or more codes ("simultaneous coding") is justified depending on the context. However, excessive multiple code occurrences may mean that the coding scheme lacks focus (Saldaña, 2012, pp. 80-81).

Table 5-8. Deductive coding rules

#	Rule
1	Apply a code if confident
2	If confident to a degree, add a qualifier (-) to indicate
3	Leave blank if not confident
4	Apply more than one code if confident

It appeared that only a small portion of the text was coded differently as the two coders had assigned different codes in just eight cases (i.e., the value of A was about 91%, well

above 80%). In addition, O. A. had not been confident to assign a code to 18 units (19% of all units). In further 12 cases (13% of all units) the code assigned by O. A. matched one of the two codes assigned by K. P. but not the other one.

The researcher met with O.A. in order to discuss the outcomes of the coding of the ID data domain and to reconcile the differences. The disagreements were resolved. In five cases the code suggested by O. A. was assigned, in three cases the code suggested by K. P. was assigned. Furthermore, three of the units not coded by O. A. were assigned a unique code and 15 were assigned two codes. The coders also checked and recoded data units coded with a minus sign (-) by O. A. (who at times doubted his understanding of the context).

Further checking showed some data units could be interpreted only in conjunction with an adjacent data unit. For example, DUN 12 (below)

> *If we look at the history of one of the biggest mobile game companies Gameloft we will see that the company did not succeed in becoming a world leader although it was a pioneer in this field (DUN 12, Part. P7R12).*

provides context for DUN 13:

> *In order to be successful, the undertaking has to offer something new that is better and more convenient for users than the ways they are currently using – and this is not an easy task (DUN 13, Part. P7R12).*

Spiggle's (1994) recommendation is to discard such text elements from further independent coding and if appropriate amalgamate with other units. Subsequently DUNs 12 and 54 were further considered jointly with DUNs 13 and 55 and one unit was discarded as non-meaningful: "*None I can think of" (DUN 2, Part. P6R11);* the number of ID domain data coding units to be analyzed further was reduced to 90.

During the examination of the coded text it was found that on several occasions the response could be labelled with one of the four codes; however, a lack of confidence was also evident in the participant's response. It was decided by the researcher to add a new code (UNCERTAINTY, or UNC) and apply it where appropriate; the relevant units were re coded accordingly. Overall 14 data coding units were assigned two codes and one unit was assigned three codes. Examples are provided in Table 5-9.

Table 5-9. Examples of deductively coded data units (domain ID)

Deductive code(s)	Data coding unit and interviewee ID
SER	*"What really matters is the value that the mobile product brings and how desired the solution is" (DUN 24, P11R18)*
SUP	*"What is more, most of the successful paid products very quickly stimulate developers to make a free for use analogue (the successful free Open Office alternative to MS Office package is an example)." (DUN 19, P7R12)*
INN	*"Yes, of course, this is an intensely developing sphere of IT and there is much potential in it – in order to use this potential effectively, there is a constant need of new services." (DUN 67, P5R10)*
REG	*"I don't think that in Bulgaria the state is regulating how a mobile application will be distributed as long it does not break any fundamental laws (through racism propaganda for example)." (DUN 46, P7R12)*
UNC	*"Mobile technologies are a market that may have the potential to develop. If and when this will happen, I can't tell." (DUN 64, P7R12)*
SER + SUP	*"Of course, this depends on the application. If it is a game, users and needs are totally different from those of e-banking".(DUN 39, P7R12)*
SER + INN	*"A market they could be offered at; – Interesting ideas that would motivate people to use new development." (DUN 26, P5R10)*
SER + SUP+ INN	*"Obstacles are: too high investment costs and unsatisfactory return on investment, too narrow customer base, unwillingness to change previous routines and customer behaviour (traditionalists), bad marketing communication, weak use cases, no superior selling proposition etc." (DUN 7, P11R18)*
SUP + UNC	*"There are no clear criteria exactly what the market wants. The developers have to overcome the limitations of mobile devices." (DUN 29, P7R12)*

Similarly, the results of the coding of data domain IS were discussed by the coders at a working meeting. All data were coded excluding the interview with P12R19 which was set aside to be coded at the end of the process, as a way of checking the applicability of codes – recommended by Lincoln and Guba (1985) as cited in (Seale, 1999, p. 44).

It appeared that in the IS data domain: (i) 166 units were coded by both coders (with 22 disagreements, the value of A was about 88%); (ii) 15 units (9%) were not coded by O. A. due to lack of confidence, and (iii) 10 units (5%) were not coded by any of the coders due to lack of clarity in the transcript. As A met the 80% threshold, the coding process continued as explained next.

The differences were resolved in a discussion. To test the resulting understanding the P12R19 interview data were coded independently by the two coders, who agreed on all codes. After clarifying the meaning of the text by referring to the interview question codes were allocated to units not coded previously. Examples are shown in Table 5-10. Four units were excluded as not meaningful (DUNs 106, 147, 153, 154; see, for example, *"I don't have an opinion"*, DUN *147, P1R2*) thus reducing the number of units to be analyzed further to 187.

After the conference the researcher reviewed the coding and added a second code where a data unit was found to relate to two different content areas. O. A. did the same

independently; the codes were discussed once again, resulting overall in 24 data coding units being assigned two codes. Examples are provided in Table 5-10.

Table 5-10. Examples of deductively coded data units (domain IS)

Deductive code(s)	Data coding unit and interviewee ID
SER	*"Inertia of older consumers, expressed in fear and resistance against innovations and developments." (DUN 94,P1R2)*
SUP	*"From this perspective, the lack of investments and a flexible investment policy are the biggest challenges for telecoms." (DUN 101, P4R9)*
INN	*"Yes, because of competition prices are falling down and the operator has to be innovative and constantly work on its services." (DUN 159, P9R16)*
REG	*"There are restrictions for competition (financially), but there is enough advertisement freedom." (DUN 152, P9R16)*
SER + SUP	*"Because of competition, the market is contributing to the development of new services and thus keeps the need for operators to constantly amend the products they are offering." (DUN 158,P8R15)*
SER + INN	*"Innovation is important in this sector – …The customer has the choice how to get something done." (DUN 217, P10R17)*
SUP+ INN	*"Innovation is very important…: Need to be well-informed;" (DUN 212, P9R16)*

Figure 5-3shows the deductive code distribution within each data domain and across the whole Study 1 data set. At a glance it seemed that most of the meanings were clustered thematically under one or more of the codes SER, SUP, and INN while less content was related to REG and UNC (no IS domain data were coded as UNC).

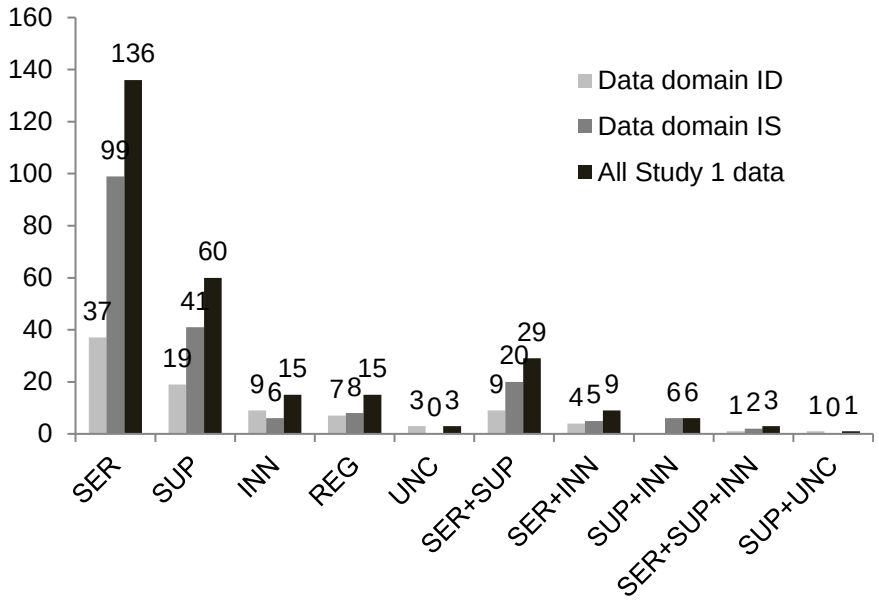

Figure 5-3. Deductive code distribution

The deductive coding described above showed that the data contained meanings relevant to the specific research questions and provided an initial understanding of the data content and potential relationships. For example, while the majority of the data were clustered in a similar way within each domain, the cluster labelled UNC was different (Figure 5-3) The code distribution also indicates that the content clustered

thematically around SER, INN and SUP may be “richer” compared to the content related to REG and UNC.

The data map derived at the first stage of the analysis (shown in Figure 5-4 as Data map 1) represented a very high-level view of the data collection (the numbers next to the lines that link clusters indicate the number of data units coded with two or more deductive codes, as indicated in Figure 5-3). The subsequent inductive coding which applied codes representing meanings (i.e., data driven codes) allowed to investigate in more depth the specific patterns and relationships emerging from the data, within and across the thematic clusters represented by the deductive codes SER, INN, SUP, REF and UNC.

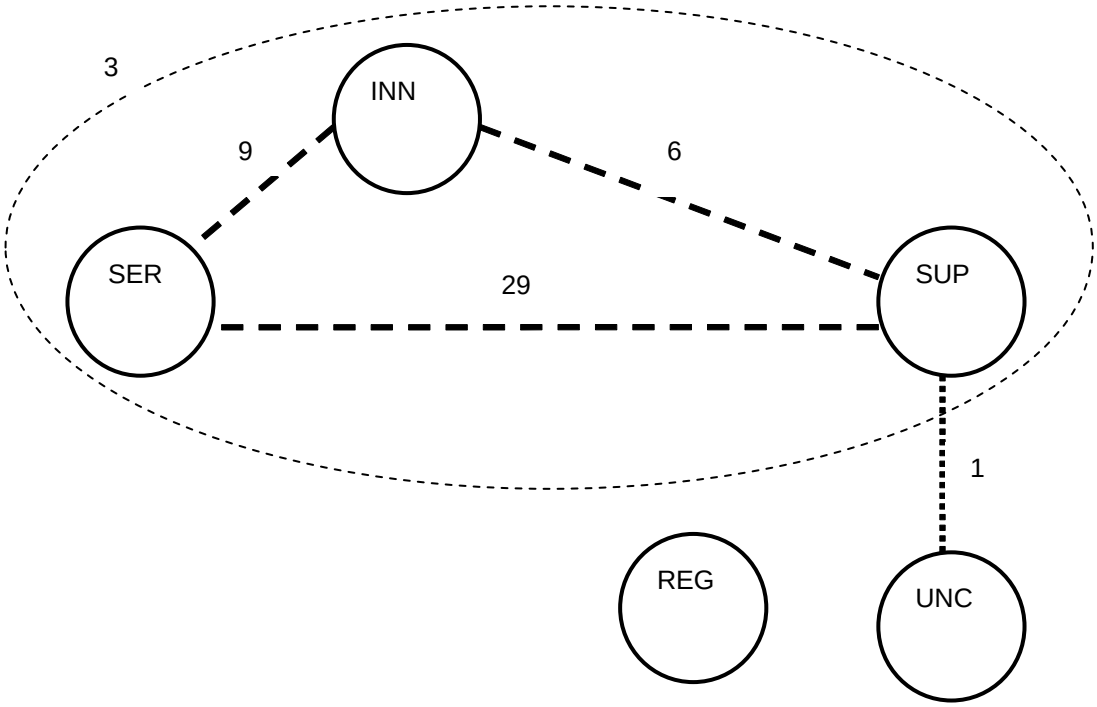

Figure 5-4. Data map 1

5.6 Study 1: Inductive Coding of the ID Data Domain (Stage 2)

After gaining an initial insight into the data the analysis proceeded with in an iterative coding of the data in the ID domain which were read and interpreted systematically in order to identify meanings and define data-driven codes representing the meanings. The codes were revised iteratively in order to refine the definitions, with subsequent recoding of the data units where existing very similar codes were merged. Where

applicable super codes were developed to combine the codes that were assigned to specific aspects or characteristics of the super code. The codes and the super codes were categorized based on relationships. The process is explained in detail further below.

5.6.1 Data driven coding

At the start of this stage the researcher had to determine where to start, i.e., with which data coding unit, and how to choose the next data coding unit. The aim was to maintain an efficient and manageable process; considering the representation of the data in Data map 1 the researcher decided to code the data cluster by cluster. The cluster INN was selected as the one to start with as it was relatively well populated but sufficiently small to allow iterative coding and multiple revisions; in addition, it was linked to other clusters and therefore, it was potentially a source of codes applicable to data in the rest of the clusters.

Starting with INN the researcher trialled extracting meanings and interpreting them in order to derive codes using the INN data units; once the technique was mastered the rest of the data were also coded. The coding protocol followed was close to in vivo coding as described by Saldaña (2012): code definitions were kept close to the text representing the meaning in order to preserve the participants' use of terms and concepts. In vivo coding is a method normally used at the early stages of the interpretive coding and is recommended to be used in studies where practitioners' opinions are sought and the initial interpretation is framed in terms found in the data rather than in purely academic terms (p. 92); in vivo codes can be applied with variable frequency density (from one code for every line of text, to one code for one to three sentences). As Study 1 participants were practitioners (industry experts) and the data coding unit definition (a complete sentence) was appropriate, in vivo coding was considered suitable as a method to be deployed at the start of the inductive coding.

Each data unit was examined, one or more meanings were extracted and one or more codes were defined and assigned to the unit, based on the meaning(s). The code definition aimed to represent the meaning in a condensed form but using wording found in the original data unit as also suggested by Graneheim and Lundman (2004). Each code was given a code label that was also explicitly related to the meaning. The code labels and definitions were maintained up to date with codes being added, revised, and redefined as needed.

The data were systematically reviewed to determine whether one of the already induced codes was applicable, before generating a new one. As before, Spiggle's (1994) recommendation was followed and data units exemplifying multiple meanings of interest were assigned multiple codes. Where necessary the relevant context (interview question and original transcript) were revisited in order to define the code. The process is shown in Figure 5-5.

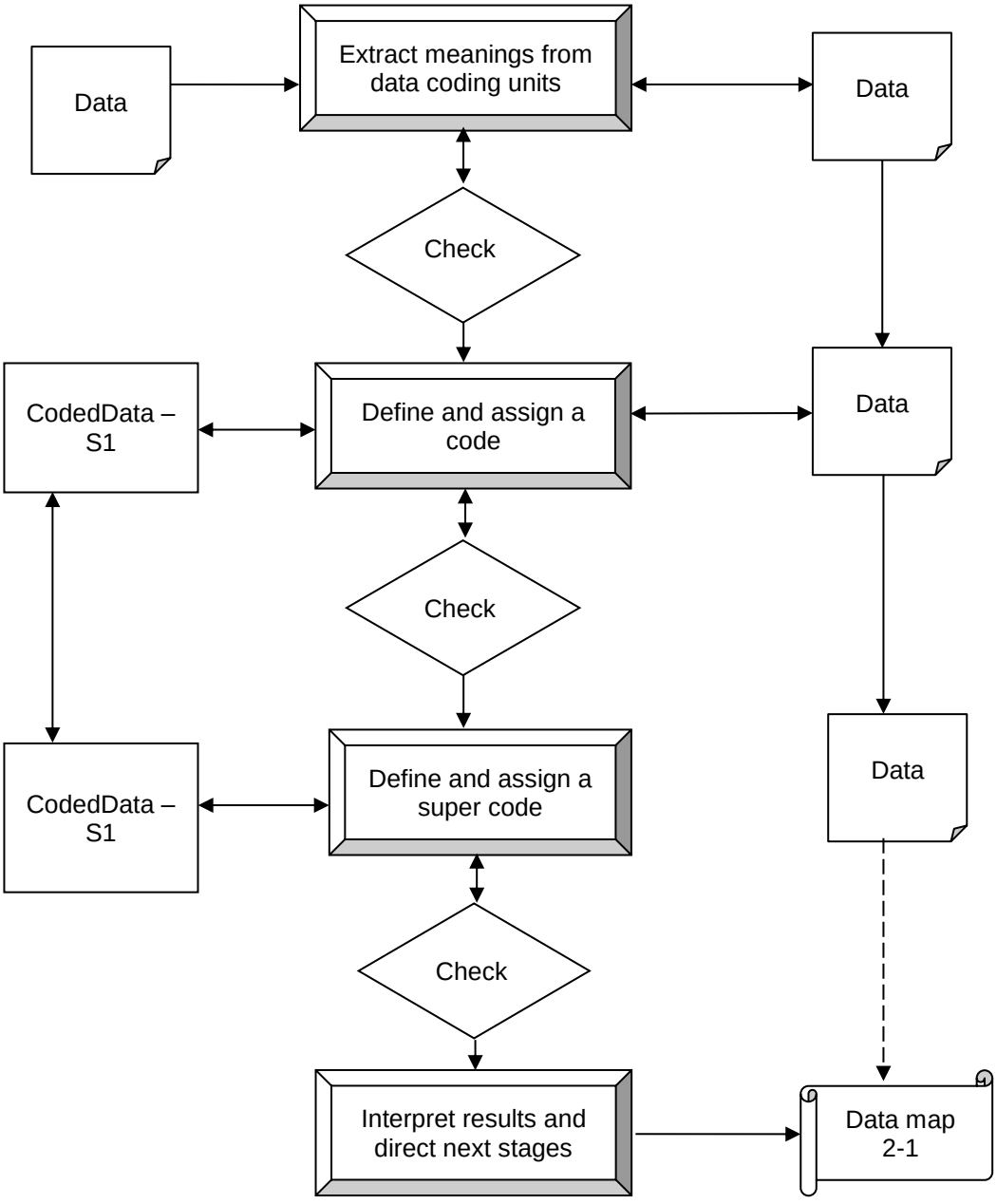

Figure 5-5. Generating codes and super codes (Stage 2)

The coding was done by the researcher with frequent checks by her (then) primary PhD supervisor. The process was highly iterative and involved reading and re-reading the data, and creating and managing multiple generations of MS Excel® spreadsheets; cell highlighting was used in order to keep track of the work and maintain the integrity of

the analysis. The process was also both time- and labour-consuming as each data coding unit was examined on the average four times; however, it provided a measure of confidence in the outcomes. Ideas about emerging themes were noted down and recorded separately in preparation for the following stages.

As sentences were often long and conveyed a range of meanings the inductive coding described above generated a relatively large number of codes (125) compared to the number of data units that were coded (90). To preserve the context and the participant's language as much as possible, parts of the text were often used as code labels and definitions thus adding to the "bulkiness" of the electronic record.

Introducing super codes reduced the overall number of codes and facilitated the next step of the analysis. Where appropriate closely associated codes were grouped together to form a composite super code by combining the respective code definitions (Figure 5-6). As not all initially defined codes were found to be part of a super code, at the end of the process such codes were converted into super codes (the code label and definition were retained as the new super code label and definition). All code and super code labels and definitions were added to the relevant data units and a record was kept in CodedData-S1. Anchoring the super codes and codes into the data helped preserve the relevant context. It also helped to maintain a data coding continuity through the iterations by keeping changes in super code definitions and labels aligned with the meanings used to define them. Several examples are shown in Figures 5-7, 5-8 and 5-9.

"*Or, even more trivially – to buy a coffee from the machine, sending an SMS to the number given". (DUN 85, Part. P7R12).*	
Code label: Paying at vending machines	**Code definition:** Mobile phones can be used to pay at vending machines
"I would say that a mobile phone can even give an additional option of paying the public services (those services are already being offered but not broadly used)". (DUN 85, Part. P7R12).	
Code label: Paying bills	**Code definition:** Mobile phones can be used to pay utilities
Super code label: Attractive use scenarios exist	**Super code definition:** Attractive scenarios already identified such as paying bills, paying at vending machines

Figure 5-6. Two related meanings from two data coding units (two codes, one super code)

In Figure 5-7 one data coding unit was interpreted, two meanings were extracted, and two different codes were generated. Conversely, the two data coding units in Figure 5-8 were coded with the same code (also converted to super codes at the end of the stage).

"Obstacles are: too high investment costs and unsatisfactory return on investment, too narrow customer base, unwillingness to change previous routines and customer behaviour (traditionalists), bad marketing communication, weak use cases, no superior selling proposition etc." (DUN 7, P11R18).	
Super code label: Customers conservative	**Super code definition:** Customers generally "traditionalists"
Super code label: High investment cost	**Super code definition:** Mobile business service have low ROI and the investment cost is high

Figure 5-7. One data coding unit, two meanings (two super codes)

"The price, the way of distribution and attracting (marketing), distribution – are distrustful can only be convinced by opinions friends who have good impressions" (DUN 60, P6R11). *"If I have to express an opinion – it is definitely the price users would pay, in order to use a certain product (not only the buying cost, but also the expenses for its future use)" (DUN 62, P7R12).*	
Super code label: Decision influenced by cost	**Super code definition:** Customer attitude is influenced by service cost

Figure 5-8. Two very similar meanings (one super code)

Figure 5-9 shows how a meaning that manifested the opposite view to a meaning already coded was labelled so that the new super code label ("Decision influenced by cost – not") showed the relationship to the existing code. This naming technique facilitated sorting by super code in the spreadsheet and subsequent searching.

"The price, the way of distribution and attracting (marketing), distribution – are distrustful can only be convinced by opinions friends who have good impressions" (DUN 60, P6R11).	
Super code label (existing): Decision influenced by cost	**Super code definition (existing):** Customer attitude is influenced by service cost
"For other apps with health apps, customers are anyway willing to pay more and price is not such a big issue in my opinion" (DUN 23, P11R18).	
Super code label (new): Decision influenced by cost – not	**Super code definition (new):** Cost not an issue with customers.

Figure 5-9. A new meaning opposing a previously identified one (a new super code)

In summary, 161 meanings were extracted "bottom-up" from 89 data coding units in the ID data domain (data coding unit DUN 66 was dropped from further analysis as its meaning was found too generic), with 83 super codes defined (a 34% reduction compared to the 125 initially defined codes). More examples are shown in **Error! R eference source not found.**. The data coding units whose DUNs are mentioned in the table can be located in Appendix H by applying the data cross reference key and locating the relevant data table and row within the table.

As the number of super codes was significant it was difficult to represent all super codes and codes graphically. Some aspects of the findings at this stage are illustrated by the map in Figure 5-10 (Data map 2-1). The map shows the thematic clusters identified at Stage 1 and the number of super codes assigned to meanings within each cluster; clusters sharing super codes are shown as linked.

Table 5-11. Examples of codes and super code labels and definitions

Super code label (sorted alphabetically)	Super code definition (repeats or combines code definitions)	Code label	Code definition	Thematic cluster	Meaning found in
anytime/anywhere services valued	customers value entertainment applications because of their availability any time/anywhere	anytime/anywhere services valued	customers value entertainment applications because of their availability any time/anywhere	SER	DUN 91
decision influenced by cost	customer attitude is influenced by service cost	decision influenced by cost	customer attitude is influenced by service cost	SER	DUN 57
				SER	DUN 59
				SER	DUN 60
				SER	DUN 62
				SUP	DUN 8
expectations for rich experience	need for services that enrich an maximize customer experience	expectations for rich experience	need for services that enrich an maximize customer experience	INN	DUN 69
				INN	DUN 72
free services valued	free applications, trials are valued and used more	free existing applications attractive	existing mobile applications are free	SUP	DUN 22
		free trial attractive	free trial generally found attractive	SER	DUN 16
				SUP	DUN 15
				SUP	DUN 17
lack of knowledge about customers	customer market needs are not known and difficult to predict	unknown customer market	market needs not known	UNC	DUN 28
				UNC	DUN 29
regulations exist that are also applicable	many of the existing regulations also applicable – communications, gambling, anti-racist propaganda	anti-racist propaganda regulations applicable	anti-racist propaganda regulations applicable	REG	DUN 46
		communications regulations applicable	communication and communication services regulations applicable	REG	DUN 43
		gambling regulations may apply	gambling regulations applicable	REG	DUN 45

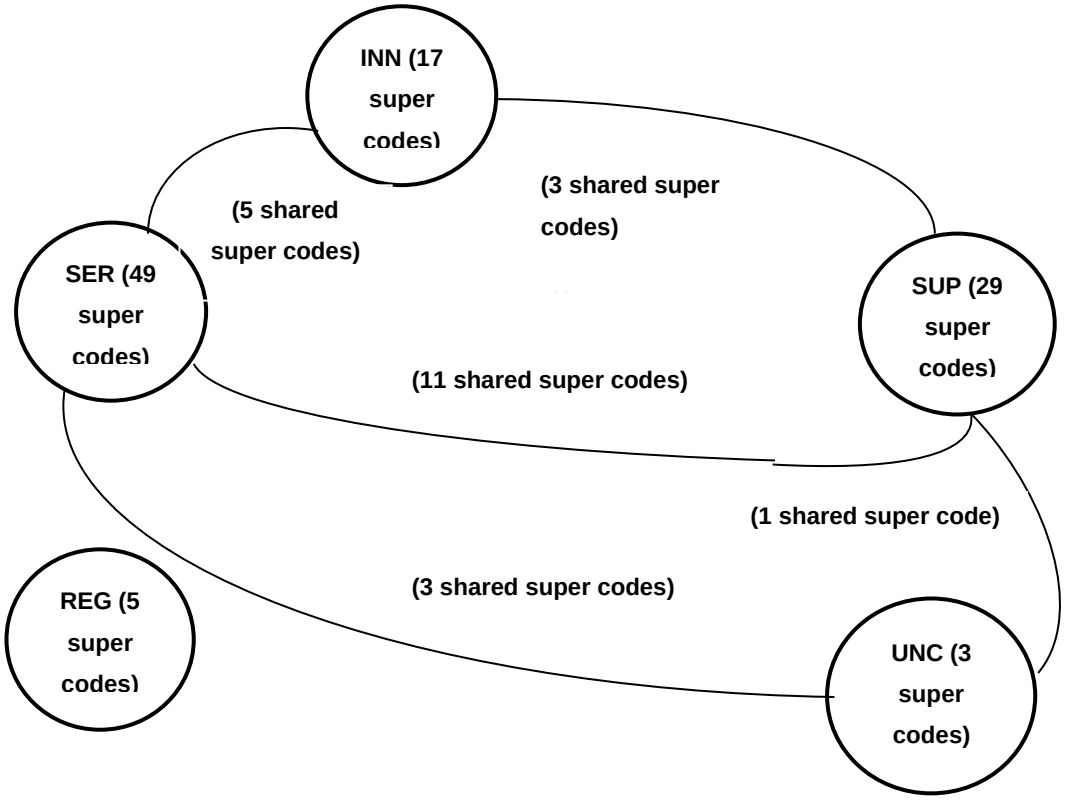

Figure 5-10. Data map 2-1 (numbers in brackets show number of super codes)

The intermediate state of the coded data set generated at the end of the process is shown in Appendix I. It contains the respective super code and code labels and definitions, and references to the relevant data coding units (including also the thematic cluster in order to preserve the stage-to-stage "audit trail" of the coding process).

5.6.2 Categorizing super codes

The data reduction achieved at the previous stage was not significant as the number of super codes were very close to the number of data coding units. However, representing the codes visually helped group some super codes and identify potential links and relationships between the super codes within and across the thematic clusters. A hand-drawn "linking and grouping" graphical illustration can be seen in Figure 5-11 (which is one of the many such drawings that were used to facilitate visualizing). The links show how that several emerging groupings of super codes formed a pattern that could lead to developing a theme.

An example of grouping codes that contributed to the same more general meaning can be seen in the bottom left corner of Figure 5-11 where the super codes "Free applications available", "Paid services less popular", and "A successful model exists" all "talk" about the potentially successful business model that includes a "free" mobile

service. A reference to the relevant data coding unit and the extracted meaning that generated the super code can be seen in Figure 5-12. [Note: This and the examples further down in the text refer to a super code by the most current version of its label at the time of writing up the analysis notes (i.e., as in Appendix I).]

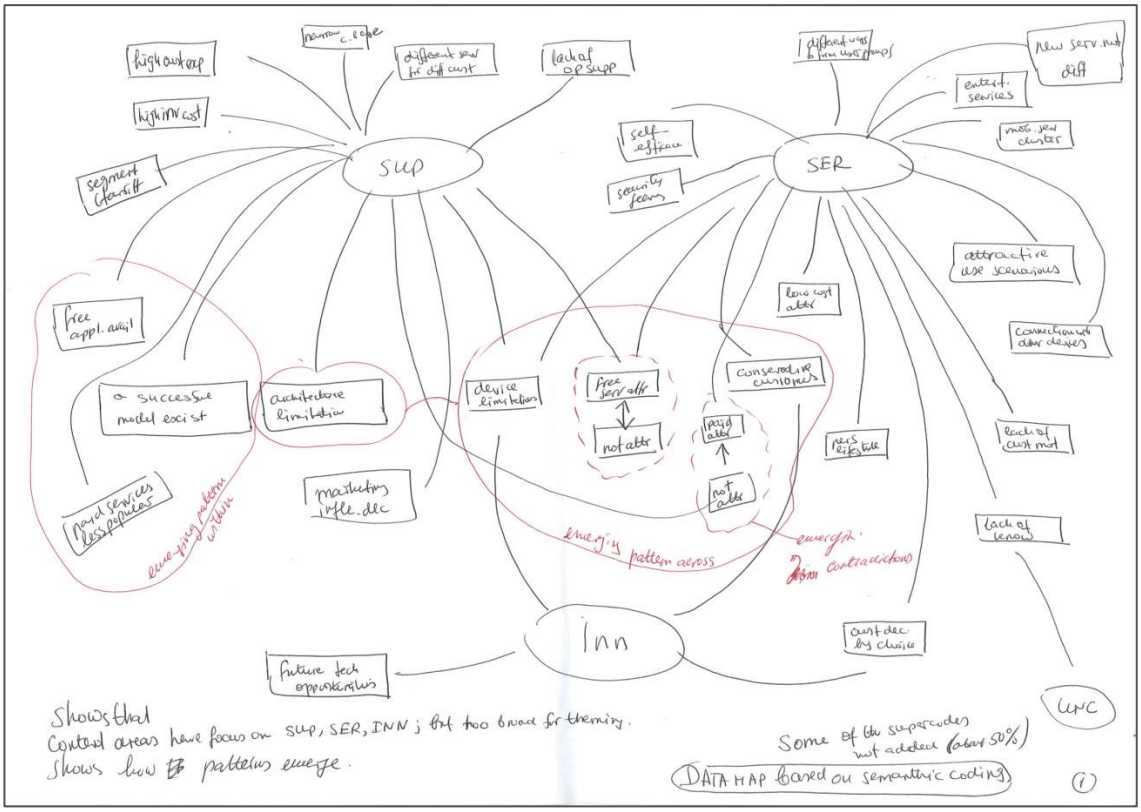

Figure 5-11. Visualizing patterns and structures

Once a pattern was identified the researcher looked at the rest of the super codes, and the data, in order to see whether other super codes could be added; for example, the super codes "Free services attractive" and "Paid services not too widely used" (seen in the middle of Figure 5-11) could also be part of the grouping "Free service". An emerging grouping of related codes pattern could be observed directly below the circle labelled SUP – it included two super codes related to "Limitations"; the super codes were defined by interpreting meanings extracted from three data coding units found in interviews with two participants as shown in Figure 5-13.

"Free services"	
[SUP] Free applications available	*"Usually most of the apps are for free or cost no more than 1 or 2 euro" (DUN 22,P11R18).*
[SUP] Paid services less popular	*"Given the distribution and use in other countries (in Bulgaria it is still very limited) – rather yes". (DUN 10, P61R11).*
[SUP] A successful model exists	*"Yes, I firmly believe that a given free product can give much more profit with its popularity, than a product that is paid and because of this – less used/less known" (DUN 18, P7R12).*

Figure 5-12. Emerging super code grouping "Free services"

"Limitations"	
[SUP] Architecture limitations	*"Perhaps the limited resources of the devices …. although technology is developing very fast, there is still much to be desired" (DUN 3, P6R11).*
[SUP] [SER Limitations due to device design	"*Perhaps the limited …. architecture – although technology is developing very fast, there is still much to be desired" (DUN 3, P6R11).* *"The developers have to overcome the limitations of mobile devices" (DUN 29, P7R12).* *"Having I mind the limitations of mobile devices (That are being more and more overcome, but still do exist…") (DUN 93, P7R12).*

Figure 5-13. Emerging super code grouping "Limitations"

A different type of grouping included structures of "opposite" super codes (indicating a disagreement) - for example, the two structures circled with a dotted line in the middle of Figure 5-11. The data and codes related to the second pair are shown in Figure 5-14 ("attractive" was later replaced with "valued").

"Free services valued vs "Free services not valued"	
[SUP] Free existing applications attractive	*"Usually most of the apps are for free or cost no more than 1 or 2 euro." (DUN 22, P11R18)*
[SUP][SER] Free trial attractive	"*Undoubtedly free applications attract the interest of people …" (DUN 15, P5R10)* *"Especially in our region – yes because it was 'not affordable' for everyone to pay to use something (this is also due to mentality – we are usually dissatisfied). "(DUN 16, P6R11)* *"But in any case, this [free trial] is a proven technique in sales, so there is no reason not to have an effect also on mobile applications." (DUN 17, P6R11)*
[SER] Free trial increases popularity	*"Yes, I firmly believe that a given free product can give much more profit with its popularity, than a product that is paid and because of this – less used/less known."(DUN 18, P7R12)*
[SUP] Free services not valued	*"…if they are not well made and sufficiently functional, as is usually the case with free stuff, the user would rather not use that application or would consider buying the paid version, which will have a much better good maintenance.", DUN 15, P5R10*

Figure 5-14. Opposing participant views

The patterns and structures identified as a result of interpreting the super codes signified the existence of relationships in the data that needed to be revealed and interpreted further. However, the number of super codes was considerably high and difficult to present graphically in one observable area making it difficult to identify relationships and see clearly how these could lead to themes. Therefore, it was decided to examine systematically all super codes along with underlying data coding units and identify and record the relationships found in a structured way (Figure 5-15).

The aim was to relate the super codes already created to each other in order to support the development and final definition of themes. An approach similar to the "code mapping", a qualitative data display strategy described in (Saldaña, 2012, pp. 194-198), was applied as a useful way to organize the in vivo codes already developed. Throughout multiple iterations the super codes were compared and grouped and re-grouped in order to identify groups of codes that seemed to "go together" (p. 196).

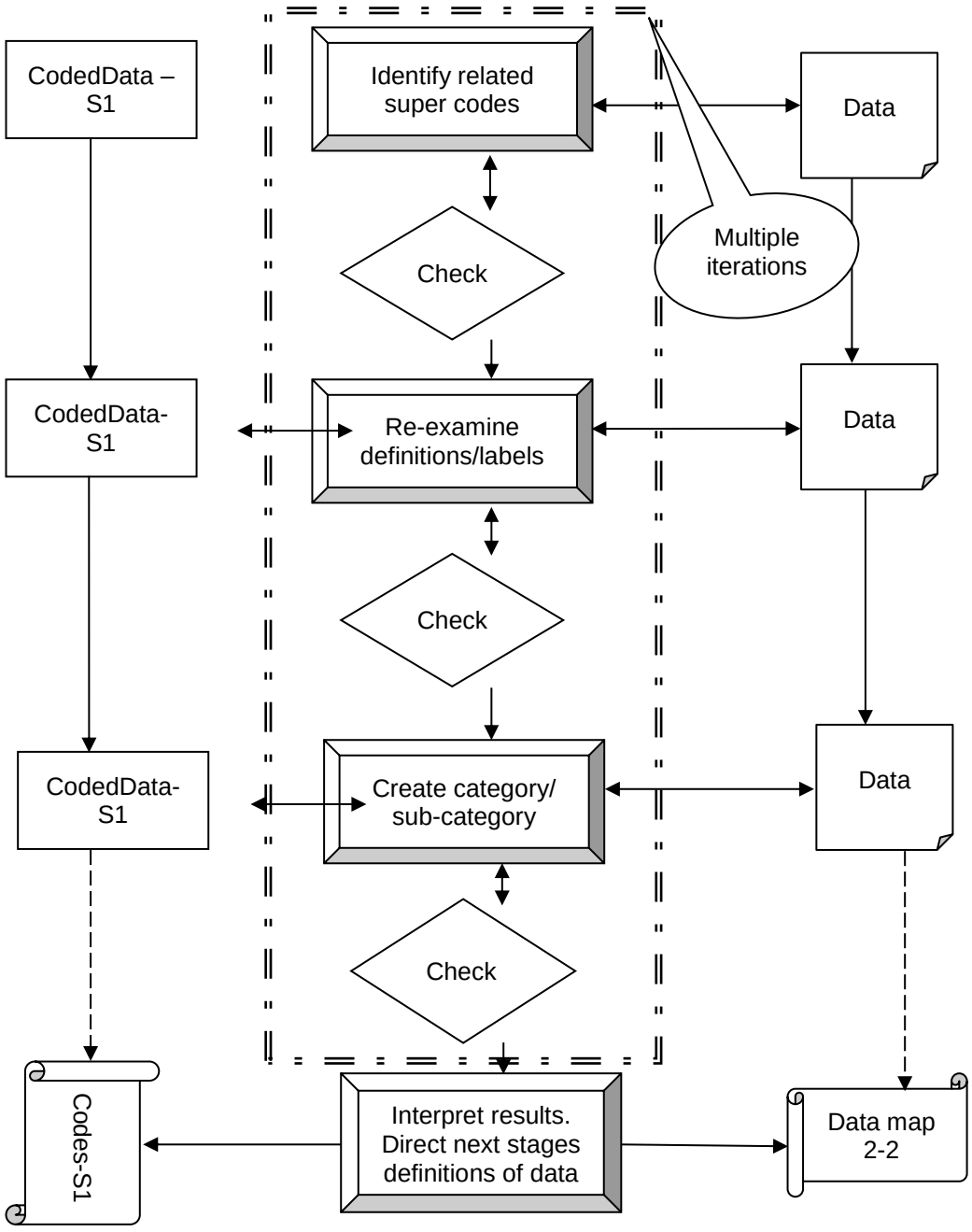

Figure 5-15. Mapping codes and super codes onto categories and sub-categories

As data and code/ super code definitions were re-read the definitions were checked again for adequacy and consistency. The super code labels were also revisited and where appropriate, modified to reflect better the coded content and to allow easy sorting. Second, the super codes and the underlying meanings were examined in order to identify groups or "families" of codes exhibiting a common characteristic (Gibson & Brown, 2009, p. 138) and signifying the "beginning of a pattern" (Saldaña, 2012, p. 9). The super code families and nested groups were used as a means to categorize the super codes into categories and sub-categories. As in (Graneheim & Lundman, 2004) the categories were seen as threads through the super codes already assigned and as a means

to describe and express manifestly the concepts that were represented in the underlying text; the resulting taxonomy of concepts could be used to identify themes and develop a theory at the next stages of the analysis (Bradley, Curry, & Devers, 2007, p. 1763).

Hand-drawn visualizations were used; examples are shown in Figure 5-16 and in Figure 5-17 where emerging meanings or concepts were identified and are indicated by circling groups of codes. The drawing in Figure 5-18 is an early attempt to define the category CUSTOMERS (participant opinions, ideas, perceptions about what customers want, need, and expect). The two upper levels of the emerging hierarchy of codes (categories and sub-categories) were created iteratively by grouping and regrouping super codes. For example, the visualization in Figure 5-19 shows a category SEGMENTATION (customer market segmented into groups according to demographics (age), socio-economic factors, self-efficacy, or specificity of requirements, or in a multidimensional way) which upon reflection became a sub-category of CUSTOMERS (Figure 5-20).

Also shown are structured groups of super codes that reflected opposite views in the category SERVICE SUPPLY AND DEMAND (participant ideas, opinions and perceptions about developing and offering mobile services); these structures were split to form appropriate sub-categories (e.g., the two branches of Demand seen in the bottom left corner of Figure 5-19 became two sub-categories of SERVICE SUPPLY AND DEMAND (Figure 5-20).

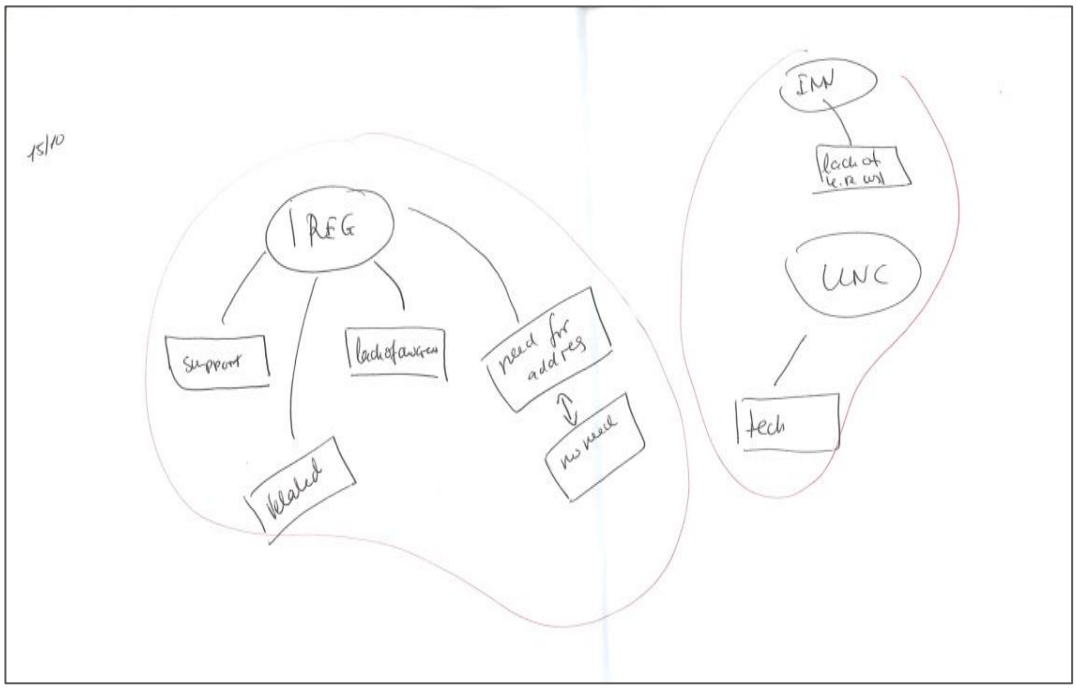

Figure 5-16. Two super code groupings

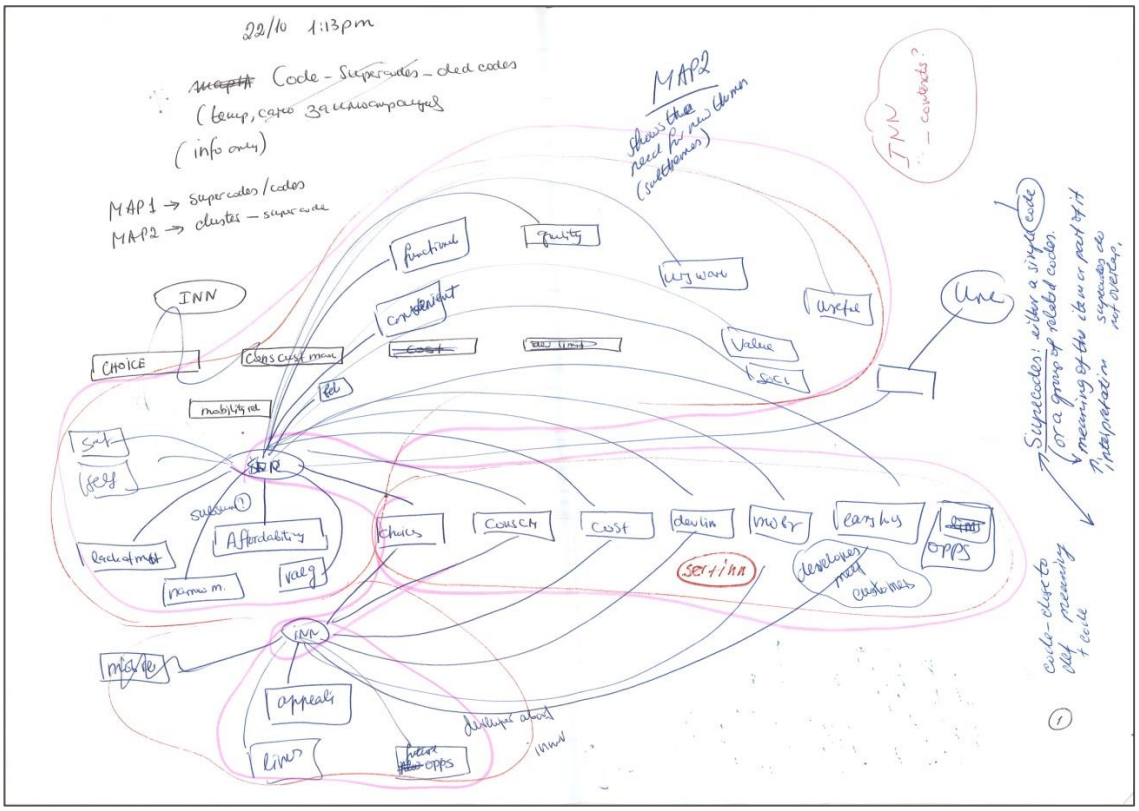

Figure 5-17. Emerging sub-categories

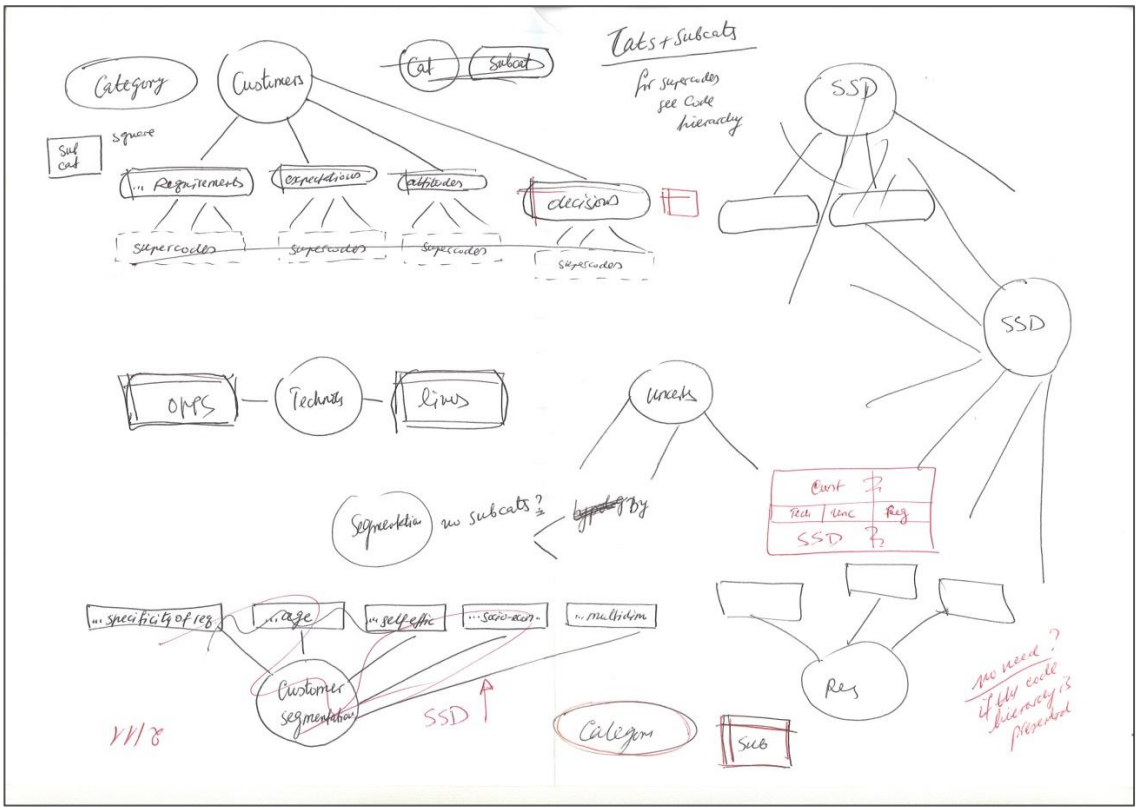

Figure 5-18. Identifying the category CUSTOMERS and its sub-categories

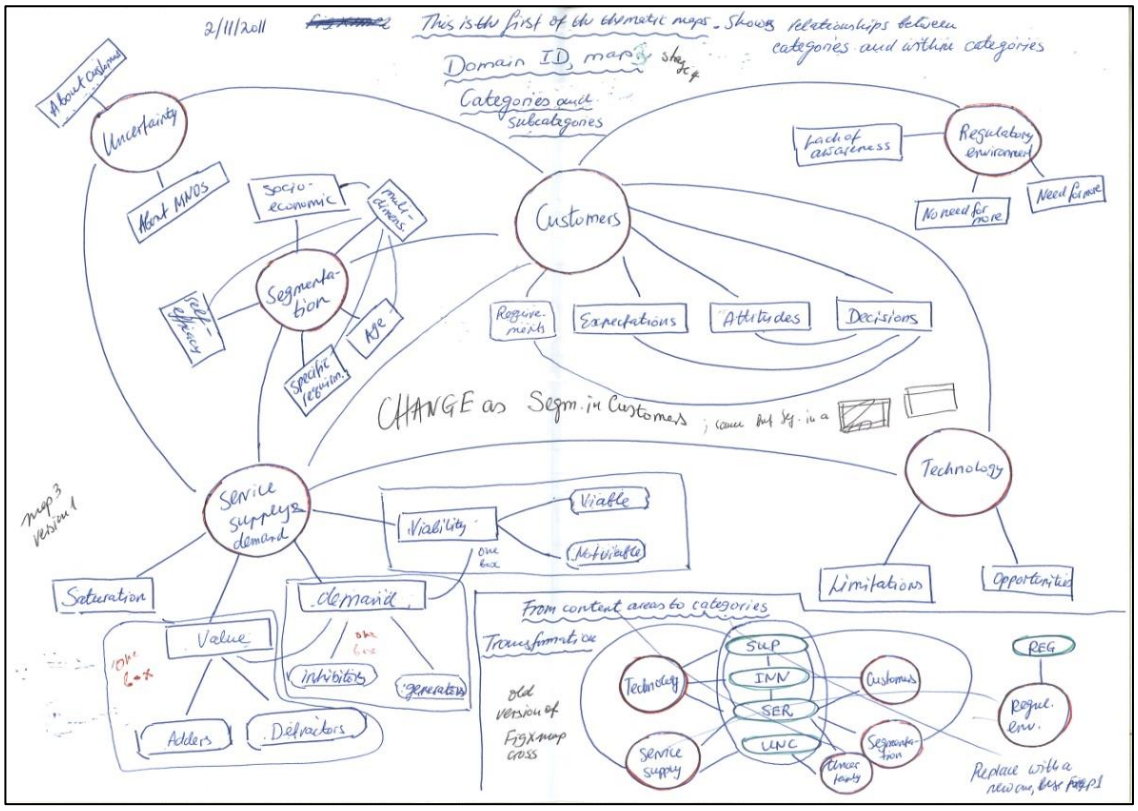

Figure 5-19. SEGMENTATION as a potential category; groups of super codes with opposite meanings

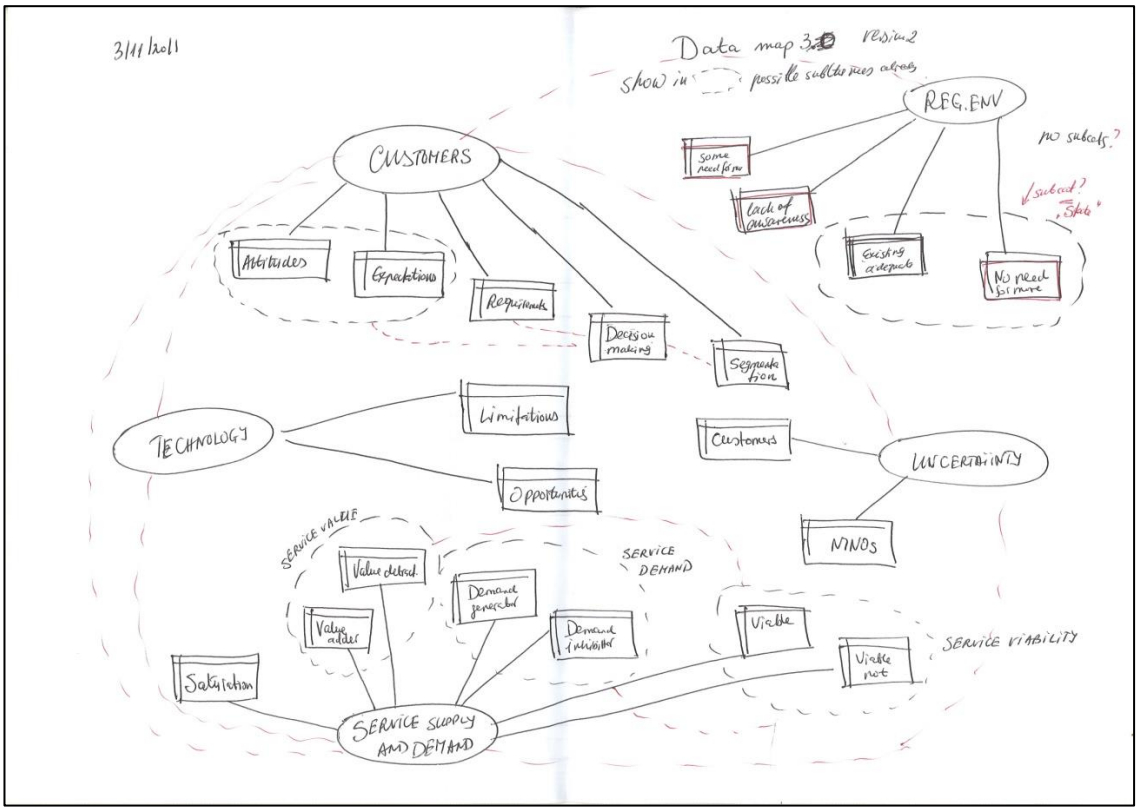

Figure 5-20. Categories and sub-categories

The categories (and the sub-categories within them) are comprehensive and mutually exclusive, i.e., a sub-category can be part of one and only category, and a super code can belong to one and only one sub-category. A summary of the code hierarchy is

shown in Table 5-12 (for a complete version showing all categories, sub-categories and super codes, see Appendix J). The categories and sub-categories were added to the updated electronic record of the coded data updated to contain all relevant labels and definitions including all previously defined super codes (Appendix K).

Table 5-12. Category and sub-category definitions

Category and sub-category definitions	
Category: **CUSTOMERS**	
Perceptions and opinions about customer attitudes, behaviours, requirements and expectations in the context of current and future mobile business services, and the resulting customer market characteristics	
Sub-categories	
CUSTOMER ATTITUDES	Perceptions about the attitude of customers towards services based on mobile technologies
CUSTOMER DECISIONS	Perceptions about the factors that influence customer decisions about the use and adoption of services based on mobile technologies
CUSTOMER EXPECTATIONS	Perceptions about customer expectations about service/ market performance
CUSTOMER REQUIREMENTS	Perceptions about what customers need to see in a mobile service
CUSTOMER SEGMENTATION	Perceptions about what customers need to see in a mobile service
Category: **SERVICE SUPPLY AND DEMAND (SSD)**	
Perceptions and opinions about mobile businesses service demand, value to customers, and viability, and the characteristics of the service supply space	
Sub-categories	
SERVICE DEMAND GENERATOR	Customer demand growth can be stimulated
SERVICE DEMAND INHIBITOR	Customer demand growth is inhibited
SERVICE SATURATION	Customers have choice of similar services
SERVICE VALUE ADDER	Service features and functions that can make a service attractive and desirable.
SERVICE VALUE DETRACTOR	Service features and functions that may decrease the attractiveness and the desirability of a service.
SERVICE VIABLE	There are use scenarios that demonstrate how value can be created
SERVICE VIABLE NOT	There are issues that may make service not viable.
Category: **TECHNOLOGY**.	
Perceptions and opinions about the opportunities offered by mobile technologies, and about their limitations	
Sub-categories	
TECHNOLOGY LIMITATIONS	Mobile technology limitations related to mobile service development
TECHNOLOGY OPPORTUNITIES	Mobile technology opportunities related to mobile services development
Category: **UNCERTAINTY**.	
What participants feel uncertain about	
Sub-categories	
UNCERTAINTY ABOUT CUSTOMERS	Developers uncertain about what customers need, want.
UNCERTAINTY ABOUT MNOS	Uncertainty about the position of MNOs related to mobile business
Category: **REGULATORY ENVIRONMENT**	
Perceptions and opinions about the regulatory environment	

As the hierarchy of codes was derived from the data it provided a data mapping that was conceptually different form the theory driven data mapping generated at Stage 1 (the two representations are shown together in draft in the bottom right corner of Figure

5-19.). In Data map 2-2 (Figure 5-21) the lines that connect the theoretically derived thematic clusters indicate that one or more of the super codes in a particular category were used to code data coding units that belonged to one or more the thematic clusters.

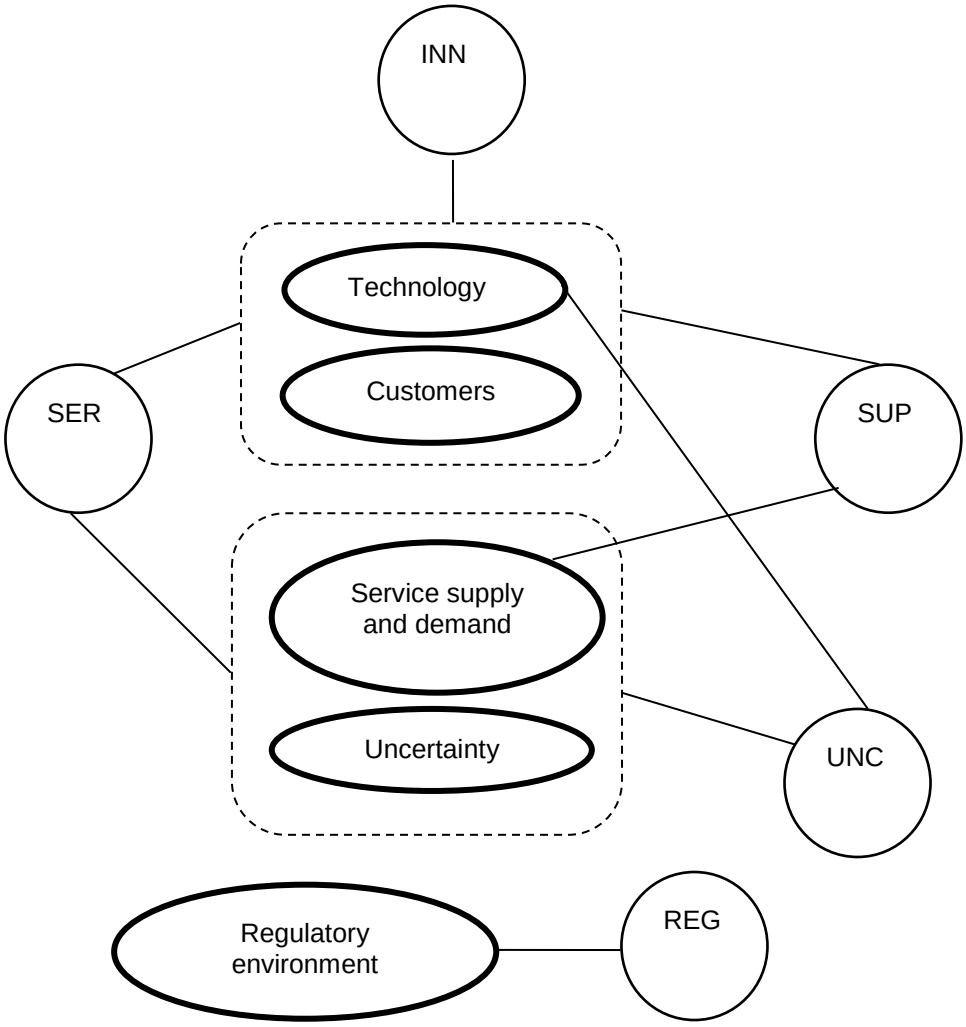

Figure 5-21. Data map 2-2

As seen two of the inductively derived categories matched very closely two of the deductively determined thematic clusters (UNCERTAINTY – UNC, and REGULATORY ENVIRONMENT – REG), in terms of the respective data coding units associated with the category/thematic cluster. However, the data categorized under CUSTOMERS, TECHNOLOGY and SERVICE SUPPLY AND DEMAND belonged to one or more of the thematic clusters SER, SUP and INN, i.e., the categories were spread across these three thematic clusters.

Table 5-13 and Table 5-14 illustrate how meanings extracted from interpreting the responses of three interviewees formed a family of super codes. The emerging key concept formed a category (TECHNOLOGY), with two sub-categories embodying the

two conceptual dimensions manifested by the data (TECHNOLOGY LIMITATIONS and TECHNOLOGY OPPORTUNITIES).

Table 5-13. Category TECHNOLOGY, sub-category TECHNOLOGY LIMITATIONS

MOBILE TECHNOLOGY LIMITATIONS
Super code limitations due to device design
Code device limitations
"Having in mind the limitations of mobile devices (that are being more and more overcome, but still do exist), it is important to know who exactly the users of the product will be and the product/service has to be in precise conformity with their technical knowledge and potentialities." (DUN 93, P7R12)
Code devices less powerful than PCs
"…in comparison with PCs – so, with much less options an application has to be developed that does not defer drastically to those, made for PCs" (DUN 76, P7R12),
Code devices restrict development
"One of the biggest problems for developers of mobile applications is that they are restricted by the limited resources of the mobile device (or most mobile devices" (DUN 76, P7R12)
Code display limitations
"…because of the display limitations, and in the maximized activities and their benefits with minimal effort. (DUN 72, P6R11)
Code innovative interface needed
"innovation is to be found in the GUI portion of applications "(DUN 72, P6R11)
Super code technology not available yet
"Limited market for certain applications or the need for technologies that are either not yet invented, or are not applicable or do not meet certain criteria". (DUN 2, P5R10)
Super code technology limits architecture
"Perhaps the limited resources of the devices, and the architecture – although technology is developing very fast, there is still much to be desired "(DUN 3, P6R11)
Super code *service needs to be technologically implementable*
"Some of the most important aspects are functionality and interesting, but applicable ideas (DUN 2, P5R10)

Table 5-14. Category TECHNO LOGY, sub-category TECHNOLOGY OPPORTUNITIES

MOBILE TECHNOLOGY OPPORTUNITIES
Super code future opportunities
Code new technologies not yet explored
"On the other hand, with smart phones new horizons have opened which are yet to be discovered. "(DUN 77, P7R12)
Code time needed for technologies to mature
"I suppose that gradually with distribution of smartphones and them becoming cheaper, mobile technologies will get more attractive for business and users, but this needs time." (DUN 65, P7R12)
Code technology has potential for new services
"Mobile technologies are a market that may have the potential to develop". (DUN 64, P7R12)
Code smart phones have potential for new services
"*Yes, of course, this is an intensely developing sphere of IT and there is much potential in it – in order to use this potential effectively, there is a constant need of new services." (DUN 67, P5R10)*
Super code opportunities offered by device design
Code mobile phones compact
"*The advantages of the mobile phone compared to the PC is that they are smaller" (DUN 83, P7R12)*
Code phone always with customer
"*The advantages of the mobile phone compared to the PC is …usually always with you (DUN 83, P7R12)*
Super code opportunities to distribute services
"*Innovations of technical nature include … service distribution while using new technologies for distribution, for example***.** *(DUN 73, P6R11)*
Super code opportunities to support customers
"Innovations of technical nature include very good support …." (DUN 73, P6R11)

The coded data excerpt in Table 5-13 shows the data underlying the sub-category TECHNOLOGY LIMITATIONS along with the labels of the super coded and related codes. The four super codes represent different aspects of technology limitations, e.g.,

limitations imposed by design. Similarly, the coded data excerpt in Table 5-14 shows the data relevant to the sub-category TECHNOLOGY OPPORTUNITIES. The four super codes describe different aspects of technology potential in the context of developing a service.

5.7 Study 1: Completing the Inductive Coding (Stage 3)

The hierarchy of codes created during the process described in the preceding section was used as a guide to coding the data in the IS data domain. The data were read and interpreted systematically in order to identify meanings and assign a super code. Where applicable, existing super codes were used to code the meaning. To ensure completeness new codes were added to existing super codes where new meanings that could be grouped under an existing super code were identified; new super codes were defined and categorized where new meanings emerged that could not be coded using existing super codes. The data and the codes were iteratively revised in order to refine the coding and the new definitions, and the code hierarchy was updated. Once all data in the IS domain were coded, the data in the ID domain were read again and the coding was checked against the updated hierarchy of codes. Finally, the two data domains were combined in one complete coded set that was used at the next stage of the analysis.

The data domain IS comprised 187 data units (already coded with the deductive codes as explained earlier in Section 5.5). The analysis started with a re-examination of the data coding units in preparation for the inductive coding. DUN 199 was removed (no discernible meaning) while DUNs 208 and 240 were merged with DUNs 209 and 241 respectively, in order to make sense, and thus reducing the number of DUNs to 184.

While reading the data it was found that in 18 data units the participant was referring specifically to “business customers” rather than to individual consumers or users; as so far the research model has consistently being considered from the perspective of the suppliers (and treating customers as individual consumers of applications or services), it was decided to exclude these data coding units from further analysis as the experiences, expectations and attitudes of business customers (i.e., enterprises) may differ significantly from those of individual customers. Once data coding units referring to business customers were removed from the set (DUNs 97, 119, 126, 165, 189, 191, 193, 194, 195,196, 200, 202, 203, 207, 220, 221, 268, 273) the overall number of data coding units in the IS data domain that were to be analyzed further was reduced to 166.

The data were interpreted and coded following an iterative process similar to the one described in significant detail in Section 5.6. The new codes and super codes that were defined during the process were added to the hierarchy of codes using the existing categories and sub-categories, or by defining new ones. Codes-S1 was updated to reflect the changes. The process followed is shown in Figure 5-22.

5.7.1 Coding the IS domain

The two research assistants (O. A. and A. A.) were asked to code the IS domain data, as follows: (i) examine each meaning and identify a sub-category from Codes-S1 that may contain a matching super code; (ii) if found then identify a matching super code, and if possible, a matching code; (iii) flag meanings that were left not coded or were coded partially, i.e., a sub-category was identified but there was no appropriate super code, or a super code was identified but there was no specific matching code.

The results from the coding done by the two research assistants were compared. All data coding units were assigned a sub-category; however, a total of 43 units were assigned different sub-categories by each of the coders (74% match). Where the sub-categories assigned by the coders matched (123 data coding units), the super codes assigned matched for 68 of the 84 units that were assigned a super code (81% match).

The researcher and the coders discussed the coding. It was established that some data coding units contained very long sentences. This was affecting the interpretation of the meanings and leading to discrepancies across coders and affecting the coding reliability. It appeared as well that the coders found it difficult to refer constantly to Codes-S1 as they were not sufficiently familiar with the coding of the ID data domain it; the process was very time consuming. To resolve the issue, the researcher first recoded the set herself, extracting meanings and coding them following the same protocol; once this was completed she compared her coding to the ones done by the two coders in order to verify it, and double checked the final coding in order to make sure that all meanings were extracted and appropriately coded. The flagged data units were also considered. Where deemed necessary new codes and super codes were defined in order to capture meanings that could not be coded using an existing code. The researcher asked A. A. (who was more familiar with the data) to review how existing codes/super codes were assigned, and suggest changes; similarly, O.A. was asked to look at the new codes and the respective data units. No changes were suggested.

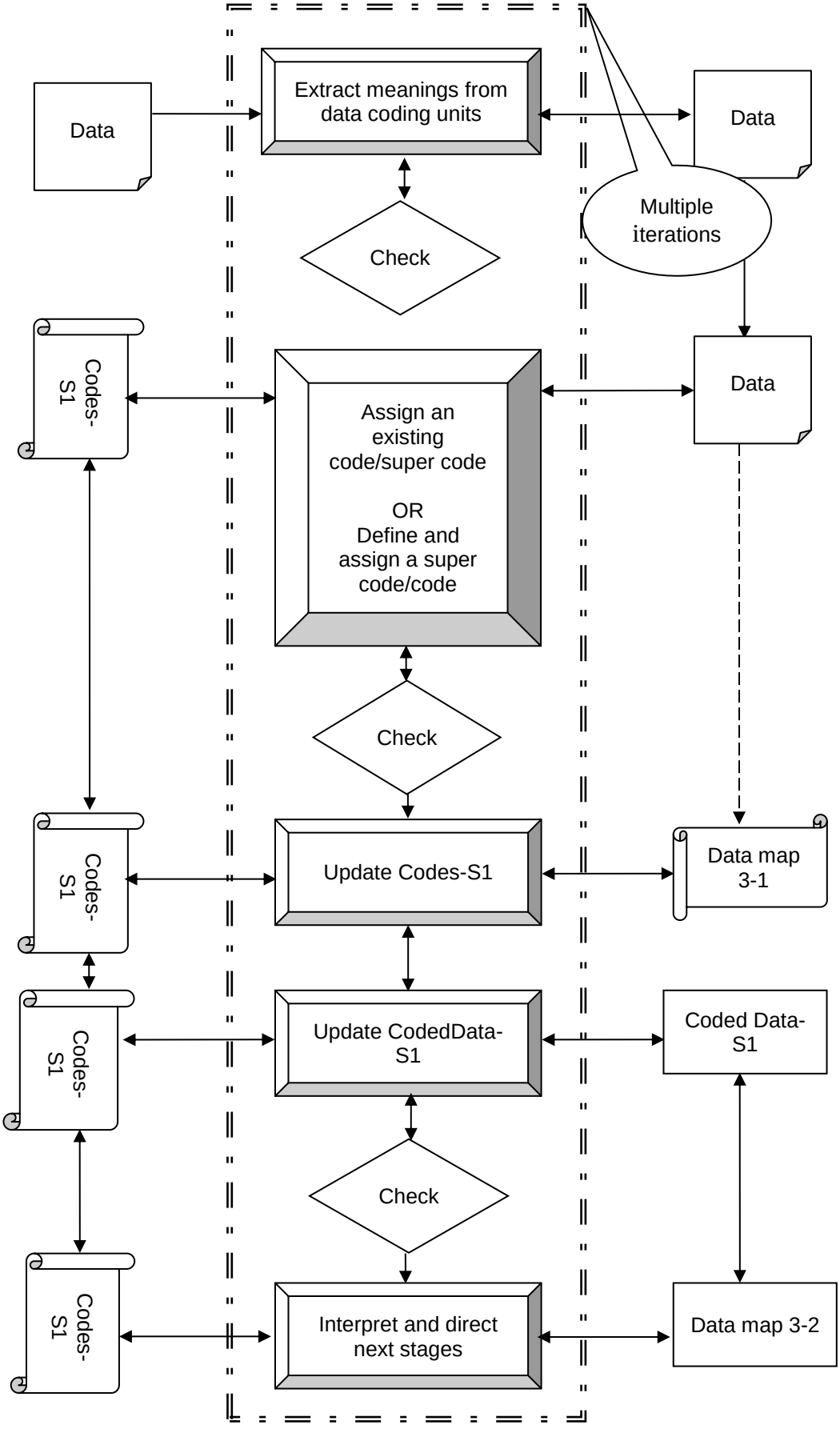

Figure 5-22. Completing the inductive coding (Stage 3)

A total of 252 meanings were identified and coded. There were 31 new codes defined as part of an existing super code. These were based on meanings that were interpreted and coded by applying an existing super code label but a new code was added to the super code in order to underline a new aspect or a characteristic of the super code (an example is shown in Figure 5-23). Some super code definitions were amended as a result.

[Obstacles in bringing a mobile product to the market] "Inertia of older consumers, expressed in fear and resistance against innovations and developments. The high cost of services. High system requirements to consumer devices". (DUN 94, P1R2).	
"Old" super code label: Customers conservative	**"Old" super code definition:** Customers generally "traditionalists"
New code label: Inertia of older customers	**New code definition:** Inertia of older customers leads to fear and resistance

Figure 5-23. New code "Inertia of older customers"

The existing sub-category SERVICE SATURATION (category SERVICE SUPPLY AND DEMAND) was subsumed as a super code by the new emerging sub-category SERVICE MARKET which comprised seven super codes (Table 5-15). In addition, 13 super codes were added to the existing sub-categories for meanings that did not "fit" an existing super code; some of the new super codes were created to represent two or more closely associated codes (examples are provided in Figure 5-24). The hierarchy of the codes was updated. As shown in Appendix L it contained 103 super codes, categorized in five categories (with 16 sub-categories within them). The coded data set (IS data domain) is shown in Appendix M.

Table 5-15. New sub-category SERVICE MARKET

CATEGORY*: SERVICE SUPPLY AND DEMAND* **SUB-CATEGORY***: SERVICE MARKET (participant perceptions and opinions about the market for mobile services)*	
Super code	Service saturation
Super code	Changing market
Super code	Not ready for innovation
Super code	Competition. **Codes:** *development timeline, increased added value, MNOs compete, similar services, MNOs do not compete*
Super code	Environment. **Codes**: *easy to identify a niche, lagging behind*
Super code	Innovativeness **Codes:** *MNOs need to be innovative, threat to MNOs*
Super code	Roles **Codes:** *all actors need to play, MNOs as leaders, MNOs as players*

"Private users expect from a service …get support in real time". (DUN 269, P12R19). *"…is there 24/7 support …". (DUN 281, P12R19)*	
New super code label: Expectations for support **New code labels**: Expectations for real time support Expectations for 24/7 support	**New super code definition:** Customers expect service support **New code definitions:** Customers expect real time support Customers expect 24/7 support
"I haven't had any particular negative experience during my work – laws are constantly changing." (DUN 150, P8R15).	
New super code label: Regulatory environment changing	**New super code definition:** The regulatory environment is subject to constant change
"Yes, because of competition prices are falling down and the operator has to be innovative and constantly work on its services" (DUN 159, P9R16) *"…The telecoms are facing the treat to lose the customers loyalty and become only the transport link to the end-user services." (DUN 157, P2R4).*	
New sub-category: **New super code label**: Innovativeness **New code labels**: MNOs need to be innovative Innovativeness as a threat to MNOs	**SERVICE MARKET** **New super code definition:** Innovativeness as a key to success **New code definitions:** MNOs need to be innovative in order to keep up with other players innovating Telecom operators threatened by new developments

Figure 5-24. Examples of new super code definitions

5.7.2 Merging the two coded domains

Maps similar to the ones created for the ID data domain were created and examined in order to identify significant differences in the data and the coding drawn from the IS data domain, if any. The resulting data maps (Data map 3-1 and Data map 3-2, Figure 5-25 and Figure 5-26, respectively) were compared to the data maps created at the end of Stage 2 (Data map 2-1 and Data map 2-2, Figure 5-10 and Figure 5-21, respectively). As seen, the mapping of the data in the IS domain across the thematic clusters INN, SER, SUP, and REG (Data map 3-1) was very similar to the mapping of the ID domain (Data map 2-1), with a slightly higher number of shared super codes. Both domains were mapped similarly across categories.

All relevant links in Data map 2-2 were also exhibited in Data map 3-2, where two new links were added (between INN and SERVICE SUPPLY AND DEMAND, and between REG and SERVICE SUPPLY AND DEMAND). Finally, during the inductive coding of the IS data domain meanings related to UNCERTAINTY were also identified, extracted from data coding units that were not coded with the deductive code UNC (possibly because the deductive codes were assigned more broadly) considering the data coding unit as a whole, and without extracting individual meanings.

The similarities observed above indicated that so far the inductive coding process was carried consistently across the Study 1 data set and that the updated hierarchy of codes

was comprehensive and represented all meanings identified. As a final check, the coded data set (ID data domain) was revisited and the codes assigned were verified against the updated hierarchy of codes; the two coded data sets were merged (as a Microsoft Excel® spreadsheet) in preparation for the next stage.

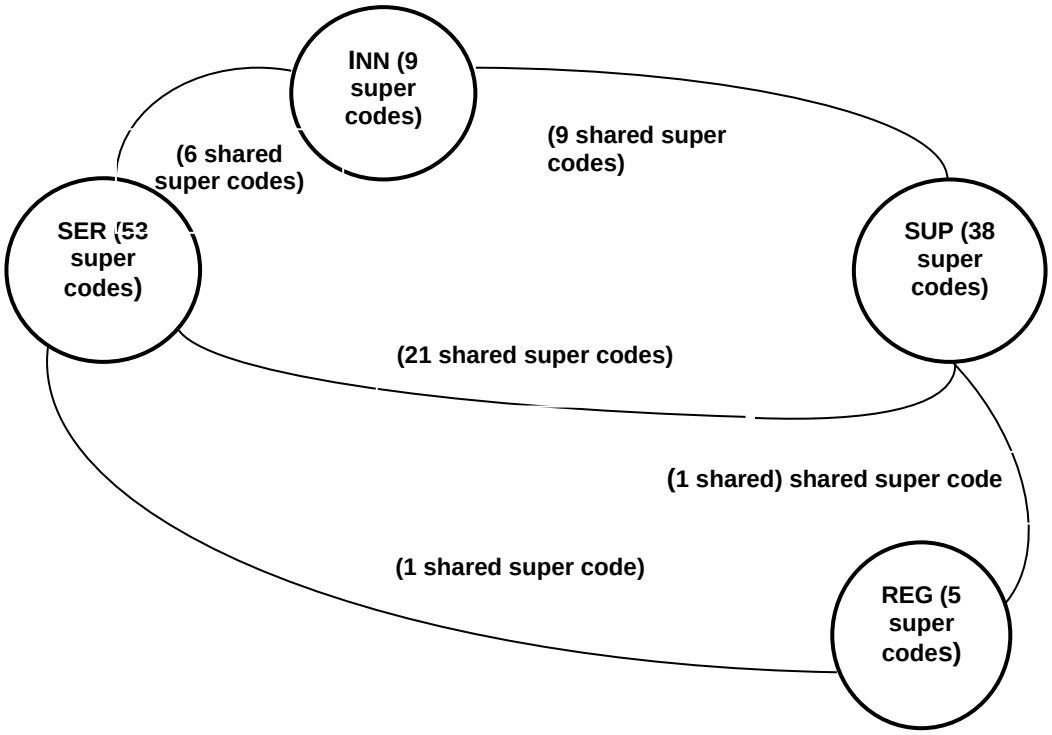

Figure 5-25. Data map 3-1

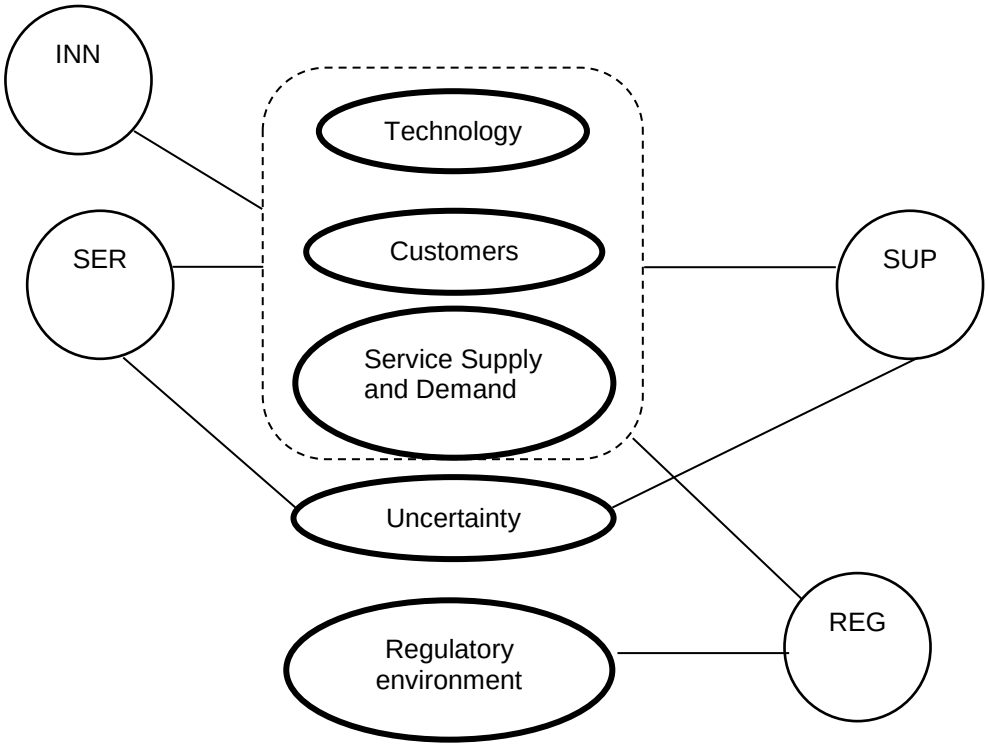

Figure 5-26. Data map 3-2

In summary, the inductive coding carried out as stages 2 and 3 prepared the data set for further analysis (identifying themes) which also followed an inductive approach while the deductive coding process (Stage 1) was used to "seed" the initial exploration of the data. The outcomes of the two coding processes were fed sequentially into one another and were validated with frequent checks for consistency. The resulting coded data set comprised a total of 255 DUNs from which 413 meanings were extracted and coded applying an appropriate super code; as already mentioned the resulting code hierarchy was composed of 103 supper codes. Figure 5-27 shows the two views of the study data arrived at as a result: a theory driven view (an outcome of the deductive coding process), and a data driven view (an outcome of the indicative coding process). Developing further the data driven view the themes emerging from the data were likely to be found across the deductively determined thematic clusters, by examining the super codes and identifying links and relationships between them.

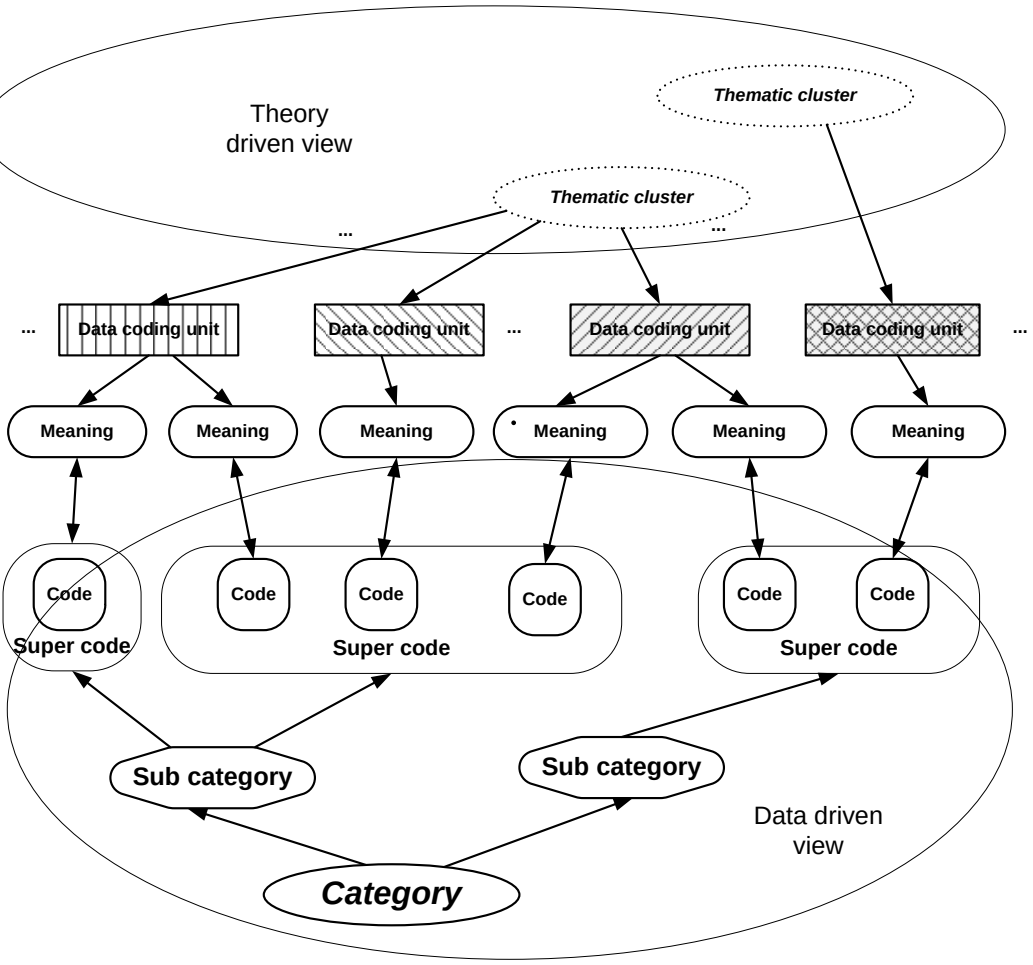

Figure 5-27. Two conceptual views of the data

5.8 Study 1: Theme Development (Stage 4)

As shown in Figure 5-28, emerging themes were identified through the examination of the relationships between super codes. The themes were grouped into a thematic map.

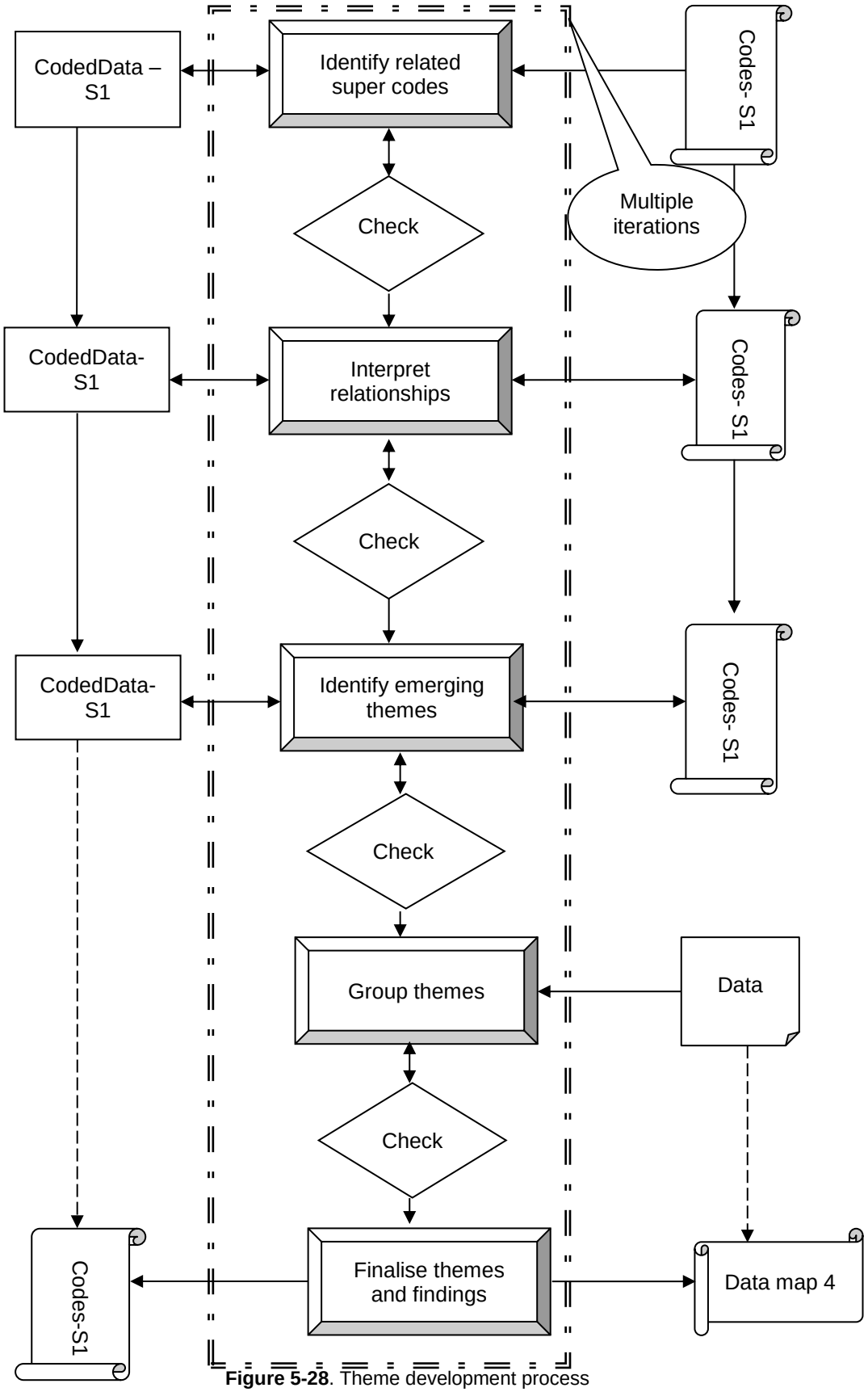

Figure 5-28. Theme development process

In qualitative research a theme is used as a way to identify the patterns that can be observed in the data (Saldaña, 2012, pp. 175-176). Following Rubin and Rubin's (2012, p. 118) understanding of a theme as a statement that summarizes participants' ideas as observed in the data, the following working definition of a theme was adopted: A theme summarizes participant views including descriptions of what is happening, and explanations about how and why it is happening.

5.8.1 Pattern coding

The approach to identifying relationships was adapted from Miles et al.'s (2014, p. 86) "pattern coding"; a systematic way to develop major themes from data that have been already coded. The raw data were used to check the results of the pattern coding and to provide support for the theme definitions. A highly iterative process that involved multiple re-examinations and revisions (including recoding) was followed. The pattern codes applied (Table 5-16) represented a set of semantic super code relationships that were defined based on Gibson and Brown's (2009, pp. 138-143) suggestions about how to search for relationship between codes, and using the examples provided by Saldaña (2012, p. 158).

Table 5-16. Relationships used for pattern coding

Relationship	Definition	May lead to
Associate	Super code A is *associated* with super code B	Adding to a description of what/how it is happening
Aspect	Super code A *is an aspect of* super code B	Adding to a description of what/why/how it is happening
Cause/Result	Super code A *causes* super code B	Adding to an explanation about why it is happening
	Super code A *is the result of* super code B	Adding to an explanation about why it is happening
Contrast	Super code A *contrasts* with super code B	Adding to an explanation about what/how it is happening
Attribute	Super code A *is an attribute (characteristic) of* super code B	Adding to an explanation of what/how it is happening

5.8.2 Developing emerging themes

The search for themes started with examining the sub-categories in the category CUSTOMERS. After a group of super codes within a sub-category were identified and coded by applying the pattern codes in Table 5-16, the rest of the same category was searched for super codes that could also be added to the emerging theme; then the process was repeated with the other categories. After that the meanings related to the theme were examined again in order to define the theme concept and, using participants' statements, to describe what was happening and explain how and why it

was happening. The rest of the data were also examined to double check the selection. The emerging theme was named, described and illustrated by supporting data.

The process was also used as a means to check the coding and make adjustments where necessary. These involved correcting wrongly recorded codes, refining interpretation, and editing definitions for spelling, grammar and clarity – a natural and desirable consequence of any iterative analysis process in terms of converging on meanings and interpretations. For example, the super code "service needs to focus on customer mobility" was amended to include access to the Internet (for mobile customers), super code "paid services less used" was subsumed by supper code "paid services no so widely used", super codes "regulatory environment not supportive" and "regulation not needed" were renamed "regulatory environment moderately supportive" and "no regulations" respectively, super code "innovativeness" was merged with super code "roles" and the latter was renamed "players", super code "segmentation by age" was split into "segmentation by age" and "segmentation by age – young customers". A new sub-category UNCERTAINTY ABOUT TECHNOLOGY was created under the category UNCERTAINTY comprising the merged super codes "not ready for innovation" and "innovation not successful".

An example of an edited super code definition (super code **Segmentation by socio-economic status):**

> *Old definition:* "if voice services customers are divided in socio economic groups and this will play a role in business data services as well"
>
> *Edited definition:* "Similarly, to voice services where customers are divided in socio economic groups this will play a role in business data services as well"

Recoding the relevant meanings in order to implement the changes resulted in data set comprising 385 meanings extracted from the 255 DUNs. The coded data set and the hierarchy of codes were updated accordingly. A Stage 4 working version of Codes-S1 is shown in Appendix N; it contains 100 super codes grouped under five categories (and 17 sub-categories within them).

Once the researcher considered a theme "completed", i.e., once she could not find any more supporting data to be added to it, the pattern coding was repeated in order to identify the next emerging theme. Visualizations (hand drawn diagrams) of the super code groupings, and highlighting portions of the coded data set (in its spreadsheet form)

were used to facilitate the analysis and ensure that all data were considered, and to keep track of data already included in a theme. During the process notes were made to record observations about the theme that may be of interest later, and about potential relationships and overlaps between the themes as they emerged.

All emerging themes were described with reference to the "what-how-why" framework introduced above. In order to demonstrate comprehensively the theme development method, the first six themes were illustrated by embedding in the narrative full quotes (meanings) extracted from the respective data list. Further, direct quotes as well as references to the respective supporting meanings were used. The rest of the subsection explains how themes were developed, providing a complete theme description and a concept definition for each theme; a numbered bullet point data list of associated data statements (along with their respective DUNs and participant IDs) was also created and included in the text to accompany the theme description.

5.8.2.1 Theme "Difficult customers"

By reading the coded data 13 super codes were identified as related to customer attitude, forming a potential theme about how participants perceived their customers' attitudes towards mobile services (customer market difficult, customers conservative, customers distrustful of innovation, customers distrustful of phones, customers prefer well known services, segmentation by age, segmentation by attitude to innovation, expectations about quality high, expectations difficult to meet, expectations for choice of services, service to surpass existing ones, services not different from existing ones) (Table 5-17).

Pattern codes were applied to label the relationships between the super codes; some are shown in the left hand side graph in Figure 5-29, e.g., "distrustful of phones" is an aspect of "customers distrustful of innovation", "conservative customers" causes "customer market difficult" (top left hand side corner)[27]. The extracted meanings belonged to 28 DUNs (18 DUNs from the ID data domain and 10 DUNs from the IS data domain). As participants generally found customers difficult to satisfy the theme was named "**Difficult customers".** All relevant data were pulled together as shown in Data list 5-1. The data were read again in order to extract a theme description in terms of "what was happening, how and why".

[27] Here and elsewhere, the labels on the hand-drawn diagrams and in the text may differ slightly as the diagrams were created during the coding process and do not reflect changes made later; also the researcher used abbreviations in the diagrams.

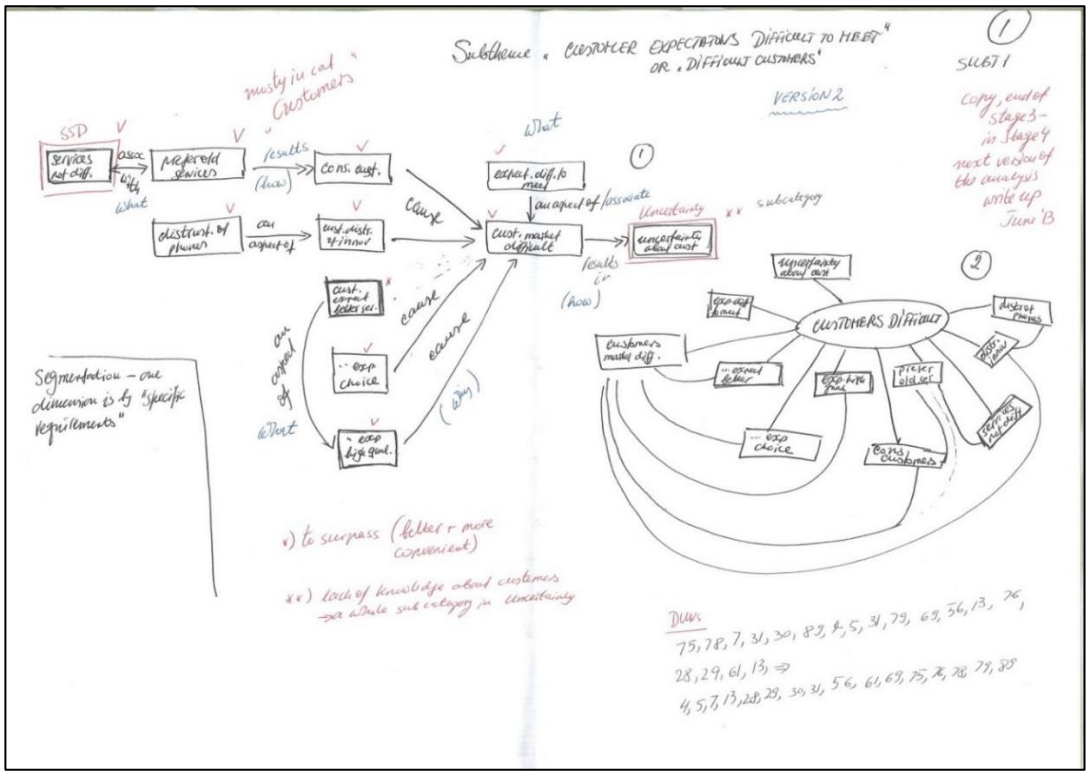

Figure 5-29. Developing theme "Difficult customers"

Data list 5-1. Data supporting theme "Difficult customers"

1. *"In order to successfully set a particular product on the market, innovation is of major importance." (DUN 75, P7R12)*
2. *"…in any case, there is a critical need for innovations, so that the product can set foot on this market." (DUN 78, P7R12)*
3. *"…unwillingness to change previous routines and customer behaviour (traditionalists). "(DUN 7, P11R18)*
4. *"In my opinion, it is difficult to persuade customers to break with the old routines and influence them towards adopting new innovative products if the need to do so is not urgent." (DUN 31, P11R18)*
5. *" …Inertia of older consumers, expressed in fear and resistance against innovations and developments." (DUN 94, P1R2)*
6. *"One of the biggest obstacles is that customers might not always appreciate all advantages a certain product could give them; there are very innovative users, but also many who are conservative and prefer to continue using older, better known options (DUN 134, P8R15)*
7. *"Apart from all of that, they have to have in mind also the possible distrust of potential users." (DUN 30, P7R12)*
8. *"First, security, as the majority of users don't easily rely on innovations." (DUN 89, P6R11)*
9. *"…Sometimes the market is not ready to use new development – it is also sceptical, too cost-sensitive, and everyone is comparing themselves to others instead of judging what advantages the service could bring personally to them." (DUN 103, P9R16)*
10. *"The biggest obstacle is people's perception of mobile phones – at the moment, for most of the people a phone is just a phone." (DUN 4, P7R12)*
11. *"People usually are not confident to use mobile devices for more serious stuff, e.g., e-banking or remote desktop." (DUN 5, P7R12)*
12. *"Mostly user-friendliness – universal fallacy is that since we live in the technology era, anyone can operate with technology, even more: most young people reduce their computer access and other technologies to the most popular and accessible applications and functions -Skype, Facebook, etc." (DUN 88, P5R10)*
13. *Customers who are looking for innovative solutions (they want to be the first ones to use a certain service)" (DUN 142, P10R17)*
14. *"Paid services however, could be used by a broader group in which customers would not necessarily use the product only because they need it, but because they would like to try it out" (DUN 260, P12R19)*
15. *"Who would want an application that would work only if it had free resources not used for telephony." (DUN 56, P7R12)*

16. *"Paid services are used by certain target groups which are interested in the product for specific reasons – meaning that customers have already made a well-grounded decision according to their specific needs." (DUN 259, P12R19)*
17. *"More entertainment at lower prices, as well as many innovative useful applications." (DUN 79, P3R8)*
18. *"The most serious problems developers of mobile applications are facing, and all pioneers, is that they are entering into a more or less unknown territory." (DUN 28, P7R12)*
19. *"There are no clear criteria exactly what the market wants..." (DUN 29, P7R12)*
20. *"In general, this is a complicated matter that needs a more thorough marketing analysis among potential users." (DUN 61, P7R12)*
21. *"From the developer's point of view: Lack of information about what the service should include, how it should be organized, how much should it cost (sometimes very difficult to define)". (DUN 139, P10R17)*
22. *"Companies as Google and Facebook change fundamentally the perceptions "who own the customers (DUN 156, P2R4)*
23. *"The continuous use is a sign of increasing demand however, not always it brings new subscribers. (DUN 181, P2R4)*
24. *"In order to be successful, the undertaking has to offer something new that is better and more convenient for users than the ways they are currently using – and this is not an easy task." (DUN 13, P7R12)*
25. *"…but also to bring innovation that facilitates some activity, to contribute to a richer user experience or to correct the mistakes of old systems." (DUN 69, P6R11)*
26. *"Better customer experience.; Better support. (DUN 163 and DUN 164, P2R4)*
27. *[Customer attitude is affected by] does it offer easier use in comparison to the 'traditional' way to execute operations;" (DUN 280, P12R19)*
28. *"One of the biggest problems for developers of mobile applications is that they are restricted by the limited resources of the mobile device (or most mobile devices), in comparison with PCs – so, with much less options an application has to be developed that does not defer drastically to those, made for PCs." (DUN 76, P7R12)*

What was happening? On one side participants felt that innovation was critical for the success of mobile services ("…*In order to successfully set a particular product on the market, innovation is of major importance."*, DUN 75, P7R12). On the other side they were unsure about how to do it ("*In order to be successful, the undertaking has to offer something new and better. and this is not an easy task."*, DUN 13, P7R12*).* They had some ideas about what customers wanted (*"…but also to bring innovation that facilitates some activity, to contribute to a richer user experience or to correct the mistakes of old systems."*, DUN 69, P6R11) but felt that they did not know enough (*"There are no clear criteria exactly what the market wants..."*, DUN 29, P7R12).

How was it happening? Most customers were behaving as less than enthusiastic adopters ("*difficult …to influence them towards adopting new innovative products if the need to do so is not urgent."*, DUN 31, P11R18), with high expectations about choice, price, usefulness ("*More entertainment at lower prices, as well as many innovative useful applications."*, DUN 79, P3R8; "*[Customer attitude is affected by] does it offer easier use in comparison to the 'traditional' way to execute operations", DUN 280, P12R19),* and also quality and support *("Who would want an application that would work only if it had free resources not used for telephony*.", DUN 56, P7R12; *"Better support."*, DUN 164, P2R4). However, some customers could be motivated to adopt: "*Paid services however, could be used by a broader group in which customers would*

*not necessarily use the product only because they need it, but because they would like to try it out" (*DUN 260, P12R)*;* "*Customers who are looking for innovative solutions (they want to be the first ones to use a certain service (DUN 142, P10R17*).

Why was it happening? Customers were generally distrustful of innovation (*"First, security, as the majority of users don't easily rely on innovations."*, DUN 89, P6R11) and of using mobile phones for business services ("*People usually are not confident to use mobile devices for more serious stuff, e.g., e-banking or remote desktop."*, DUN 5, P7R12); they perceived as conservative ("*…difficult to persuade customers to break with the old routines"*, DUN 31, P11R18), especially older customers *("…Inertia of older consumers, expressed in fear and resistance against innovations and developments."*, DUN 94, P1R2) who needed new services to emulate closely the familiar personal computer oriented ones ("..*One of the biggest problems for developers of mobile applications is that they are restricted by the limited resources of the mobile device… so, with much less options an application has to be developed that does not defer drastically to those, made for PCs."*, DUN 76, P712). Younger customers would not be necessarily willing to adopt a new service either; due to their relative lack of experience and with developments still maturing younger customers may experience frustration ("*Mostly user-friendliness – universal fallacy is that since we live in the technology era, anyone can operate with technology, even more: most young people reduce their computer access and other technologies to the most popular and accessible applications and functions -Skype, Facebook, etc."* (DUN 88, P5R10).

The theme's concept was summarized as "**Customers perceived as difficult to satisfy, may be less than enthusiastic to adopt",** illustrated by "*One of the biggest obstacles is that customers might not always appreciate all advantages a certain product could give them; there are very innovative users, but also many who are conservative and prefer to continue using older, better known options"* (DUN 134, P8R15).

The following observations were made:

Note 1. Customers were found difficult in a multitude of ways.
Note 2. The continuum "young–old" may not be the same as "will adopt – will not adopt".

The composition of the theme in terms of super codes, and the categories and sub-categories they belong to is provided in Table 5-17. A total of 13 super codes were used to define the theme, from three different categories and five sub-categories within them.

Table 5-17. Theme "Difficult customers"

Theme "Difficult customers"	
Category and sub-category (numbers in brackets show the number of related super codes)	**Super codes (numbers in brackets show the number of meanings associated with each super code)**
CUSTOMERS (11)	
CUSTOMER ATTITUDES (5)	customer market difficult (2) customers conservative/inertia (4) customers distrustful of innovation (4) customers distrustful of phones (2) customers prefer well known services (2)
CUSTOMER SEGMENTATION (2)	segmentation by age – young customers (1) segmentation by attitude to innovation (2)
CUSTOMER EXPECTATIONS (4)	expectations about quality high (2) expectations difficult to meet (1) expectations for choice of services (1)
SERVICE SUPPLY AND DEMAND (1)	
SERVICE VALUE DETRACTOR (1)	service to surpass existing ones (4) services not different from existing ones (1)
UNCERTAINTY (1)	
UNCERTAINTY ABOUT CUSTOMER NEEDS (1)	lack of knowledge about customers (6)

5.8.2.2 Theme "Customer segmentation"

The examination continued with the remaining super codes. A set of nine super codes related to perceptions about the customer market structure were identified (segmentation by specificity of requirements, segmentation by age, segmentation by self-efficacy, segmentation by socio-economic status, segmentation is multidimensional, customers do not mix entertainment and serious business, decision influenced by cost – not, decision influenced by cost, narrow customer base) (Table 5-18).

The extracted meanings belonged to 35 DUNs meanings (20 were extracted from the ID domain and 15 – from the IS domain). Some of the pattern codes assigned are shown in Figure 5-30. Since participants seemed to perceive the market as highly segmented due in part to differences in customer expectations and requirements, the theme was named "**Customer segmentation".**

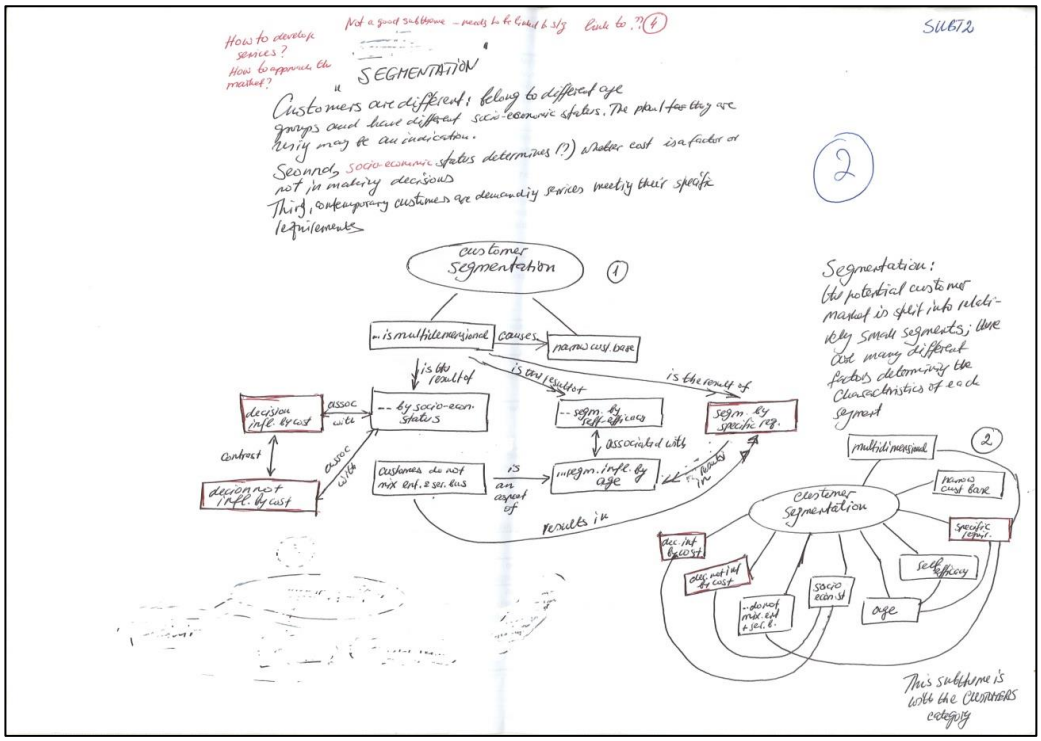

Figure 5-30. Developing theme “Customer segmentation”

All relevant data were pulled together as shown in Data list 5-2. The data were read again in order to extract a theme description in terms of ‘‘what was happening, how and why’’.

Data list 5-2. Data supporting theme “Customer segmentation“

1. *“[obstacles]The high cost of services.“ (DUN 95, P1R2)*
2. *“Sometimes the market is not ready to use new development –...too cost-sensitive,“ (DUN 103, P9R16)*
3. *“The price is a key factor, especially in Bulgaria;“ (DUN 124, P9R16)*
4. *“[customer attitude influenced by]The cost of the application.“ (DUN 162, P1R2)*
5. *“[customer attitude influenced by]The price “ (DUN 167, P4R9)*
6. *“customer attitude influenced by] The price;“ (DUN 170, P8R15)*
7. *“It depends on the particular offer – its price, the marketing strategy and a number of other factors.“ (DUN 8, P3R8)*
8. *“Price and quality.“ (DUN 57, P3R8)*
9. *“Whether the service is for free and if not – whether the user can afford it.“ (DUN 59, P5R10)*
10. *“The price, the way of distribution and attracting (marketing), distribution – are distrustful can only be convinced by opinions friends who have good impressions.“ (DUN 60, P6R11)*
11. *“If I have to express an opinion – it is definitely the price users would pay, in order to use a certain product (not only the buying cost, but also the expenses for its future use).“ (DUN 62, P7R12)*
12. *“For other apps with health apps, customers are anyway willing to pay more and price is not such a big issue in my opinion.“ (DUN 23, P11R18)*
13. *“This is why I think that not so much the price, “ (DUN 121, P4R9)*
14. *“Customers, for whom the price is not important –“ (DUN 146, P10R17)*
15. *“Because games are very common and generally pleasure is sought at any moment, due to the limited free time in everyday life, a demanded feature would also be the entertainment potential of the applications (of course, serious applications should not allow it at all as this would lead to distrust effect“ (DUN 91, P6R11)*
16. *“Yes, there are and their expectations are different. “ (DUN 32, P3R8)*
17. *“Naturally, there are different user groups – it is not a coincidence that there are different tariff plans whose primary objective is a specific group.“ (DUN 34, P5R10)*
18. *“Indeed, consumers can be divided into groups of expectations – as I said already, some seek security and usability, other entertainment, facility, etc.“ (DUN 37, P6R11)*
19. *“Of course, this depends on the application. If it is a game, users and needs are totally different from those of e-banking.“ (DUN 39, P7R12)*

20. *"This has to be taken into account very well before developers start a new undertaking." (DUN 40, P7R12)*
21. *"Customers who are looking for more security and control; " (DUN 144, P10R17)*
22. *"Customers who are e.g., environmentally conscious and are looking for eco-friendly services and products;" (DUN 145, P10R17)*
23. *"It is important that new development is targeted to particular groups of customers, not just to the "wide masses" – different groups have different criteria and needs about what would make their work easier." (DUN 239, P9316)*
24. *"Paid services are used by certain target groups which are interested in the product for specific reasons – meaning that customers have already made a well-grounded decision according to their specific needs." (DUN 259, P12R19)*
25. *"Those groups can be divided as to age and social status." (DUN 33, P3R8)*
26. *"Different groups can be divided according to different criteria:-age; – according to interests; – technological competence; – etc." (DUN 35, P6R11)*
27. *"Having in mind the limitations of mobile devices (that are being more and more overcome, but still do exist), it is important to know who exactly the users of the product will be and the product/service has to be in precise conformity with their technical knowledge and potentialities." (DUN 93, P7R12)*
28. *"Indeed, consumers can be divided into groups of expectations – as I said already, some seek security and usability, other entertainment, facility, etc." (DUN 38, P6R11)*
29. *"There a few different groups of users:" (DUN 141, P10R17)*
30. *"Limited market for certain applications or the need for technologies that are either not yet invented, or are not applicable or do not meet certain criteria." (DUN 2, P5R10)*
31. *"Obstacles are: too high investment costs and unsatisfactory return on investment, too narrow customer base, unwillingness to change previous routines and customer behaviour (traditionalists), bad marketing communication, weak use cases, no superior selling proposition etc." (DUN 7, P11R18)*
32. *"If the particular application has enough market – yes." (DUN 9, P5R10)*
33. *"Constant dynamics is needed in this sector in order for it to bring profits." (DUN 113, P8R15)*
34. *"If new development is very well targeted they could be profitable – otherwise they don't bring much of the profits. " (DUN 114, P9R16)*
35. *"There are always different user groups… in technology there are also different expectations.", (DUN 36, P6R11)*

The "<u>what</u>" in the theme was that according to participants the customer base ice was relatively narrow. *("Obstacles are: too high investment costs and unsatisfactory return on investment, too narrow customer base…",* DUN 7, P11R18) yet a service would be viable only if there was a known and well defined market for it *("If the particular application has enough market – yes.",* DUN 9, P5R10; *"If new development is very well targeted they could be profitable – otherwise they don't bring much of the profits.",* DUN 114, P9R16*; "It is important that new development is targeted to particular groups of customers, not just to the "wide masses" – different groups have different criteria and needs about what would make their work easier.",* DUN 239, P9R16).

<u>How was this happening?</u> Through the interplay of the factors that split the customer market *"There a few different groups of users…",* DUN 141, P10R17). The customer groups may have different expectations ("*Yes, there are* [groups] *and their expectations are different. ",* DUN 32, P3R8*; "Because games are very common and generally pleasure is sought at any moment, due to the limited free time in everyday life, a demanded feature would also be the entertainment potential of the applications … ",* DUN 91, P6R11) or preferences *("Indeed, consumers can be divided into groups of*

expectations – some seek security and usability, other entertainment, facility, etc.", DUN 38, P6R11). The market segmentation was already recognized by the pricing strategies of the MNOs *("Naturally, there are different user groups – it is not a coincidence that there are different tariff plans whose primary objective is a specific group",* DUN 34, P5R10).

Why was this happening? Some of the segmentation was caused by factors related to demographics, socio economic status and self-efficacy *("Different groups can be divided according to different criteria:-age; – according to interests; – technological competence; – etc.",* DUN 35, P6R11). Specific factors included the existence of customer groups with service related requirements (*"Customers who are looking for more security and control;",* DUN 144, P10R17; *"Different groups can be divided … according to interests…",* DUN 35, P6R11; "*Of course, this depends on the application. If it is a game, users and needs are totally different from those of e-banking.",* DUN 39, P7R12) and technology related requirements ("*Limited market for certain applications or the need for technologies that are either not yet invented, or are not applicable or do not meet certain criteria.",* DUN 2, P5R10).

Somewhat contradicting views about service cost were expressed. Some stated that customer decision would be influenced by cost *("Sometimes the market is not ready to use new development – it is also sceptical, too cost-sensitive, and everyone is comparing themselves to others instead of judging what advantages the service could bring personally to them.",* DUN 103, P9R16; *"If I have to express an opinion – it is definitely the price users would pay, in order to use a certain product (not only the buying cost, but also the expenses for its future use.",* DUN 62, P7R12*; "Whether the service is for free and if not – whether the user can afford it.",* DUN 59, P5R10; *"The price is a key factor, especially in Bulgaria…",* DUN 124, P9R16). According to others cost was considered along with other factors ("*Paid services are used by certain target groups which are interested in the product for specific reasons – meaning that customers have already made a well-grounded decision according to their specific needs.",* DUN 259, P12R19*;* "*The price, the way of distribution and attracting (marketing), distribution – are distrustful can only be convinced by opinions friends who have good impressions.",* DUN 60, P6R11*; "For other apps with health apps, customers are anyway willing to pay more and price is not such a big issue in my opinion.",* DUN 23, P11R18) including also quality *("Price and quality.",* DUN 57,

P3R8*; "Customers, for whom the price is not important – they are ready to pay more for safety, stability of the service and IT security of their data",* DUN 146, P10R17).

The theme concept was summarized as "**Customer market very segmented",** illustrated by: "*Having in mind the limitations of mobile devices, that are being more and more overcome, but still do exist, it is important to know who exactly the users of the product will be and the product/service has to be in precise conformity with their technical knowledge and potentialities*." (DUN 93, P7R12).

The following observations were made:

Note 3. Participants had similar views on how the customer market was segmented based on demographics and requirements with the exception of service cost.
Note 4. May be related to "Customers difficult" as both refer to perceived customer behaviour towards (new) mobile services; the market as segmented in a multitude of ways.

The composition of the theme in terms of super codes, and the categories and sub-categories they belong to is provided in Table 5-18. A total of nine super codes were defined the theme, from two different categories and four sub-categories within them.

Table 5-18. Theme "Customer segmentation"

Theme "Customer segmentation"	
Category and sub-category (numbers in brackets show the number of related super codes)	**Super codes (numbers in brackets show the number of meanings associated with each super code)**
CUSTOMERS (8)	
CUSTOMER SEGMENTATION (5)	segmentation by specificity of requirements (11) segmentation by age (2) segmentation by self-efficacy (2) segmentation by socio-economic status (2) segmentation is multidimensional (2)
CUSTOMER REQUIREMENTS (1)	customers do not mix entertainment and serious business (1)
CUSTOMER DECISION MAKING (2)	decision influenced by cost – not (3) decision influenced by cost (11)
SERVICE SUPPLY AND DEMAND (1)	
SERVICE VIABLE NOT (1)	narrow customer base (5)

5.8.2.3 Theme "Attractive services"

According to theme "Difficult customers" (and to a degree, to theme "Customer segmentation) customers were reluctant to embrace mobile services. What would attract them? A theme around this concept emerged as illustrated in the left hand side of Figure 5-31 (with examples of the pattern coding). It was named "**Attractive services".**

The theme was supported by meanings coded with seven super codes (expectations for appealing service design, expectations for rich experience, services that are attractive to customers, free trial increases popularity, free services attractive if modelled on

successful paid ones, paid services less attractive, customer motivation needed to stimulate development) (Table 5-19).

The meanings were extracted from 18 DUNs (eight DUNs from the ID domain and ten DUNs from the IS domain). All relevant data were pulled together as shown in Data list 5-3. The data were read again in order to extract a theme description in terms of "what was happening, how and why".

Data list 5-3. Data supporting theme "Attractive services"

1. *"A market they could be offered at; – Interesting ideas that would motivate people to use new development" (DUN 26, P5R10)*
2. *"The added value for the business segment and the design for the consumer segment" (DUN 186, P2R4)*
3. *"The developers of a mobile service have to offer far-seeing solutions and be flexible to fit the changing market situation and meet the wide range of customer expectation regarding factors such as money for value, support, availability, technical characteristics, user friendly interface, design." (DUN 266, P12R19)*
4. *"Design features are also part of the motivation of a private user to use a certain mobile application." (DUN 272, P12R19)*
5. *"Innovation is practically mandatory in the development of software systems from the new generation, as they must both are based on familiar methods, in order for customers not to be unfamiliar with them, but also to bring innovation that facilitates some activity, to contribute to a richer user experience or to correct the mistakes of old systems." (DUN 69, P6R11)*
6. *"In short, innovation is to be found in the GUI portion of applications because of the display limitations, and in the maximized activities and their benefits with minimal effort." (DUN 72, P6R11) free services attractive if modelled on successful paid ones*
7. *"What is more, most of the successful paid products very quickly stimulate developers to make a free for use analogue (the successful free Open Office alternative to MS Office package is an example)." (DUN 19, P7R12)*
8. *"Yes, I firmly believe that a given free product can give much more profit with its popularity, than a product that is paid and because of this – less used/less known." (DUN 18, P7R12)*
9. *"Free access is always a good way to make a new product more popular…." (DUN 258, P12R19)*
10. *"Therefore, free applications are downloaded/purchased by a larger number of people...." (DUN 261, P12R19)*
11. *"Mobile internet prices in many aspects are making the use of applications expensive and thus unattractive." (DUN 53, P7R12)*
12. *"…. The service has to be...modern" (DUN 124, P9R16)*
13. *"Mobile applications not only provide a service to the telecom customers, they are a product themselves and as such must be sold. Therefore, innovations are needed so that the application is attractive for the user." (DUN 209, P4R9)*
14. *"Product innovation." (DUN 223, P2R4)*
15. *"Because they are new for Bulgaria and because they are needed for the business." (DUN 234, P2R4)*
16. *"Also they are bound with the new market trends and business models, used in Bulgaria." (DUN 235, P2R4)*
17. *"The factors named. are relevant for the private ones[clients]: if the service is modern..." (DUN 241, P10R17)*
18. *"Some of the most important aspects are functionality and interesting, but applicable ideas." (DUN 68, P5R10)*

The "what" in theme was that according to participants, mobile services needed to provide motivation for customers to use them, by being innovative and aligned with the latest trends: "*Mobile applications not only provide a service to the telecom customers, they are a product themselves and as such must be sold. Therefore, innovations are needed so that the application is attractive for the user*." (DUN 209, P4R9); customers were attracted by services inherently interesting and with a contemporary feel: "*Some of*

the most important aspects are functionality [and] *interesting, but applicable ideas."* (DUN 68, P5R10); *"…Interesting ideas that would motivate people to use new development"* (DUN 26, P5R10); *".... The service has to be .... modern"* (DUN 124, P9R16).

How was this happening? Service providers were trying to attract customers with free services *("Yes, I firmly believe that a given free product can give much more profit with its popularity than a product that is paid and because of this – less used/less known."*, DUN 18, P7R12), or free trials: *"Free access is always a good way to make a new product more popular…. "* (DUN 258, P12R19).

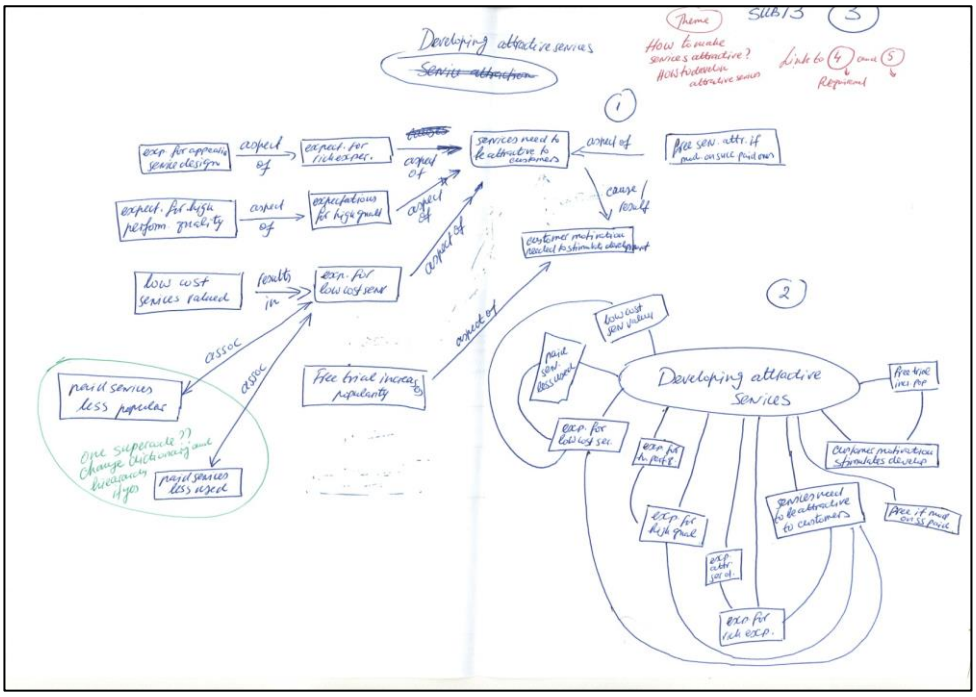

Figure 5-31. Developing Theme "Attractive services"

Why was this happening? According to participants, the specific limitations of the mobile device necessitated the development of an attractive user interface: *"In short, innovation is to be found in the GUI portion of applications because of the display limitations, and in the maximized activities and their benefits with minimal effort."* (DUN 72, P6R11). Customers were perceived as expecting services to be appealing in terms of design and experience: *"Design features are also part of the motivation of a private user to use a certain mobile application." (DUN 272, P12R19); "Innovation is practically mandatory in the development of software systems from the new generation, … innovation that facilitates some activity, to contribute to a richer user experience or to correct the mistakes of old systems." (DUN 69, P6R11*); providing free access to services could be used as a means to evaluate them (*"Free access is always a good way*

to...get feedback from users.“, DUN 258, P12R19). Finally, the market was seen as fast moving, with new ideas quickly absorbed and implemented in free or low cost services: *“What is more, most of the successful paid products very quickly stimulate developers to make a free for use analogue (the successful free Open Office alternative to MS Office package is an example).“* (DUN 19, P7R12).

The theme's concept was summarized as **“Appealing design and innovative features attract customers”,** illustrated by: *“Mobile applications not only provide a service to the telecom customers, they are a product themselves and as such must be sold. Therefore, innovations are needed so that the application is attractive for the user.“* (DUN 209, P4R9).

The following observations were made:

Note 5. “Attractiveness” was seen as an expectation, i.e., as something customers would expect regardless of the other service characteristics/specific requirements.
Note 6. In the second theme (about customer segmentation) there were opposing views on how cost influences decisions. There “not attractive” was associated with “costly”.
Note 7. What makes a service attractive – this could be an overarching theme.

The composition of the theme in terms of super codes, and the categories and sub-categories they belong to is provided in Table 5-19. Seven super codes were used to define the theme, from three different categories and four sub-categories within them.

Table 5-19. Theme “Attractive services”

Theme “Attractive services”	
Category and sub-category (numbers in brackets show the number of related super codes)	**Super codes (numbers in brackets show the number of meanings associated with each super code)**
CUSTOMERS (2)	
CUSTOMER EXPECTATIONS (2)	expectations for appealing service design (3) expectations for rich experience (2)
SERVICE SUPPLY AND DEMAND (4)	
SERVICE DEMAND GENERATOR (3)	services that are attractive to customers (9) free trial increases popularity (4) free services attractive if modelled on successful paid ones (1)
SERVICE VALUE INHIBITOR (1)	paid services less attractive (2)
UNCERTAINTY (1)	
UNCERTAINTY ABOUT CUSTOMERS (1)	customer motivation needed to stimulate development (1)

5.8.2.4 Theme “Free services”

Several potentially related themes around other aspects of services that participants perceived as expected or required by customers emerged. The next four themes were developed in several iterations as initially it was thought that these themes could be all

parts of one theme. Figure 5-32 shows the super codes and the relationships underlying the themes, including some potential links between them.

As before, themes emerged across categories and subcategories. The theme "**Free services"** evolved around super codes related to participant opinions about how customers perceived free services (see the bottom half of Figure 5-32, the area labelled with a circled "4"). At a glance the data contained some contrasting views about customer attitudes towards free services; the theme served as a means to capture the aspects of this contrast.

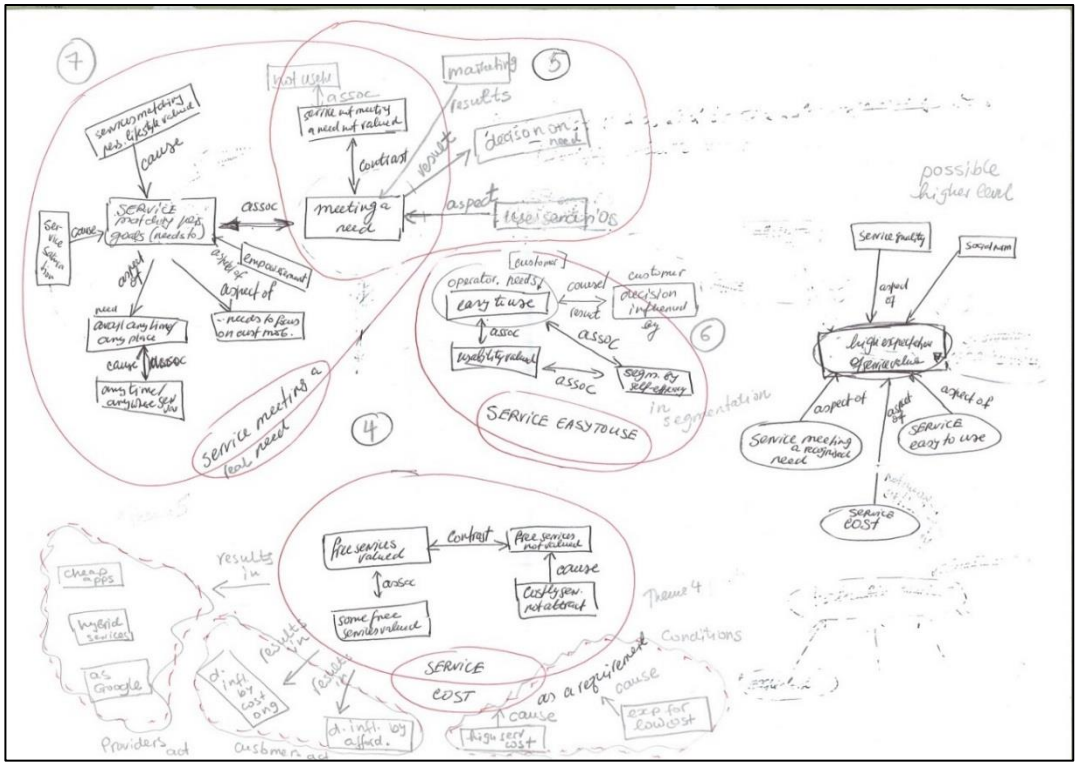

Figure 5-32. Developing the next four themes

The theme was based on data associated with ten super codes (decision influenced by cost ongoing, decision influenced by service affordability, expectations for low service cost, free services valued, low cost service valued, free services not reliable, high service cost due to high data cost, free services profitable if very popular, service with some free functions may be successful, heap applications already available) (Table 5-20). The relevant meanings were extracted from 18 DUNs (11 from the ID domain and seven form the IS domain). All relevant data were pulled together as shown in Data list 5-4. The data were read again in order to extract a theme description in terms of "what was happening, how and why".

Data list 5-4. Data supporting theme "Free services"

1. *"The free (unpaid) access to new development is definitely a key factor for the users,..." (DUN 122, P8R15)*
2. *"The free (unpaid) access always plays a role – even if the customer does not necessarily need a service, he might try it because it is for free …. " (DUN 125, P10R17)*
3. *". Even if they do not use the service any longer [free apps], because they do not really need it, this initial use could help get more feedback and make changes to the product " (DUN 261, P12R19)*
4. *"Especially in our region – yes because it was "not affordable' for everyone to pay to use something (this is also due to mentality – we are usually dissatisfied)." (DUN 16, P6R11)*
5. *"But in any case, this is a proven technique in sales, so there is no reason not to have an effect also on mobile applications." (DUN 17, P6R11)*
6. *"The price, because of the competition between different channels (operators??) and the economic crisis." (DUN 87, P3R8)*
7. *"Low cost of services. Speed. Customization options." (DUN 232, P1R2)*
8. *"Undoubtedly free applications attract the interest of people, but if they are not well made and sufficiently functional, as is usually the case with free stuff, the user would rather not use that application or would consider buying the paid version, which will have a much better good maintenance." (DUN 15, P5R10)*
9. *"Private users usually are not ready to pay a considerable price and the cost-value relation is an especially important part of their motivation to purchase the product." (DUN 271, P12R19)*
10. *"More entertainment at lower prices, as well as many innovative useful applications." (DUN 79, P3R8)*
11. *"If I have to express an opinion – it is definitely the price users would pay, in order to use a certain product (not only the buying cost, but also the expenses for its future use)." (DUN 62, P7R12)*
12. *"The high cost of services. High system requirements to consumer devices" (DUN 95, P1R2)*
13. *"The cost of the application. The price of services. System requirements of the application to the user mobile phone" (DUN 162, P1R2)*
14. *"In Bulgaria they rather disturb, as prices are not yet at the level of the market – the study of my colleague from the mobile applications will show it clearly." (DUN 50, P6R11)*
15. *"Usually most of the apps are for free or cost no more than 1 or 2 euro." (DUN 22, P11R18)*
16. *"Yes, I firmly believe that a given free product can give much more profit with its popularity, than a product that is paid and because of this – less used/less known." (DUN 18, P7R12)*
17. *"On the other hand, a number of free products generate big profits just because they are popular (examples: Google, Facebook, Yahoo, etc.)." (DUN 20, P7R12)*
18. *"The hybrid alternative could also be successful – to some extent for free, and then paid additional services" (DUN 21, P7R12)*

The "what" in the theme was that customers were generally perceived as having a favourable view about MDS offered at no lost or low cost ("*The free (unpaid) access to new development is definitely a key factor for the users,...",* DUN 122, P8R15; "*Undoubtedly free applications attract the interest of people, but if they are not well made and sufficiently functional, as is usually the case with free stuff, the user would rather not use that application or would consider buying the paid version, which will have a much better good maintenance*.", DUN 15, P5R10).

Why was this happening? Customers had developed expectations about free service availability ("*Private users usually are not ready to pay a considerable price and the cost-value relation is an especially important part of their motivation to purchase the product.",* DUN 271, P12R19). They had to consider how affordable a service would be given the high device and access costs ("I*n Bulgaria… prices are not yet at the level of the market – … ",* DUN 50, P6R11; *"…The high cost of services. High system requirements to consumer devices",* DUN 95, P1R2).

How was it happening? Service providers were looking for ways to attract customers with free or cheap applications as part of a service ("*Usually most of the apps are for free or cost no more than 1 or 2 euro.*", DUN 22, P11R18) and service bundles ("T*he hybrid alternative could also be successful – to some extent for free, and then paid additional services",* DUN 21, P7R12; *"Yes, I firmly believe that a given free product can give much more profit with its popularity, than a product that is paid and because of this – less used/less known."*, DUN 18, P7R12).

The theme's concept was summarized as "**Free services draw customer attention",** illustrated by: *"The free, unpaid access always plays a role – even if the customer does not necessarily need a service, he might try it because it is for free..."* (DUN 125, P10R17).

The following observation was made:

Note 8. One participant thought that some customers actually may prefer paid services thus corroborating theme "Customer segmentation" where one of the customer market segmentation dimensions was attitude towards service cost.

The composition of the theme in terms of super codes, and the categories and sub-categories they belong to is provided in Table 5-20. Ten super codes were used to define the theme, from two different categories and five sub-categories within them.

Table 5-20. Theme "Free services"

Theme "Free services"	
Category and sub-category (numbers in brackets show the number of related super codes)	**Super codes (numbers in brackets show the number of meanings associated with each super code)**
CUSTOMERS (3)	
CUSTOMER DECISION MAKING (2)	decision influenced by cost ongoing (1) decision influenced by service affordability (2)
CUSTOMER EXPECTATIONS (1)	expectations for low service cost (2)
SERVICE SUPPLY AND DEMAND (7)	
SERVICE VALUE ADDER (3)	free services valued (5) low cost service valued (2)
SERVICE VALUE DETRACTOR (2)	free services not reliable (1) high service cost due to high data cost (1)
SERVICE VIABLE (2)	free services profitable if very popular (2) service with some free functions may be successful (1) cheap applications already available (1)

5.8.2.5 Theme "Need for service"

The data were examined further in order to identify more meanings related to essential service characteristics and how these affected customer attitude and decision making according to participants. A theme around perceptions about customer need for a service

emerged; it was named **"Need for service"** (see the upper half of Figure 5-32, the area labelled with a circled "5").

The related meanings extracted from 40 DUNs (11 DUNs from the ID domain and 29 – from the IS domain) were used to define the theme which was based on six super codes: decision influenced by how much a service is needed, decision influenced by marketing, service needs to be meeting a need, service not useful, service not meeting a need not valued, attractive use scenarios exist. All relevant data were pulled together as shown in Data list 5-5. The data were read again in order to extract a theme description in terms of "what was happening, how and why".

Data list 5-5. Data supporting theme "Need for service"

1. *"Obstacles are: too high investment costs and unsatisfactory return on investment, too narrow customer base, unwillingness to change previous routines and customer behaviour (traditionalists), bad marketing communication, weak use cases, no superior selling proposition etc." (DUN 7, P11R18)*
2. *"It depends on the particular offer – its price, the marketing strategy and a number of other factors." (DUN 8, P3R8)*
3. *"The price is a major factor, but not the only one. Whether they would start using it directly depends on their needs and on what the specific application is "giving" them. Nowadays the user has a choice." (DUN 14, P3R8)*
4. *"For other apps with health apps, customers are anyway willing to pay more and price is not such a big issue in my opinion." (DUN 23, P11R18)*
5. *"What really matters is the value that the mobile product brings and how desired the solution is." (DUN 24, P11R18)*
6. *"In my opinion, it is difficult to persuade customers to break with the old routines and influence them towards adopting new innovative products if the need to do so is not urgent." (DUN 31, P11R18)*
7. *"[attitude toward accepting] The necessity of a new service; – How easy it is to use; -" (DUN 58, P5R10)*
8. *"Some of the most important aspects are functionality and interesting, but applicable ideas." (DUN 68, P5R10)*
9. *"More entertainment at lower prices, as well as many innovative useful applications." (DUN 79, P3R8)*
10. *"I would say that a mobile phone can even give an additional option of paying the public services (those services are already being offered but not broadly used)." (DUN 84, P7R12)*
11. *"Or, even more trivially – to buy a coffee from the machine, sending an SMS to the number given." (DUN 85, P7R12)*
12. *"In my opinion, development of new services is going ahead of demand." (DUN 120, P4R9)*
13. *"This is why I think that not so much the price, but advertisement, i.e., information about the availability of such a service and how to use it, is determining." (DUN 121, P4R9)*
14. *"But some other factors are gaining more and more importance too: Safety of the personal information and the user's data; Effectiveness; Accountability; Depending on quality and need, users would also pay for new development in order to get good quality" (DUN 123, P8R15)*
15. *"The price is a key factor, especially in Bulgaria; The service has to be effective; Useful, and modern" (DUN 124, P9R16)*
16. *"Other factors are: Effectiveness and usefulness. User-friendliness; Making the work process easier" (DUN 127, P10R17)*
17. *"This question has many aspects. On the one hand, the service offered is very important for the customers." (DUN 131, P4R9)*
18. *"Other factors: the service has to be accepted by the customer – if it is not, the advertisement should be modified" (DUN 137, P9R16)*
19. *"From the customer's point of view: lack of enough information for new services and products – there are products also in world scale that are barely spread." (DUN 138, P10R17)*
20. *"[attitude towards accepting…]Information about the service." (DUN 166, P4R9)*
21. *"[attitude towards accepting…] The need for a certain service;" (DUN 168, P8R15)*
22. *"[attitude towards accepting…] The usefulness/customer-friendliness of the service" (DUN 171, P8R15)*
23. *"[attitude towards accepting…] Becoming aware of the need for a certain service;" (DUN 172, P9R16)*
24. *"[attitude towards accepting…] Implied need through advertisement;" (DUN 173, P9R16)*

25. *"[attitude towards accepting…] To what extent the customer is familiar with the product and the services offered – this is mainly a task of the merchants who have to be able to explain all advantages to the customer so that he does not refrain from buying it." (DUN 174, P10R17)*
26. *"There are some new development services that are not really applicable and are actually useless – there's not much sense in creating them." (DUN 197, P8R15)*
27. *"Available sales channels." (DUN 205, P2R4)*
28. *"Appropriate marketing campaign." (DUN 206, P2R4)*
29. *"Innovation is very important in this sector – single aspects are; the applicability of a product; the effectiveness of the product/service for the user; cost-effectiveness for the operator" (DUN 210, P8R15)*
30. *"Innovation is very important in this sector – single aspects are: The usefulness and effectiveness of the service;" (DUN 215, P10R17)*
31. *"OR services that were available before, but in a different form. E.g. mobile banking, mobile payment of communal services and a system for better control of point of sale terminals at the NAP" (DUN 228, P8R15)*
32. *"The exact information at the right time." (DUN 233, P1R2)*
33. *"In first place, the effectiveness of new development. Cost-effectiveness for the customer (reducing their costs/saving money)" (DUN 237, P8R15)*
34. *"Usefulness and convenience (user-friendly products)" (DUN 238, P8R15)*
35. *"[New features] wide range of functions e.g., covering the spectrum of the mostly used banking functions (money transfer, internal bank payment, account balance, information on credit cards)" (DUN 249, P12R19)*
36. *"The app has to offer functionality, flexibility and be user-friendly in order to be attractive and competitive on the market" (DUN 251, P12R19)*
37. *"Internet banking now works well and customers want it on their mobile phones." (DUN 256, P12R19)*
38. *"Other factors which influence customer decisions are The applicability of the product, Added value of the service, Popularity, Value for money relation (if paid service), User friendliness and compatibility with other programs/OS/devices" (DUN 262, P12R19)*
39. *"[Customer attitude is affected by] Attractiveness – is the service helpful, does it save time," (DUN 279, P12R19)*
40. *"… sometimes market is not ready to use new development – in this way introducing it does not bring much positive effects and is not profitable." (DUN 104, P10R17)*

What was happening? Service providers were attempting to actively influence customers by providing information about new services that would indicate how useful they could be thus creating service awareness and even need: *"This is why I think that not so much the price, but advertisement, i.e., information about the availability of such a service and how to use it, is determining.*", DUN 121, P4R9); "*Other factors: the service has to be accepted by the customer – if it is not, the advertisement should be modified"*, DUN 137, P9R16; "*Becoming aware of the need for a certain service;*", DUN 172, P9R16); "*Implied need through advertisement;"*, DUN 173, P9R16). Services that did not match customer requirements would not be viable (*"There are some new development services that are not really applicable and are actually useless – there's not much sense in creating them.*", DUN 197, P8R15). Reinvented existing services could also be marketed as meeting an existing need by new means *("[New features] wide range of functions e.g., covering the spectrum of the mostly used banking functions (money transfer, internal bank payment, account balance, information on credit cards)"*, DUN 249, P12R19; *"… to buy a coffee from the machine, sending an SMS to the number given.", DUN 85, P7R12).*

How was it happening? According to participants, one of the factors on which customers based service acceptance decisions on was perceiving a particular service as needed (e.g., necessary to help meeting a specific need): *"[attitude toward accepting] The necessity of a new service ….*, *DUN 58, P5R10).* Customers would make judgements about service applicability and functionality (how well the service matched the need related requirements) and about the service usefulness in meeting these requirements effectively (*"Innovation is very important in this sector – single aspects are: The usefulness and effectiveness of the service;"*, DUN 215, P10R1*; Innovation is very important in this sector – single aspects are; the applicability of a product; the effectiveness of the product/service for the user…"*DUN 210, P8R15).

Why was it happening? Customers were perceived as being aware of their needs (*"Other factors which influence customer decisions are the applicability of the product… "*, DUN 262, P12R19) based in part on their experience with other technology supported services in familiar areas (*"Internet banking now works well and customers want it on their mobile phones"*, DUN 256, P12R19; *"For other apps with health apps, customers are anyway willing to pay more and price is not such a big issue in my opinion."*, DUN 23, P11R18). However, customers may not be aware of all options: *"… an additional option of paying the public services (those services are already being offered but not broadly used.", (DUN 84, P7R12).*

The theme's concept was summarized as "**Services are viable if customers see them as meeting their specific needs",** illustrated by: *"The price is a major factor, but not the only one. Whether they would start using it directly depends on their needs and on what the specific application is "giving" them. Nowadays the user has a choice.*" (DUN 14, P3R8).

The following observations were made:

Note 9. Usefulness and ease of use are mentioned often together and in the first place, i.e., as basic requirements.
Note 10. Need for a service may influence the perceived service value? Services not needed are not viable?

The composition of the theme in terms of super codes, and the categories and sub-categories they belong to is provided in Table 5-21. Six super codes were used to define the theme, from two different categories and five sub-categories within them.

Table 5-21. Theme "Need for service"

Theme "Need for service"	
Category and sub-category (numbers in brackets show the number of related super codes)	**Super codes (numbers in brackets show the number of meanings associated with each super code)**
CUSTOMERS (3)	
CUSTOMER DECISION MAKING (2)	decision influenced by how much a service is needed (4)
CUSTOMER REQUIREMENTS (1)	decision influenced by marketing (12) service needs to be meeting a need (21)
SERVICE SUPPLY AND DEMAND (3)	
SERVICE DEMAND INHIBITOR (1)	service not useful (1)
SERVICE VALUE DETRACTOR (1)	service not meeting a need not valued (3)
SERVICE VIABLE (1)	attractive use scenarios exist (6)

5.8.2.6 Theme "User friendly service"

The data units that supported the development of the theme above often referred to useful /effective/functional/helpful along with "easy to use" and "usable" as characteristics important to service viability. A distinctive theme emerged around the concept of customer need for really easy to use services" (see Figure 5-32, centre, the area labelled with a circled "6"). It was named **"User friendly service".**

The theme was based on three super codes (decision influenced by ease of use, service needs to be easy to use, usability valued) and supported by meanings extracted from 18 DUNs (eight from the ID domain and ten from the IS domain). All relevant data were pulled together as shown in Data list 5-6. The data were read again in order to extract a theme description in terms of "what was happening, how and why".

Data list 5-6. Data supporting theme "User friendly service"

1. *"The necessity of a new service; – How easy it is to use; -" (DUN 58, P5R10)*
2. *"And this is if we assume that the product itself is made well – stable, intuitive, fast, with nice design." (DUN 63, P7R12)*
3. *"Innovation is practically mandatory in the development of software systems from the new generation, as they must both are based on familiar methods, in order for customers not to be unfamiliar with them, but also to bring innovation that facilitates some activity, to contribute to a richer user experience or to correct the mistakes of old systems." (DUN 69, P6R11)*
4. *"Because in most cases, the device is everywhere with the user, he should be able to take advantage of it and get the most convenient services and interfaces for their use." (DUN 71, P6R11)*
5. *"In short, innovation is to be found in the GUI portion of applications because of the display limitations, and in the maximized activities and their benefits with minimal effort." (DUN 72, P6R11)*
6. *"Mostly user-friendliness – universal fallacy is that since we live in the technology era, anyone can operate with technology, even more: most young people reduce their computer access and other technologies to the most popular and accessible applications and functions – Skype, Facebook, etc." (DUN 88, P5R10)*
7. *"Second usability – that is a characteristic of each application." (DUN 90, P6R11)*
8. *"A mandatory condition for a particular mobile device is for it to be intuitive enough and just for work." (DUN 92, P7R12)*
9. *"Other factors are: Effectiveness and usefulness. User-friendliness; Making the work process easier" (DUN 127, P10R17)*
10. *"Easiness of access to the service/application via mobile application. The price" (DUN 167, P4R9)*
11. *"The usefulness/customer-friendliness of the service" (DUN 171, P8R15)*
12. *"Usefulness and convenience (user-friendly products)" (DUN 238, P8R15)*
13. *"[New features] easy to use platform;" (DUN 246, P12R19)*
14. *"An easy and quick to use interface allowing customers to use the full range of features and functions of the application while saving them time – because the market offers more and more new services to the "mobile" customer that are designed to save " (DUN 250, P12R19)*

15. *"The app has to offer functionality, flexibility and be user-friendly in order to be attractive and competitive on the market" (DUN 251, P12R19)*
16. *"Other factors which influence customer decisions are The applicability of the product, Added value of the service, Popularity, Value for money relation (if paid service), User friendliness and compatibility with other programs/OS/devices" (DUN 262, P12R19)*
17. *"The developers of a mobile service have to offer far-seeing solutions and be flexible to fit the changing market situation and meet the wide range of customer expectation regarding factors such as money for value, support, availability, technical characteristics, user friendly interface, design." (DUN 266, P12R19)*
18. *"Private users expect from a service to be easy to use, offer them flexibility and handiness and get support in real time." (DUN 269, P12R19)*

The "what" in the theme was that according to participants, services offered to customers needed to be user-friendly and easy to use (*"*[Features attractive to mobile customers] *Second usability – that is a characteristic of each application."*, DUN 90, P6R11; *"[Features attractive to mobile customers] Usefulness and convenience (user-friendly products)"*, DUN 238, P8R15).

How was it happening? Participants thought that user friendliness was a factor in customer decision making: "*Other factors which influence customer decisions are:… User friendliness and compatibility with other programs/OS/devices"*, DUN 262, P12R19).

Why was it happening? According to participants, user-friendliness was an expectation customers already had. Therefore, only user friendly services would be able to compete in the market: *"The app has to … be user-friendly in order to be attractive and competitive on the market"*, DUN 251, P12R19); "*The developers of a mobile service have to …meet the wide range of customer expectation[s] …such as …user friendly interface…"*, DUN 266, P12R19).

The theme's concept was summarized as "**Customers require services to be friendly",** illustrated by: *"An easy and quick to use interface allowing customers to use the full range of features and functions of the application while saving them time – because the market offers more and more new services to the 'mobile' customer… "*, DUN 250, P12R19.

The following observation was made:

Note 11. DUNs 279, 252, 262, 261 state features that serviced need to have in order to achieve viability (attract customers AND compete in the market).

The composition of the theme in terms of super codes, and the categories and sub-categories they belong to is provided in Table 5-22. Three super codes were used to define the theme, from two different categories and three sub-categories within them.

Table 5-22. Theme "User friendly service"

Theme "User friendly service"	
Category and sub-category (numbers in brackets show the number of related super codes)	**Super codes (numbers in brackets show the number of meanings associated with each super code)**
CUSTOMERS (2)	
CUSTOMER DECISION MAKING (1)	decision influenced by ease of use (4)
CUSTOMER REQUIREMENTS (1)	service needs to be easy to use (12)
SERVICE SUPPLY AND DEMAND (1)	
SERVICE VALUE ADDER (1)	usability valued (3)

5.8.2.7 Theme "Personal goals"

A theme about the preferences of customers related to meeting their personal lifestyle and objectives emerged, as seen in the top left corner in Figure 5-32 (the area labelled with a circled "7"). It was named **"Personal goals".** The theme was based on six super codes (service needs to focus on personal mobility, service needs to meet personal goals, service saturation, anytime/anywhere services valued, customer empowerment, services matching personal lifestyle valued). It was supported by meanings extracted from the 34 DUNs (five from the ID domain and 29 from the IS domain). All relevant data were pulled together as shown in Data list 5-7. The data were read again in order to extract a theme description in terms of "what was happening, how and why".

Data list 5-7. Data supporting theme "Personal goals"

1. *"Primarily the convenience to be able to do whatever you want, whenever and wherever you want - something very important because it saves time." (DUN 81, P6R11)*
2. *"24/7 service availability and support." (DUN 109, P2R4)*
3. *"However, the products features and the product flexibility always prevail vs. the fashion design." (DUN 185, P2R4)*
4. *"Innovation is very important in this sector – single aspects are: Dynamics and flexibility;" (DUN 211, P9R16)*
5. *"Accessibility at any time and from anywhere to information resources as well as speed in obtaining information." (DUN 218, P1R2)*
6. *"Ability the product features to be extended in future." (DUN 222, P2R4)*
7. *"Customers, whose motivation is to cut down their expenses;" (DUN 143, P10R17)*
8. *"They are a way to save time, are handy and give control" (DUN 231, P10R17)*
9. *"In first place, the effectiveness of new development. Cost-effectiveness for the customer (reducing their costs/saving money)" (DUN 237, P8R15)*
10. *"Private users expect from a service to be easy to use, offer them flexibility and handiness and get support in real time." (DUN 269, P12R19)*
11. *"[Customer attitude is affected by] does the mobile application make business and private operations easier and faster;" (DUN 283, P12R19)*
12. *"[Customer attitude is affected by] does it save money." (DUN 284, P12R19)*
13. *"In this regard, the mobile technologies should focus most on innovation-related to one special feature – mobility." (DUN 70, P6R11)*
14. *"In general, mobile applications are relatively new, but despite this, I have the impression that with time, even there the "saturation" effect is visible – there is a big choice of products to be chosen among (in still relatively small spheres)." (DUN 74, P7R12)*
15. *"I personally am a fan of the idea that mobile devices can displace some of the everyday functions that people do in the common old-fashioned way or even using computer." (DUN 82, P7R12)*
16. *"Because games are very common and generally pleasure is sought at any moment, due to the limited free time in everyday life, a demanded feature would also be the entertainment potential of the applications (of course, serious applications should not allow it at all, as this would lead to a counterproductive distrust effect)" (DUN 91, P6R11)*
17. *"Currently the 'mobile' or the 'mobility' became expression with very wide range and covering services and features which are not based on pure GSM or mobile technology." (DUN 99, P2R4)*
18. *"On the other hand, sometimes operators are competing at "small distances" […short term competition]" (DUN 160, P9R16)*

19. *"Innovation is very important in this sector – single aspects are; The customer has the choice how to get something done" (DUN 217, P10R17)*
20. *"The possibility of any kind of online services and internet access." (DUN 236, P4R9)*
21. *"It could happen that their mobile product is no longer attractive or there are too many similar products by the time of its launch." (DUN 253, P12R19)*
22. *"At the moment, the market offers an immense number of mobile applications." (DUN 263, P12R19)*
23. *"As described above, there is always a risk that the time needed for planning and designing a mobile application is too long and that the service is no longer attractive or needed in the time of its launching and that there are other similar services" (DUN 267, P12R19)*
24. *"Yes, because of flexibility." (DUN 107, P2R4)*
25. *"Ability customer to be able to control, monitor and act pro-actively." (DUN 108, P2R4)*
26. *"Innovation is very important in this sector – single aspects are: Saving money/time;" (DUN 216, P10R17)*
27. *"Provide flexibility to the customers. Provide complete control of the expenses for telecom services." (DUN 219, P2R4)*
28. *"New development is attractive for the customer because it offers services/products/applications the user might have never thought of before (or would not think could be helpful/useful)" (DUN 227, P8R15)*
29. *"Low cost of services. Speed. Customization options." (DUN 232, P1R2)*
30. *"Our new mobile service application for individuals provides direct access to our customers' bank account through a mobile device, which saves them time, makes access to banking operations easier and is available 24/7 in real time" (DUN 244, P12R19)*
31. *"New features] flexibility;" (DUN 248, P12R19)*
32. *"The app has to offer functionality, flexibility and be user-friendly in order to be attractive and competitive on the market" (DUN 251, P12R19)*
33. *"The developers of a mobile service have to offer far-seeing solutions and be flexible to fit the changing market situation and meet the wide range of customer expectation regarding factors such as money for value, support, availability, technical characteristics, user friendly interface, design." (DUN 266, P12R19)*
34. *"[Customer attitude is affected by] Attractiveness – is the service helpful, does it save time," (DUN 279, P12R19)*

Theme "**Personal goals**" is described below. Numbers in square brackets refer to bullet point numbers in Data list 5-7 and point at meanings supporting the theme description.

The "What" in the theme was that according to participants, mobile services needed to offer customers flexibility, e.g., the opportunity to select a service that met their personal requirements. Customer criteria included a range of personal goals such as saving time, saving money, service functionality, service availability, service performance (e.g., [1-5], [24-27])

How was this happening? According to participants, services designed to be flexible and to allow customers to control their use were already offered and the service market had become highly competitive [14; 18]; more such services were likely to appear, as user friendly and flexible services were perceived as attractive by customers and thus were more competitive (e.g., [32, 33]).

Why was this happening? Customers were perceived by research participants as being well aware of the opportunities provided by technology in terms of supporting customer mobility – for example, access to services anywhere/anytime, and expecting to be able to choose from amongst services with a clear value proposition (e.g., [17]; [19-20]).

The theme's concept was summarized as "**Customers choose services based on personal goals",** illustrated by: "*They are a way to save time, are handy and give control"*[8], and *"Low cost of services. Speed. Customization options."*[29].

The following observation was made:

Note 12. The theme seems to be supported mostly by meanings extracted from data in the IS domain, the first so far to exhibit such a property.

The composition of the theme in terms of super codes and the categories and sub-categories they belong to is provided in Table 5-23; six super codes were used to define the theme, from two different categories and three sub-categories within them.

Table 5-23. Theme "Personal goals"

Theme "Personal goals"	
Category and sub-category (numbers in brackets show number of related super codes)	**Super codes (numbers in brackets show number of meanings associated with each super code)**
CUSTOMERS (2)	
CUSTOMER REQUIREMENTS (2)	service needs to focus on personal mobility (3) service needs to meet personal goals (14)
SERVICE SUPPLY AND DEMAND (4)	
SERVICE MARKET (1)	service saturation (6)
SERVICE VALUE ADDER (3)	anytime/anywhere services valued (2) customer empowerment (4) services matching personal lifestyle valued (11)

5.8.2.8 Theme "Service value"

The remaining codified data were examined further to find out more about service features and their importance as reflected in participant perceptions about customer attitudes/opinions on how services needed to be developed in order to be attractive. A theme around the concept of service value emerged: What makes a service valuable in the eyes of the customer? How does service value relate to service cost when it comes to making a decision about service use? Figure 5-33 illustrates one of the attempts to group the relevant super codes and also to identify possible links to themes already developed. The emerging theme captured service value and what it meant for customers (as perceived by participants). It was named "**Service value".**

The theme was based on 13 super codes (decision influenced by added value, decision influenced by comparison, decision influenced by compatibility, decision influenced by cost-effectiveness, decision influenced by service quality, decision influenced by social norm, expectations for high service performance, expectations for service value, expectations for support, service needs to be convenient, connection with other devices

valued, paid services with support valued, security fears). It was supported by meanings extracted from 37 DUNs (12 and 25 from the ID and IS data domains, respectively).

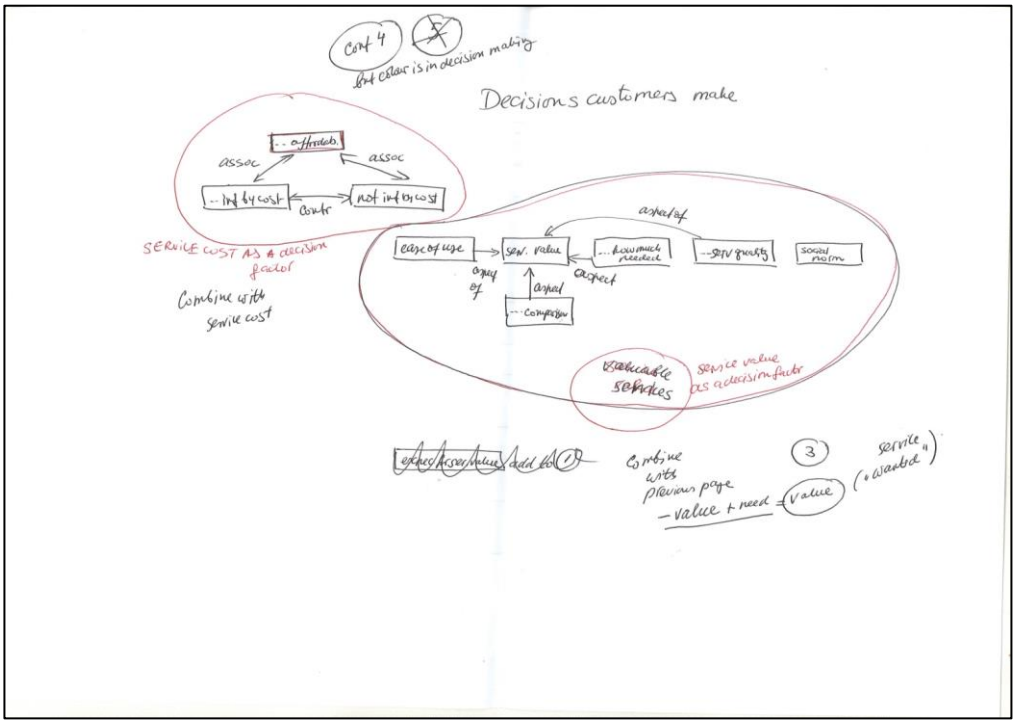

Figure 5-33. Developing theme “Service value”

All relevant data were pulled together as shown in Data list 5-8. The data were read again in order to extract a theme description in terms of ‘‘what was happening, how and why’’.

Data list 5-8. Data supporting theme “Service value”

1. *“There is not much information about what the level of information and personal data security is when adding data on sites via mobile phones – maybe that is the reason why users are a bit distrustful to this type of applications.“ (DUN 6, P7R12)*
2. *“The price, the way of distribution and attracting (marketing), distribution – are distrustful can only be convinced by opinions friends who have good impressions.“ (DUN 60, P6R11)*
3. *“Because in most cases, the device is everywhere with the user, he should be able to take advantage of it and get the most convenient services and interfaces for their use.“ (DUN 71, P6R11)*
4. *“They could offer connection to any kind of other devices – TVs, cars to be operated via mobile phone“ (DUN 80, P5R10)*
5. *“Primarily the convenience to be able to do whatever you want, whenever and wherever you want - something very important because it saves time.“ (DUN 81, P6R11)*
6. *“We could even go further – why not operate devices at home via phone – while on the way back home, to be able to give an instruction to the oven/the air condition to turn on in order not to lose time until you get home.“ (DUN 86, P7R12)*
7. *“Sometimes the market is not ready to use new development – it is also sceptical, too cost-sensitive, and everyone is comparing themselves to others instead of judging what advantages the service could bring personally to them.“ (DUN 103, P9R16)*
8. *“The main-stream opinion in the society about a product;“ (DUN 169, P8R15)*
9. *“Media outcome. “ (DUN 180, P2R4)*
10. *“Compatibility with various OS as Android, Windows Mobile, BlackBerry and others.“ (DUN 204, P2R4)*
11. *“Accessibility at any time and from anywhere to information resources as well as speed in obtaining information.“ (DUN 218, P1R2)*
12. *“The convenience of online services are the thing that attracts people as a whole.“ (DUN 225, P4R9)*
13. *“The accessibility of these services without restriction of place and time through the mobile phone is a huge advantage.“ (DUN 226, P4R9)*

14. *"Usefulness and convenience (user-friendly products)" (DUN 238, P8R15)*
15. *"Our new mobile service application for individuals provides direct access to our customers' bank account through a mobile device, which saves them time, makes access to banking operations easier and is available 24/7 in real time" (DUN 244, P12R19)*
16. *"[New features]Easy and fast accessibility and support 24 hours a day;" (DUN 245, P12R19)*
17. *"[New features] compatibility with other OS and devices," (DUN 247, P12R19)*
18. *"The developers of a mobile service have to offer far-seeing solutions and be flexible to fit the changing market situation and meet the wide range of customer expectation regarding factors such as money for value, support, availability, technical characteristics, user friendly interface, design." (DUN 266, P12R19)*
19. *"Private users expect from a service to be easy to use, offer them flexibility and handiness and get support in real time." (DUN 269, P12R19)*
20. *"What really matters is the value that the mobile product brings and how desired the solution is." (DUN 24, P11R18)*
21. *"And this is if we assume that the product itself is made well – stable, intuitive, fast, with nice design." (DUN 63, P7R12)*
22. *"On the other hand, it is important that the application itself has good mobile software performance." (DUN 132, P4R9)*
23. *"Added value – because it has direct impact on the customer." (DUN 187, P2R4)*
24. *"Perform[ance]s because it has impact on the customer relationship management." (DUN 188, P2R4)*
25. *"[private users]They usually use a mobile product in order to save time and be able to manage operations from their mobile, anytime a day." (DUN 270, P12R19)*
26. *"Private users usually are not ready to pay a considerable price and the cost-value relation is an especially important part of their motivation to purchase the product." (DUN 271, P12R19)*
27. *"[Customer attitude is affected by] does it add value to the service; is there 24/7 support and availability." (DUN 281, P12R19)*
28. *"The price is a major factor, but not the only one. Whether they would start using it directly depends on their needs and on what the specific application is "giving" them. Nowadays the user has a choice." (DUN 14, P3R8)*
29. *"Price and quality." (DUN 57, P3R8)*
30. *"Innovation is practically mandatory in the development of software systems from the new generation, as they must both are based on familiar methods, in order for customers not to be unfamiliar with them, but also to bring innovation that facilitates some activity, to contribute to a richer user experience or to correct the mistakes of old systems." (DUN 69, P6R11)*
31. *"Yes, the promotion at the beginning always sale, however, we prefer to provide more value instead of price discounts." (DUN 118, P2R4)*
32. *"The free (unpaid) access to new development is definitely a key factor for the users, or the lowest price in comparison to other companies' offers." (DUN 122, P8R15)*
33. *"But some other factors are gaining more and more importance too: Safety of the personal information and the user's data; Effectiveness; Accountability; Depending on quality and need, users would also pay for new development in order to get good quality" (DUN 123, P8R15)*
34. *"Customers, …..ready to pay more for safety, stability of the service and IT security of their data" (DUN 146, P10R17)*
35. *"Based on the service design, customers will estimate the value from the new development." (DUN 190, P2R4)*
36. *"Other factors which influence customer decisions are The applicability of the product, Added value of the service, Popularity, Value for money relation (if paid service), User friendliness and compatibility with other programs/OS/devices" (DUN 262, P12R19)*
37. *"….the user would consider buying the paid version, which will have a much better good maintenance." (DUN 15, P5R10)*

Theme "**Service value**" is described below. Numbers in square brackets refer to bullet point numbers in Data list 5-8 and point at meanings supporting the theme description.

The "what" in this theme was that according to participants, service value (for customers) was created by some important service characteristics, such the ones summarized in the statement [16]: "*Easy and fast accessibility and support 24 hours a day*". Unrestricted and unlimited access to the service (to ensure the service was convenient to use) and access to service support (to ensure that the service was available when needed) were both needed according to [19]: *''Private users expect from a service*

to be easy to use, offer them flexibility and handiness and get support in real time", and also as shown in [3; 5; 11-15; 25]. Other features that were seen as having the potential to add value were related to the specificity of the service, such as innovative use of connectivity ("*They could offer connection to any kind of other devices – TVs, cars to be operated via mobile phone"*[4]) and to service design that supported compatibility ("*Compatibility with various OS as Android, Windows Mobile, BlackBerry and others."*[10]). Finally, it would be needed to address security issues in order to alleviate customer security concerns: *"But some other factors are gaining more and more importance too: Safety of the personal information and the user's data…."* [33].

How was this happening? According to participants, customers would compare services in order to decide which ones balanced "*price and quality*" [29] and gave most value: *"The free (unpaid) access to new development is definitely a key factor for the users, or the lowest price in comparison to other companies' offers."*[32]. Customers would use sources such as social media [18] or peers to gauge the service "*popularity*" [36]: "*[customers] are distrustful …can only be convinced by opinions friends who have good impressions."*[2].

Why was this happening? Customers were perceived as having already built clear expectations. Therefore, services needed to match customers' expectations, for example, expectations about the service bringing a distinct value: "*What really matters is the value that the mobile product brings and how desired the solution is."*[20]. Also anticipated were high service performance and stability, e.g., *"On the other hand, it is important that the application itself has good mobile software performance."*[22]; *"And this is if we assume that the product itself is made well – stable, intuitive, fast, with nice design."*[21]. Finally, the expectations for value and quality were coupled with an expectation for maintenance [37] and reasonable pricing: *"Private users usually are not ready to pay a considerable price and the cost-value relation is an especially important part of their motivation to purchase the product."*[26].

The theme's concept was summarized as "**Customers look for service value",** illustrated by: *"Customers, …. ready to pay more for safety, stability of the service and IT security of their data" (DUN 146, P10R17); The price is a major factor, but not the only one. Whether they would start using it directly depends on their needs and on what the specific application is "giving" them. … (DUN 14, P3R8).*

The following observation was made:

Note 13. The theme seems to have strong connections with theme "Personal goals" (convenience and anywhere/any time availability), and with themes "Customer segmentation" and "Free services").

The composition of the theme in terms of super codes and the categories and sub-categories they belong to is provided in Table 5-24; a total of 13 super codes were used to define the theme, from two different categories and five sub-categories within them.

Table 5-24. Theme "Service value"

Theme "Service value"	
Category and sub-category (numbers in brackets show the number of related super codes)	**Super codes (numbers in brackets show the number of meanings associated with each super code)**
CUSTOMERS (10)	
CUSTOMER DECISION MAKING (6)	decision influenced by added value (4) decision influenced by comparison (3) decision influenced by compatibility (3) decision influenced by cost-effectiveness (2) decision influenced by service quality (3) decision influenced by social norm (5)
CUSTOMER EXPECTATIONS (3)	expectations for high service performance (11) expectations for service value (3) expectations for support (4)
CUSTOMER REQUIREMENTS (1)	service needs to be convenient (10)
SERVICE SUPPLY AND DEMAND (3)	
SERVICE VALUE ADDER (2)	connection with other devices valued (2) paid services with support valued (1)
SERVICE VALUE DETRACTOR (1)	security fears (4)

5.8.2.9 Theme "Optimistic providers"

At this stage it appeared that all data classified under super codes in the category CUSTOMERS were used in the themes defined so far, with a significant number of the meanings in the category SERVICE SUPPLY AND DEMAND also used. However, the data in the categories TECHNOLOGY and REGULATORY ENVIRONMENT had not been considered yet.

Going through the remaining part of the coded data set and also referring to the data maps developed during the iterative coding stages it was possible to identify a set of several potential themes that were relatively smaller in terms of the number of meanings supporting them (compared to the already developed themes). For example, groups of super codes where the views of the participants diverged – on technology, and on service viability, can be seen in Figure 5-34 and in Figure 5-35 (these figures also illustrate attempts to identify links between themes as part of the iterative process, and the search for overarching themes). More specifically a theme representing an optimistic view on the future of mobile service emerged (see Figure 5-35, upper left corner – the area with a boxed label "Theme 9"). It was named **"Optimistic providers**".

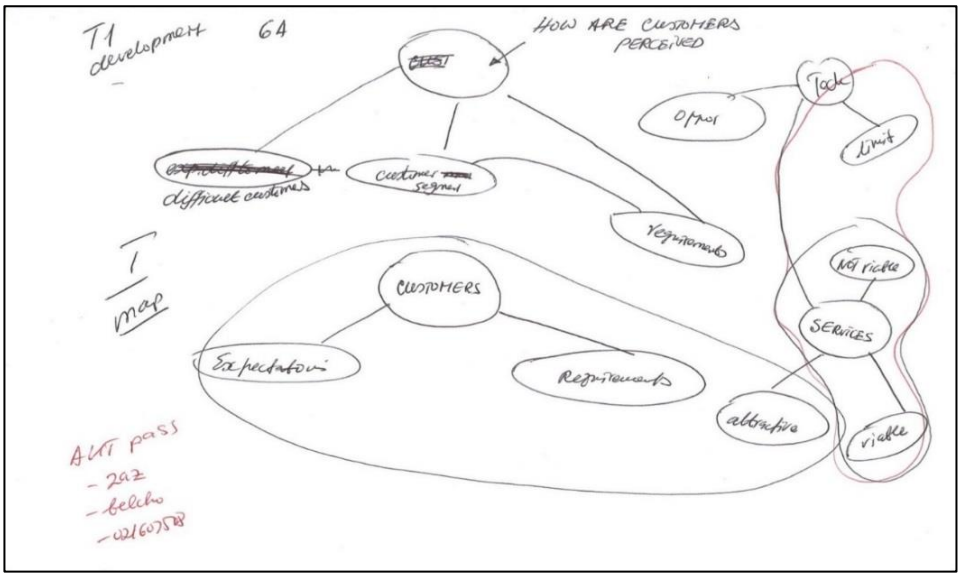

Figure 5-34. Developing theme “Optimistic providers”

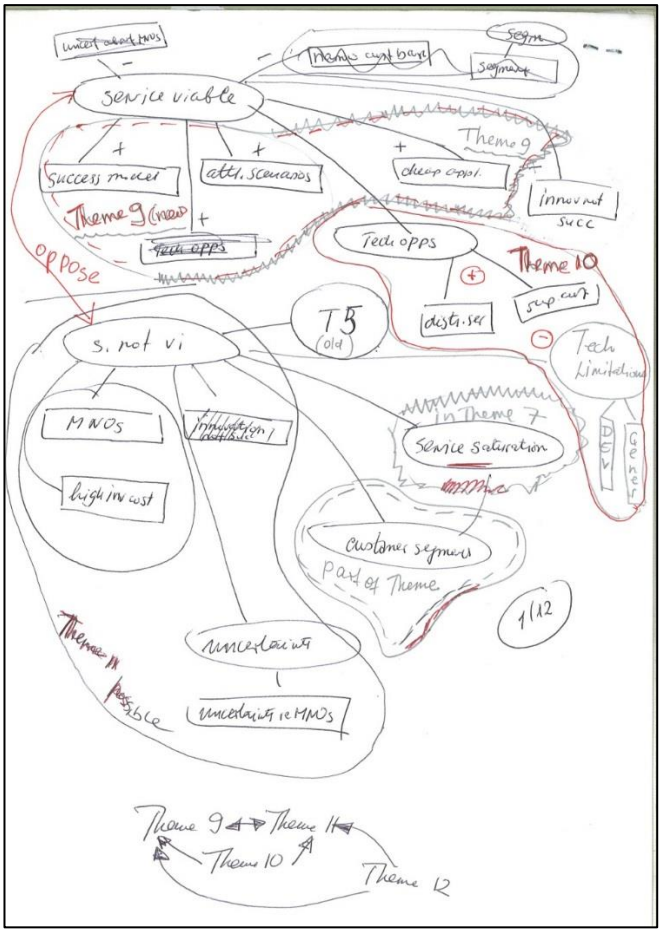

Figure 5-35. Developing theme “Optimistic providers”

The theme was based on nine super codes (current use, need for entertainment services, changing market, competition, environment, first on the market, user experience, viability potential, successful models exist). It was supported by meanings extracted from 21 DUNs. As only three DUNs belonged to the ID data domain (with 18 DUNs from the IS data domain) the views represented by the theme were predominantly

service provider views complemented in part by views contributed by application and service developers. All relevant data were pulled together as shown in Data list 5-9. The data were read again in order to extract a theme description in terms of "what was happening, how and why".

Data list 5-9. Data supporting theme "Optimistic providers"

1. *"More entertainment at lower prices, as well as many innovative useful applications." (DUN 79, P3R8)*
2. *"In my opinion, a forthcoming boom in this direction is to be expected." (DUN 111, P4R9)*
3. *"Because of competition, the market is contributing to the development of new services and thus keeps the need for operators to constantly amend the products they are offering." (DUN 158, P8R15)*
4. *"Innovation is very important in this sector – single aspects are: To be fast when offering a new service;" (DUN 213, P9R16)*
5. *"Yes other banks are doing it so we decided to do it as well." (DUN 255, P12R19)*
6. *"However, in cases where a product is similar to other offered by other providers, its competitiveness requires more added value and more specific and eloquent advantages." (DUN 265, P12R19)*
7. *"The developers of a mobile service have to offer far-seeing solutions and be flexible to fit the changing market situation and meet the wide range of customer expectation regarding factors such as money for value, support, availability, technical characteristics, user friendly interface, design." (DUN 266, P12R19)*
8. *"The Bulgarian mobile market is small in comparison to bigger countries with a larger number of users. In comparison to other markets, new solutions are offered relatively late here." (DUN 276, P12R19)*
9. *"They could be profitable, but not all of them are (e.g., sat phone services) – sometimes not much profit is made, but there are other advantages for the company (e.g., better image)." (DUN 116, P10R17)*
10. *"Not all new development is created in order to bring financial profits." (DUN 117, P10R17)*
11. *"Yes, because as companies are striving to be the best, they develop services not orientated mainly towards financial profit, but are important for the image of the company." (DUN 161, P10R17)*
12. *"[business value promoter] Consumption." (DUN 176, P2R4)*
13. *"Number of new customers, using the new service. ARPU – Average revenue per unit." (DUN 177, P2R4)*
14. *"Upsale to existing customers." (DUN 178, P2R4)*
15. *"Churn rate." (DUN 179, P2R4)*
16. *"The better customer adoption and user experience allays brings more benefit and affect the customers satisfaction." (DUN 184, P2R4)*
17. *"In the banking sector in Bulgaria, our [company] mobile service is among the first ones which makes it especially valuable for customers." (DUN 264, P12R19)*
18. *"Therefore, it is often easy for the developers of a mobile application to fill a "niche" in the market." (DUN 278, P12R19)*
19. *"Given the distribution and use in other countries (in Bulgaria it is still very limited) – rather yes." (DUN 10, P6R11)*
20. *"However, similar services are already offered on our market." (DUN 51, P6R11)*
21. *"here is a cost for us but in the long term it will be recovered." (DUN 257, P12R19)*

Theme "**Optimistic providers**" is described below. Numbers in square brackets refer to bullet point numbers in the relevant data list and point at meanings supporting the theme description.

What was happening? [Some] participants shared an optimistic view about the future of mobile services [2], with an expected demand explosion – for example, in entertainment [1]. Service providers compete to be the first to offer a service [4]. While some emulate the success of others as in the case of mobile banking [5] it is understood that in order to be competitive services need to have a clear value proposition [6-7]. Still overall the

range of offerings seems to be "lagging' behind compared to larger countries/markets even though innovation is considered important [3].

How was this happening? Service provider strategies included looking for niche applications [18], and/or developing services where they could be the first on the market [17]: ignoring financial gain at the start [10] but focusing on customer experience [16] and creating service awareness to achieve sustained use [12-15].

Why was this happening? Mobile services have been successfully offered already in other countries markets [19] as well as locally [20], with a good prospect of investment recovery in the long run [21] as even services that are not hugely profitable financially contribute non-financial value to service providers if adopted [9; 11].

The theme's concept was summarized as "**Service providers believe in the future of mobiles services",** illustrated by *"The developers of a mobile service have to offer far-seeing solutions and be flexible to fit the changing market situation and meet the wide range of customer expectation regarding factors such as money for value, support, availability, technical characteristics, user friendly interface, design."*[7].

The following observation was made:

Note 14. The theme was supported mostly by data statements extracted from interviews with service providers.

The composition of the theme is provided in Table 5-25. Nine super codes were used to define the theme, from three sub-categories within the same category.

Table 5-25. Theme "Optimistic providers"

Theme "Optimistic providers"	
Category and sub-category (numbers in brackets show the number of related super codes)	**Super codes (numbers in brackets show the number of meanings associated with each super code)**
SERVICE SUPPLY AND DEMAND (9)	
SERVICE DEMAND GENERATOR (2)	current use (4)
	need for entertainment services (1)
SERVICE MARKET (3)	changing market (2)
	competition (4)
	environment (2)
SERVICE VALUE ADDER (2)	first on the market (1)
	user experience (1)
SERVICE VIABLE (2)	viability potential (4)
	successful models exist (3)

5.8.2.10 Theme "Service innovation"

This theme was based on statements about the relationship between mobile technology and MDS. The pattern coding (Figure 5-36) included all data coded under the category

TECHNOLOGY. The two pairs of super codes linked in a "contrast" relationship (device design limitations vs device design opportunities) and technology not available yet vs potential opportunities) were identified as the nucleus of the theme from which the other associations followed.

As the theme evolved around aspects of innovation in technology and in mobile services it was named **"Service innovation".** The theme was based on nine super codes (limitations due to device design, technology not available yet, technology limits architecture, service needs to be technologically implementable, potential opportunities, opportunities offered by device design, opportunities to distribute services, opportunities to support customers, uncertainty about technology). It was supported by meanings extracted from 20 DUNs; a total 13 DUNs belonged to the ID data domain and seven DUNs were from the IS data domain.

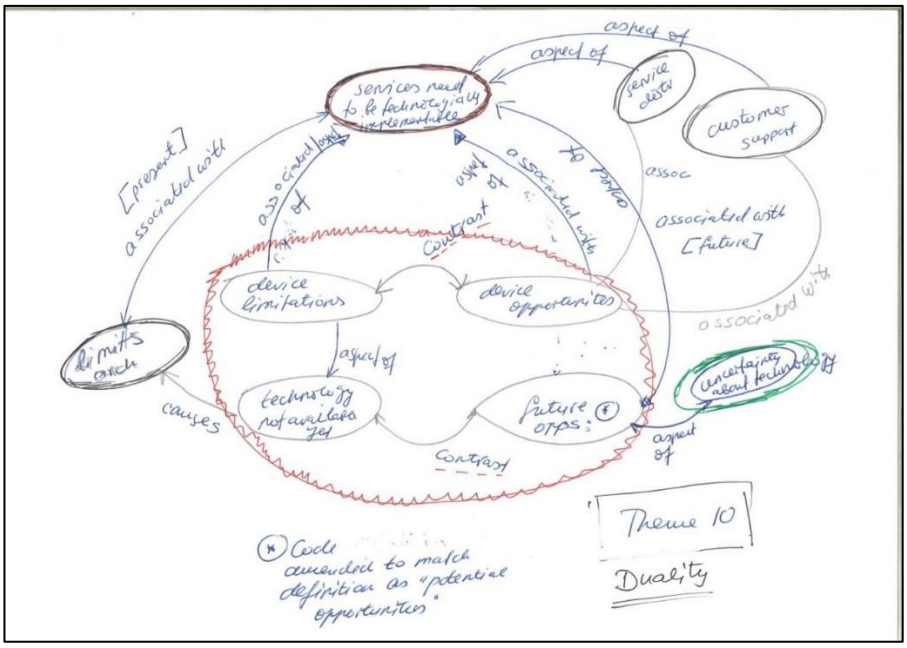

Figure 5-36. Developing theme "Service innovation"

All relevant data were pulled together as shown in Data list 5-10. The data were read again in order to extract a theme description in terms of "what was happening, how and why".

Data list 5-10. Data supporting theme "Service innovation"

1. *"Limited market for certain applications or the need for technologies that are either not yet invented, or are not applicable or do not meet certain criteria." (DUN 2, P5R10)*
2. *"Innovations of technical nature include very good support and service distribution while using new technologies for distribution, for example." (DUN 73, P6R11)*
3. *"I suppose that gradually with distribution of smartphones and them becoming cheaper, mobile technologies will get more attractive for business and users, but this needs time." (DUN 65, P7R12)*
4. *"Yes, of course, this is an intensely developing sphere of IT and there is much potential in it – in order to use this potential effectively, there is a constant need of new services." (DUN 67, P5R10)*

5. *"They are related with the operator CRM and CC&B [customer care and billing] and allow the end-customer to be more flexible, managing its mobile services." (DUN 96, P2R4)*
6. *"In recent years the mobile phone is not only a phone or more precisely, it is at least a telephone." (DUN 224, P4R9)*
7. *"Mobile phones are becoming more than just a means to make a phone call – it combines the functions also of other devices (video, e-mail, alarm, browsing)." (DUN 229, P9R16)*
8. *"The applications of mobile phones are getting wider – it is also a very good means for advertisements." (DUN 230, P9R16)*
9. *"Perhaps the limited resources of the devices, and the architecture – although technology is developing very fast, there is still much to be desired" (DUN 3, P6R11)*
10. *"Mobile technologies are a market that may have the potential to develop. If and when this will happen, I can't tell.", DUN 64, P7R12*
11. *"Some of the most important aspects are functionality and interesting, but applicable ideas." (DUN 68, P5R10)*
12. *"The advantages of the mobile phone compared to the PC is that they are smaller and usually always with you." (DUN 83, P7R12)*
13. *"Mobile network capabilities – essential factor for each new idea."[aspect of readiness] (DUN 201, P2R4)*
14. *"They are a way to save time, are handy and give control" (DUN 231, P10R17)*
15. *"There are no clear criteria exactly what the market wants. The developers have to overcome the limitations of mobile devices." (DUN 29, P7R12)*
16. *"In short, innovation is to be found in the GUI portion of applications because of the display limitations, and in the maximized activities and their benefits with minimal effort." (DUN 72, P6R11)*
17. *"One of the biggest problems for developers of mobile applications is that they are restricted by the limited resources of the mobile device (or most mobile devices), in comparison with PCs – so, with much less options an application has to be developed that does not defer drastically to those, made for PCs." (DUN 76, P7R12)*
18. *"On the other hand, with smart phones new horizons have opened which are yet to be discovered." (DUN 77, P7R12)*
19. *"Having in mind the limitations of mobile devices (that are being more and more overcome, but still do exist), it is important to know who exactly the users of the product will be and the product/service has to be in precise conformity with their technical knowledge and potentialities." (DUN 93, P7R12)*
20. *"New technologies and innovation are essential for mobile business applications and services." (DUN 242, P12R19)*

Theme "**Service innovation**" is described below. Numbers in square brackets refer to bullet point numbers in the relevant data list and point at meanings supporting the theme description.

What was happening? Participants felt that mobile technology had become pervasive [6-8]. Services developed for mobile devices had a potential to attract customers [12;14]. There was "…*still much to be desired*"[9] as mobile technology was not yet sufficiently developed [1] or stable [3;13] to sustain innovative services even though it already offered better opportunities for customer and service management [2; 5]. The state of the technology development affected service development as developers of mobile applications were "*restricted by the limited resources of the mobile device (or most mobile devices*)" [17].

How was this happening? Innovative approaches were needed in order to explore the potential of the technology [4]; however, mobile technology limitations imposed limitations on service architecture as new services needed to be technologically implementable [11]. While innovative customer and service management provided an

example of how the new technology could be used successfully [2] the fast development pace [9] contributed to creating a feeling of an unpredictable future [10].

Why was this happening? The intrinsic limitations of the technology (such as screen size) requires significant development effort; for example, mobile application developers who were restricted by technology limitations such as display limitations [16] had to "*...overcome the limitations of mobile devices*" [15] by developing innovative user interfaces that could offer value: "maximized activities and their benefits with minimal effort" [16]. This could be achieved better if developers knew "*who exactly the users of the product will be*" as "*… the product/service has to be in precise conformity with their technical knowledge and potentialities*" [19]; however, market directions were not clear: "*There are no clear criteria exactly what the market wants*" [15].

The theme's concept was summarized as **"Mobile technology offers potential that can be captured through innovative approaches",** illustrated by *"New technologies and innovation are essential for mobile business applications and services."*[20].

The following observations were made:

Note 15. It also may mean that it is not feasible to explore and build services on technology that moves on quickly.
Note 16. Possible link with theme "Customers difficult" ?

The composition of the theme in terms of super codes and the categories and sub-categories they belong to is provided in Table 5-26. Nine super codes were used to define the theme, from two categories and three sub-categories within them.

Table 5-26. Theme "Service innovation"

Theme "Service innovation"	
Category and sub-category (numbers in brackets show the number of related super codes)	**Super codes (numbers in brackets show the number of meanings associated with each super code)**
TECHNOLOGY (8)	
LIMITATIONS (4)	limitations due to device design (7)
	technology not available yet (1)
	technology limits architecture (2)
	service needs to be technologically implementable (1)
OPPORTUNITIES (4)	potential opportunities (8)
	opportunities offered by device design (3)
	opportunities to distribute services (1)
	opportunities to support customers (2)
UNCERTAINTY (1)	
UNCERTAINTY ABOUT TECHNOLOGY (1)	uncertainty about technology (1)

5.8.2.11 Theme "Regulatory environment opportunistic"

This theme was based on statements about the regulatory environment found solely within the category REGULATORY ENVIRONMENT as the rest of the categories did not contain super codes related to the theme (refer Data map 2-2 in Figure 5-21, Data map 3-2 in Figure 5-26). Part of the pattern coding is shown in Figure 5-37.

The data were re-examined and two super codes were renamed: the name of the super code "regulatory environment not supportive" was changed to "regulatory environment moderately supportive" as the underlying statements talked about degrees of support rather that total lack of support; the super code "regulation not needed" was renamed as "no regulation" in order to express better the meaning.

The theme was named **"Regulatory environment opportunistic**". It was based on seven super codes (regulations exist that are also applicable, no regulations, regulation needed – some, regulatory environment – lack of awareness, regulatory environment supportive, regulatory environment moderately supportive, regulatory environment changing) and was supported by meanings extracted from 14 DUNs (with seven DUNs from each of the IS and ID data domains).

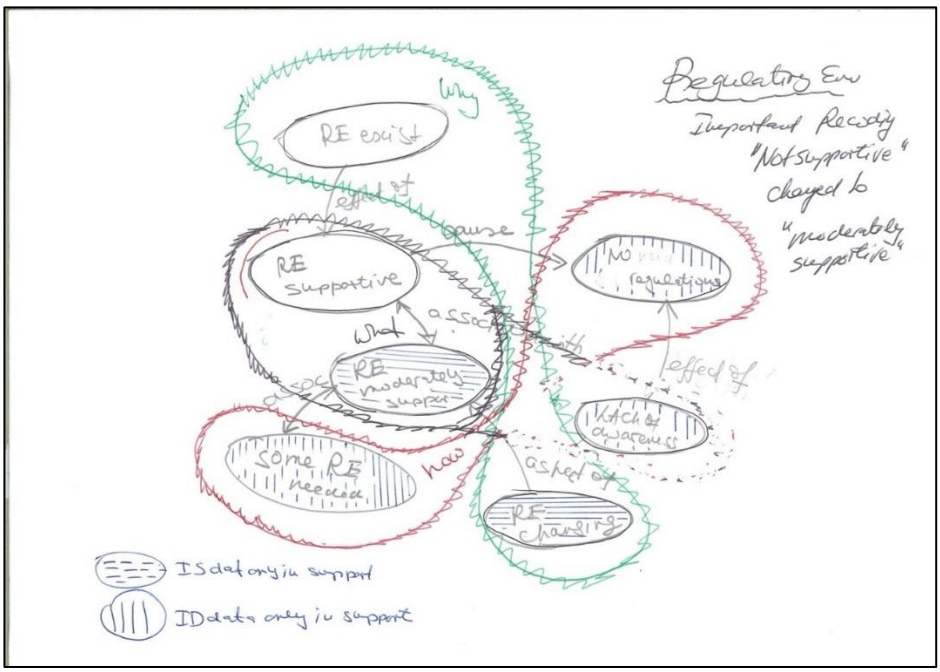

Figure 5-37. Developing theme "Regulatory environment opportunistic"

In this theme, five of the seven super codes were supported by data statements extracted either from the IS or from the ID data domain only. All relevant data were pulled together as shown in Data list 5-11. The data were read again in order to extract a theme description in terms of "what was happening", "how" and "why".

Data list 5-11. Data supporting theme "Regulatory environment opportunistic"

1. *"I think that the regulatory environment is relatively supportive, except for the area of private data abuse in terms of location based services and private person location information." (DUN 47, P11R18)*
2. *"Rather, the legal environment should have a positive and stimulating influence." (DUN 149, P4R9)*
3. *"They are rather not a problem; another thing is if they're helping new development." (DUN 151, P9R16)*
4. *"There are restrictions for competition (financially), but there is enough advertisement freedom." (DUN 152, P9R16)*
5. *"In Bulgaria, the regulatory environment does not provide much on the sector of mobile business services and applications. This makes it, on one hand, more difficult for companies to licence a new product, but, on the other, this also means that because of the lack of detailed provisions much room is left for new services that are not restricted too much by regulations" (DUN 274, P12R19)*
6. *"From a technical point of view, the lack of much detailed regulation, is an advantage, whereas the legal departments of companies offering mobile solutions may have to struggle with unpredictability of the way licensing institutions apply and interpret" (DUN 275, P12R19)*
7. *"I can't decide" (DUN 41, P3R8) [the question asked was "…how does the current regulatory environment support (or not) the development, implementation and market penetration of new mobile business services and/or applications?"]*
8. *"I don't know if any legal framework exists" (DUN 42, P5R10)*
9. *"In Bulgaria e-commerce, e-government etc. are still developing and I am not familiar with laws that govern mobile services in this aspect (of course there is a law for the communications and communication services, but I do not know if it regulates also applications of mobile technologies)" (DUN 43, P6R11)*
10. *"I am not very familiar with laws on mobile applications – I don't know if this is actually regulated in some way." (DUN 44, P7R12)*
11. *"I don't think that in Bulgaria the state is regulating how a mobile application will be distributed as long it does not break any fundamental laws (through racism propaganda for example)." (DUN 46, P7R12)*
12. *"Specifically, when talking about gambling, in most countries this is clearly regulated and developers have to conform with the given regulations." (DUN 45, P7R12)*
13. *"Also, a new idea should be approved by many other departments in the company (e.g., finance) or the regulations in the country could be changed during the process of creating a new development and introducing it to the market" (DUN 140, P10R17)*
14. *"I haven't had any particular negative experience during my work – laws are constantly changing." (DUN 150, P8R15)*

Theme "**Regulatory environment opportunistic"** is described below. Numbers in square brackets refer to bullet point numbers in the relevant data list and point at meanings supporting the theme description.

What was happening? The participants felt that while the regulatory environment was *"relatively supportive"* [1] this was mostly due to the fact it did not impose severe restrictions [4] without being really *"helpful*" [3] or *"stimulating"* [2]. While this was an advantage to an extent as it allowed for new services to be introduced without too many difficulties [5], at times *"legal departments of companies offering mobile solutions may have to struggle with unpredictability of the way licencing institutions apply and interpret"* [6].

How was it happening? According to participants the state was either not interfering with mobile services provision except to monitor anti- constitutional activities such as racist propaganda [11] or privacy breaches [1]. Corroborative evidence was provided by statements coded under the super code "regulatory environment -lack of awareness", for

example, *"I am not familiar with laws that govern mobile services*" [9] (these statements were found in the ID data domain only).

Why was this happening? The regulatory environment was seen as a dynamic one [6;13;14] with some of the already existing legal frameworks also applicable to mobile service development and provision in specific areas for example, mobile gambling [12, or location based services [1].

The theme's concept was summarized as "**While the regulatory environment is not specifically supportive it offers opportunities**", illustrated by: *"… the regulatory environment does not provide much on the sector of mobile business services and applications. This makes it, on one hand, more difficult for companies to licence a new product, but, on the other, this also means that because of the lack of detailed provisions much room is left for new services that are not restricted too much by regulations"*[5].

The following observations were made:

Note 17. These theme may be linked to the optimistic view (theme "Optimistic providers").
Note 18. Lack of awareness – only from developers.

The composition of the theme in terms of super codes, and the categories and sub-categories they belong to is summarized in Table 5-27. Seven super codes were used to define the theme, from one category.

Table 5-27. Theme "Regulatory environment opportunistic"

Theme "Regulatory environment opportunistic"	
Category and sub-category (numbers in brackets show the number of relevant super codes)	***Super codes (numbers in brackets show the number of meanings associated with each super code)***
REGULATORY ENVIRONMENT (7)	*regulations exist that are also applicable (4)* *no regulations (1)* *regulation needed – some (1)* *regulatory environment – lack of awareness (4)* *regulatory environment supportive (2)* *regulatory environment moderately supportive (4)* *regulatory environment changing (2)*

5.8.2.12 Theme "Operators a barrier"

Prior to commencing the pattern coding the remainder of the super codes, the data within the sub-category SERVICE MARKET (which emerged at Stage 3) were revisited and reinterpreted in order to check their coding. Some adjustments were made. First, the super code "not ready for innovation" was merged with the super code "innovation not successful" in sub-category "service viable not". Next the super codes

"innovativeness" and "roles" were merged into one new super code "players" comprising five codes ("operators under threat", "operators need to lead", "operators need to be creative", "operators need to be competitive", and "all need to be involved") replacing the previous set of four codes ("MNOs need to be innovative", "innovativeness as a threat to MNOs", "all actors need to play", "MNOs as leaders").

The pattern coding is shown in the bottom half of Figure 5-38, the area labelled as "Theme 12" (the figure also depicts an intermediate attempt to connect this and the next theme). The theme emerged as one representing a negative view on the role of mobile operators in relation to mobile services. It was based on four super codes (operators as a barrier to service, high investment cost, lack of operator support for development, low quality of service due to lack of operator support) and was supported by meanings extracted from 18 DUNs (nine from each data domain). All relevant data were pulled together as shown in Data list 5-12. The data were read again in order to extract a theme description in terms of "what was happening, how and why" as supported by the data.

Data list 5-12. Data supporting theme "Operators a barrier"

1. *"This depends again on the market. If we look at Bulgaria, we will notice that operators are rather in the way of mobile applications distribution." (DUN 52, P7R12)*
2. *"Mobile internet prices in many aspects are making the use of applications expensive and thus unattractive." (DUN 53, P7R12)*
3. *"Mobile operators were doing their best to destroy the application in the beginning because they were concerned that people would rather use it instead of telephony in their networks, which would lead to a turn-down in their profits – and to a great extent, they succeeded." (DUN 55, P7R12)*
4. *"The highest profit is made by standard services." (DUN 115, P9R16)*
5. *"For the current development the main obstacles are mainly related with the internal product integration and time-to-market plan." (DUN 129, P2R4)*
6. *"The system integration and the flexible service provisioning are the most common problems in present days." (DUN 130, P2R4)*
7. *"Also, how the new application would be involved in the complex structure of a telecom, how much and what will be the cost the development and its implementation." (DUN 133, P4R9)*
8. *"In the same time, this makes room for introducing new services at a cost effective price and there is less competitiveness among mobile operators because the market is neither very big nor diverse." (DUN 277, P12R19)*
9. *"And again – if we look at Bulgaria, we will see that internet traffic has the lowest priority in mobile devices in comparison with telephony, for example. Who would want an application that would work only if it had free resources not used for telephony." (DUN 56, P7R12)*
10. *"The lack of motivation on part of operators to deploy a particular technology." (DUN 1, P3R8)*
11. *"To persuade the operators to start offering their technology." (DUN 25, P3R8)*
12. *[do MNOs support the development of mobile services] "Not to my knowledge" (DUN 49, P5R10)*
13. *"Obstacles are: too high investment costs and unsatisfactory return on investment, too narrow customer base, unwillingness to change previous routines and customer behaviour (traditionalists), bad marketing communication, weak use cases, no superior selling proposition etc." (DUN 7, P11R18)*
14. *"I rather believe that the [investment] in mobile applications is still not very profitable." (DUN 11, P7R12)*
15. *"Each new technology requires new hardware development and/or modifying existing software." (DUN 100, P4R9)*
16. *"From this perspective, the lack of investments and a flexible investment policy are the biggest challenges for telecoms." (DUN 101, P4R9)*
17. *"They could be profitable, but one must have in mind the need for their constant upgrading/updating." (DUN 112, P8R15)*
18. *"Innovation is very important in this sector – single aspects are; the applicability of a product; the effectiveness of the product/service for the user; cost-effectiveness for the operator." (DUN 210, P8R15)*

Theme "**Operators a barrier"** is described below. Numbers in square brackets refer to bullet point numbers in the relevant data list and point at meanings supporting the theme description.

What was happening? According to participants, mobile operators did not particularly support mobile service development [12] – mostly because their standard services were both profitable [4] and sustainable [8], with no need to innovate in order to remain competitive [8]. Thus mobile operators were seen as being *"in the way of mobile applications distribution*" [1], making mobile services "*unattractive*" to customers by keeping high the cost of access to the mobile Internet [2] and giving low priority to mobile data traffic [9]. In addition, the mobile operator complex internal processes policy slowed down the implementation of innovative solutions [5-7;16].

How was this happening? The negative role of mobile network operators was illustrated by the perceived lack of support for the development of the technology needed to support mobile services: there was a "l*ack of motivation on part of operators to deploy a particular technology*" [10], it was difficult to form a cooperative relationship, to "*persuade the operators to start offering their technology*" [11].

Why was it happening? According to participants, mobile operators had a history of not supporting innovation for fear of competition [3]. A major reason was the "too high investment cost" [13] of building, maintaining and upgrading the required infrastructure [15;17] which made investment in mobile applications "not very profitable" [14] or "cost-effective for the operator" [18].

The theme's concept was summarized as "**Mobile network operators act as a barrier to mobile service development**", illustrated by: *"This depends again on the market. If we look at Bulgaria, we will notice that operators are rather in the way of mobile applications distribution.* "[1].

The following observations were made:

Note 19. This is almost opposite to views on the regulatory environment as in the previous theme.
Note 20. Linked to next and last theme?

The composition of the theme in terms of super codes, and the categories and sub-categories they belong to is summarized in Table 5-28. Four super codes were used to define the theme, from one category and two sub-categories within it.

Table 5-28. Theme "Operators a barrier"

Theme "operators a barrier"	
Category and sub-category (numbers in brackets show the number of related super codes)	**Super codes (numbers in brackets show the number of meanings associated with each super code)**
SERVICE SUPPLY AND DEMAND (4)	
SERVICE VIABLE NOT (3)	operators as a barrier to service (4) high investment cost (8) lack of operator support for development (8)
SERVICE VALUE DETRACTOR (1)	low quality of service due to lack of operator support (1)

5.8.2.13 Theme "Operators threatened"

After completing the development of the preceding theme all remaining data were considered. Six meanings were reinterpreted, recoded and related to a theme from amongst the already developed ones. The remaining meanings were reconsidered. Eighteen meanings were grouped in a new theme. Several iterations of the development are shown in Figure 5-38 (the final pattern coding generating the theme can be seen in the right hand side, see the area labelled "Theme 13").

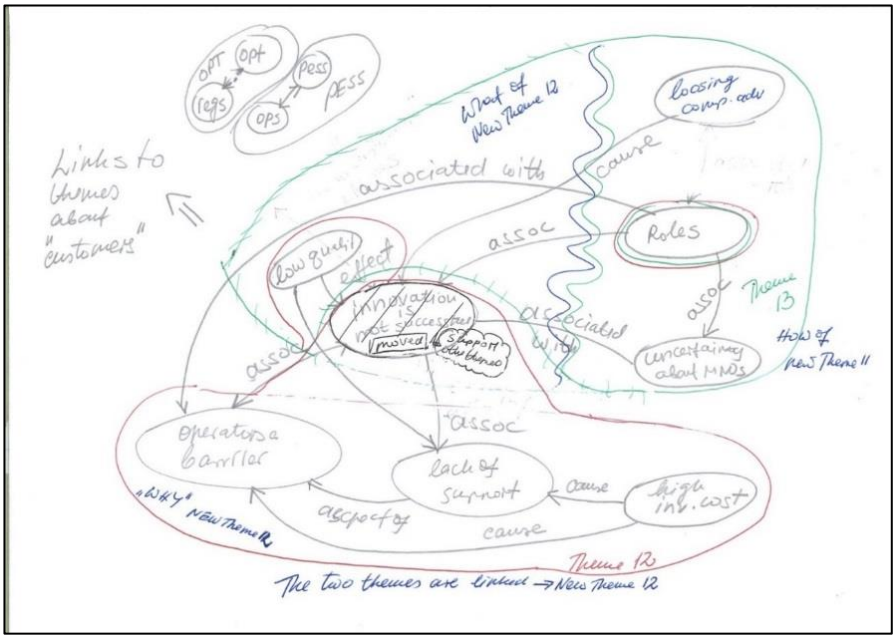

Figure 5-38. Developing themes "Operators a barrier" and "Operators threatened"

The theme emerged as one representing participant ideas about MNOs and their role in the context of mobile services development. As it was supported by meanings drawn from DUNs in the IS data domain only, this was a diverging theme in Saldaña's (2012) terminology. The theme evolved around the (negative) prospects facing MNOs. Therefore, it was named "**Operators threatened".**

The theme was based on three super codes (loosing competitive advantage, players, uncertainty about MNOs) and was supported by meanings extracted from 17 DUNs (all from the IS data domain). All relevant data were pulled together as shown in Data list

5-13. The data were read again in order to extract a theme description in terms of "what was happening, how and why" as supported by the data.

Data list 5-13. Data supporting theme "Operators threatened"

1. *"The telecoms are facing the treat to lose the customers loyalty and become only the transport link to the end-user services." (DUN 157, P2R4)*
2. *"The telecom operators should have the leading role having in mind that the connectivity is important, however, the system integrator, the hardware vendors, the software developers also need to be in the track, providing new features on the market." (DUN 155, P2R4)*
3. *"Operators realize that new services may be useful as well as a threat and that is why they need to have a role in these services." (DUN 198, ~~P8R15)~~ P4R9)*
4. *"Yes, because of competition prices are falling down and the operator has to be innovative and constantly work on its services." (DUN 159, P9R16)*
5. *"Innovation is very important in this sector – single aspects are: Need to be well-informed;" (DUN 212, P9R16)*
6. *"Innovation is very important in this sector – single aspects are: To think creatively – outside the standards" (DUN 214, P9R16)*
7. *"In order for the company to provide high standards, price-for-value products and remain attractive for customers and competitive in our business sector, we need to find and develop innovative solutions which add value to existing services." (DUN 243, P12R19)*
8. *"From the operator's point of view – the process from: creating an idea > market-analysis > cost-effectiveness calculation > approval by various departments (e.g., financial department in the company) to finally, introducing the new development to customers " (DUN 102, P8R15)*
9. *"Financing of development, finding contractors for the realization of the project." (DUN 128, P1R2)*
10. *"For the current development the main obstacles are mainly related with the internal product integration and time-to-market plan." (DUN 129, P2R4)*
11. *"The system integration and the flexible service provisioning are the most common problems in present dais." (DUN 130, P2R4)*
12. *"From a technical point of view – a problem could appear and thus make it necessary to modify the initial idea. Generally speaking, the chain of creating a new development is sometimes too long." (DUN 135, P8R15)*
13. *"From the developer's point of view: Coordination in the company, technical obstacles, functionality – has to do with investments." (DUN 136, P9R16)*
14. *"Also, a new idea should be approved by many other departments in the company (e.g., finance) or the regulations in the country could be changed during the process of creating a new development and introducing it to the market" (DUN 140, P10R17)*
15. *"Usually, it is the financial factor that hinders a technological solution to be introduced on the market when it is most attractive." (DUN 252, P12R19)*
16. *"However, also in the case that there is enough budget to finance the development of a certain service, there are a few more steps that need time and planning, e.g., marketing (targeting the user group, introducing the advantages of the application to " (DUN 254, P12R19)*
17. *"As already mentioned, there is always a risk that the time needed for planning and designing a mobile application is too long and that the service is no longer attractive or needed in the time of its launching and that there are other similar services" (DUN 267, P12R19)*

Theme "**Operators threatened"** is described below. Numbers in square brackets refer to bullet point numbers in the relevant data list and point at meanings supporting the theme description.

What was happening? According to participants, MNOs were aware of the increased competition within their own sector augment *("…because of competition prices are falling down and the operator has to be innovative and constantly work on its services*" [4]) and of the need to innovate [5-7] and as of the need to maintain their leading role as a connectivity provider [2] and a mobile service provision stakeholder ("*Operators realize that new services may be useful as well as a threat and that is why they need to have a role in these services.*"[3]) but were not flexible enough to ensure a quick

realization of an innovative idea so that "… *the service is no longer attractive or needed in the time of its launching and that there are other similar services"*[17].

How was this happening? The participants described the processes followed currently as being complex ("*the process from: creating an idea > market-analysis > cost-effectiveness calculation > approval by various departments (e.g., financial department in the company) to finally, introducing the new development to customers")* [8] and protracted ("..*the chain of creating a new development is sometimes too long,* [12]) leading to recurring problems with product and system integration and marketing [10-11;16].

Why was this happening? As participants pointed out, reasons related to the need to obtain financial approval [14] in order to coordinate investment [13;16] as normally "..*the financial factor … hinders a technological solution to be introduced on the market when it is most attractive*."[15].

The theme's concept was summarized as **"Mobile network operators are facing a threat**", illustrated by: *"The telecoms are facing the treat to lose the customers loyalty and become only the transport link to the end-user services."*[1].

The following observation was made:

Note 21. Interesting to see how linked to the preceding theme.

The composition of the theme in terms of super codes, and the categories and sub-categories they belong to is summarized in Table 5-29; three super codes were used to define the theme, from two categories and three sub-categories within them.

Table 5-29. Theme "Operators threatened"

Theme "Operators threatened"	
Category and sub-category (numbers in brackets show the number of related super codes)	**Super codes (numbers in brackets show the number of meanings associated with each super code)**
SERVICE SUPPLY AND DEMAND (2)	
SERVICE VIABLE NOT (1**)**	loosing competitive advantage (11)
SERVICE MARKET (1)	players (5)
UNCERTAINTY (1)	uncertainty about MNOs (3)
UNCERTAINTY ABOUT MNOs (1)	

5.8.3 Emerging theme summary

The final version of the code hierarchy can be found in Appendix O1. A colour coded mapping of themes onto super codes can be seen in Appendix O2. It shows which specific super codes were used to "pull out" the data supporting each of the basic

themes and demonstrates how themes emerged across categories and across the sub-categories of each category, with the themes "enveloping" super codes that exhibited an identifiable pattern. Seven meanings extracted from seven separate DUNs (DUNs 110, 148, 175, 182, 183, 192, 282) remained outside the themes: they could not be related to any of the 13 themes or aggregated into a coherent theme.

The 13 emerging themes that were defined were based on 378 meanings extracted from 248 data units, coded with a set of 99 super codes. A summary of the emerging themes is provided in Table 5-30. It can be seen that that the number of super codes composing a theme varied from three to 13 (for example, themes "User friendly service" and "Service Value", respectively). The number of supporting meanings varied form 18 in the two "smallest" (in number of supporting meanings) themes "Free services" and "Regulatory environment opportunistic", to 55 meanings in the "largest" theme "Service value". The chart in Figure 5-39 shows how the emerging themes were supported by data form the two data domains that the data set comprised; for each theme, the percentages shown were calculated as "number of DUNs from a specific domain/total number of DUNs" (refer the last two columns of Table 5-30).

Table 5-30. Emerging themes

Theme	Description	Super codes	Meanings	DUNs (ID)	DUNs (IS)
Difficult customers	Customers perceived as difficult to satisfy, may be less than enthusiastic to adopt	13	32	18	10
Customer segmentation	Customer market very segmented	9	39	20	15
Attractive services	Appealing design and innovative features attract customers	7	22	8	10
Free services	Free services draw customer attention	10	18	11	7
Need for service	Services are viable if customers see them as meeting their specific needs	6	47	11	29
User friendly services	Customers require services to be 'friendly'	3	19	8	10
Personal goals	Customers choose services based on personal goals	6	40	5	29
Service value	Customers look for service value	13	55	12	25
Optimistic providers	Service providers believe in the future of mobiles services	9	22	3	18
Service innovation	Mobile technology offers potential that can be captured through innovative approaches	9	26	13	7
Reg. environment opportunistic	While the regulatory environment is not specifically supportive it offers opportunities	7	18	7	7
Operators as a barrier	Mobile network operators act as a barrier to mobile service development	4	21	9	9
Operators threatened	Mobile network operators are facing a threat	3	19	-	17

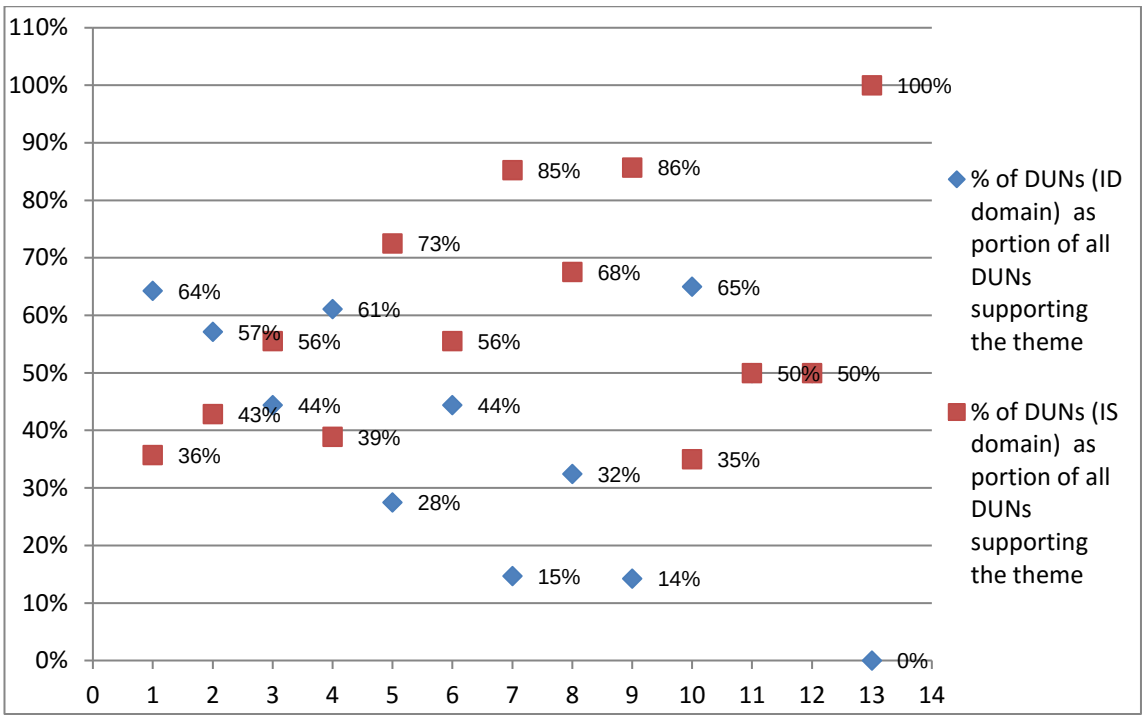

Figure 5-39. Mapping the emerging themes onto the data domains:1. Difficult customers; 2. Customer segmentation; 3. Attractive services; 4. Free services; 5. Need for service; 6. User friendly services; 7. Personal goals; 8. Service value; 9. Optimistic providers; 10. Service innovation; 11. Regulatory environment opportunistic; 12. Operators as a barrier; 13. Operators threatened.

Table 5-31 shows how the emerging themes mapped onto the data hierarchy categories. All themes except "Regulatory environment opportunistic" were supported by codes from two or more categories. Conversely two categories (TECHNOLOGY and REGULATORY ENVIRONMENT) supported a single emerging theme each while the other three categories supported four or more themes each.

Table 5-31. Emerging themes mapped onto data categories

Themes	SERVICE SUPPLY AND DEMAND	CUSTOM-ERS	UNCER-TAINTY	TECHNO LOGY	REGULA-TORY ENVIRO-NMENT
Difficult customers	X	X	X		
Attractive services	X	X	X		
Customer segmentation	X	X			
Free services	X	X			
Need for service	X	X			
User friendly services	X	X			
Personal goals	X	X			
Service value	X	X			
Operators threatened	X		X		
Optimistic providers	X				
Operators as a barrier	X				
Service innovation			X	X	
Reg. environment opportunistic					X

5.8.4 Developing thematic networks

The researcher was keeping notes about possible relationships between the emerging themes that later conceptualized the meanings of the themes in relation to the research context of the study. Some early attempts are shown in Figure 5-40 and Figure 5-41.

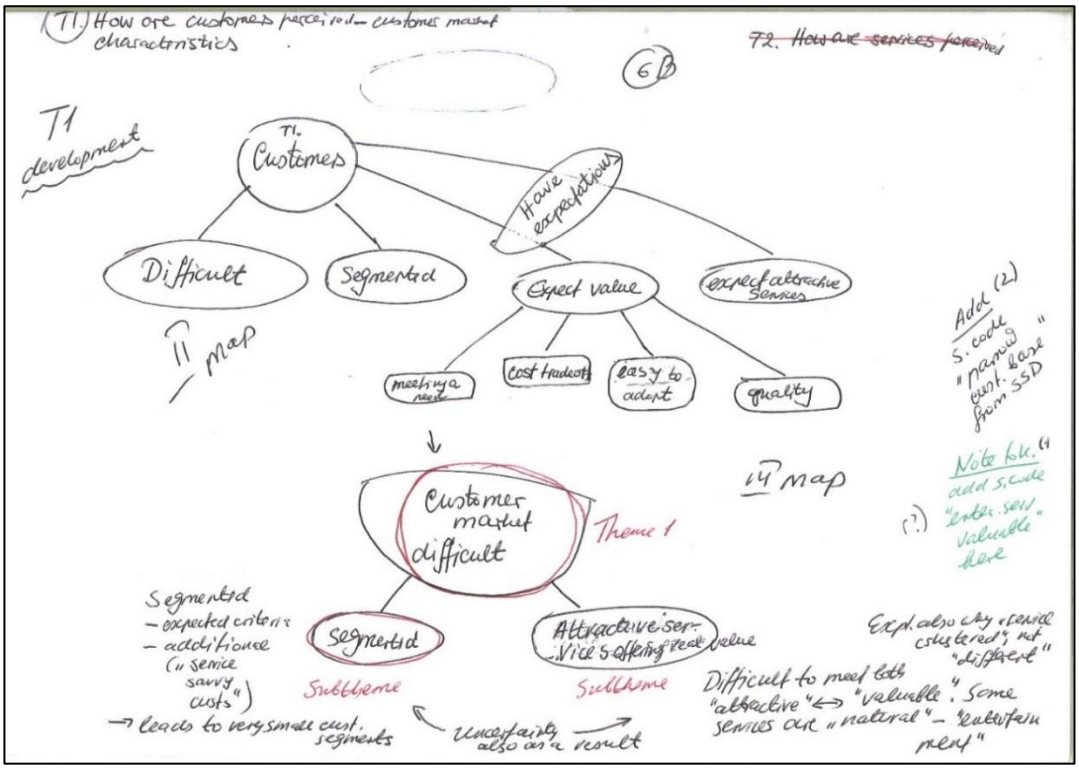

Figure 5-40. Developing thematic networks (1)

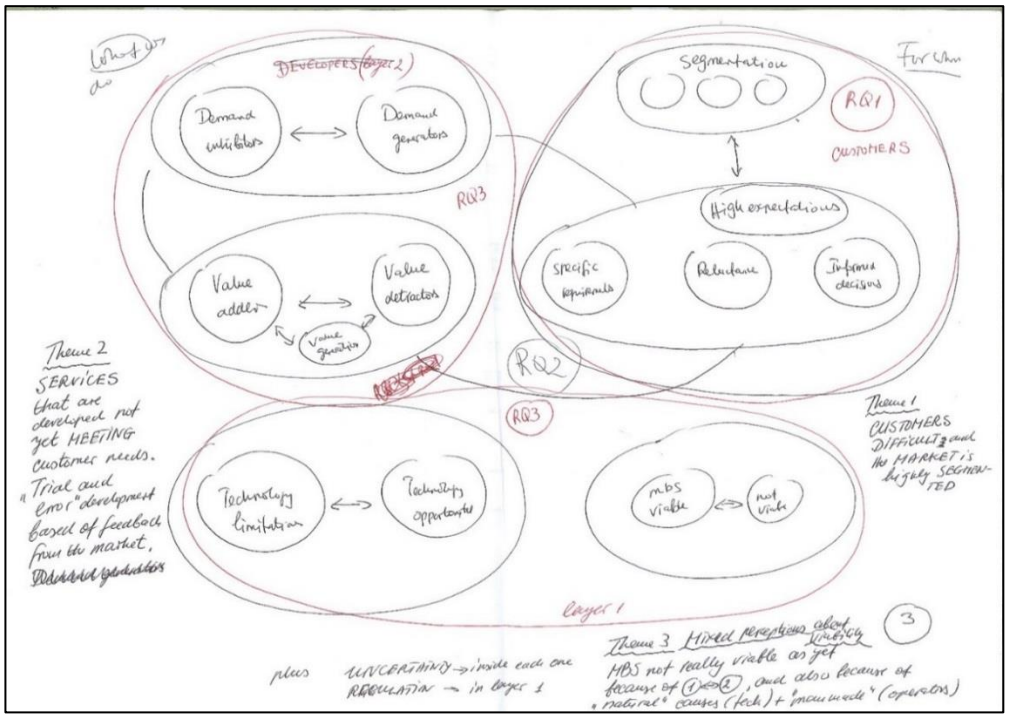

Figure 5-41. Developing thematic networks (2)

Once all themes were defined they were methodically organized and summarized, adapting the thematic network development approach suggested by Attride-Stirling (2001). First, the data supporting the 13 emerging themes ("basic themes", in Attride-Stirling's terminology) were searched for shared issues or similarities that could be used to connect them. Six similarity clusters emerged, and were used to define six theme aggregations ("organizing" themes). The relevant data were examined again in order to

extract the overall interpretations of the organizing themes. This lead to the final aggregation of the data into two overarching "global" themes. The global themes summarized the "claims, proposition, argument, assertion or assumption" (p. 393) of the organizing themes and "encapsulated" the main points, or meanings of the data (ibid). The resulting theme hierarchy is shown in Figure 5-32

Table 5-32. Emerging, organizing and global themes

Global Themes	Organizing Themes	Basic Themes
Customers demand	Customers differ	Difficult customers Customer segmentation
	Customers require	Attractive services User friendly services
	Customers prefer	Personal goals Free services
	Customers expect	Need for service Service value
Service providers face	Opportunities and challenges	Optimistic providers Service innovation Regulatory environment opportunistic
	Barriers	Operators as a barrier Operators threatened

Each global theme was represented visually by a thematic network that consisted of the underlying organizing themes. The global themes, their thematic networks and the resulting data map (Data map 4) are presented below.

5.8.4.1 Global theme "Customers demand"

Global theme "Customers demand" pertained to the characteristics and behaviour of potential and actual mobile service customers as perceived by the study participants. As shown in the bottom part of Figure 5-42 its thematic network comprises the four organizing themes summarized below.

According to the organizing theme "Customers differ" the customer market was very segmented in terms of customer requirements specificity and readiness to adopt mobile services. For example, customers with a negative attitude to mobile services (distrustful) and customers with inadequate skills to use them. Such a diverse customer market was difficult to penetrate and offered a viable service.

According to the organizing theme "Customers require" customers were well aware of their choices and having already experienced eCommerce services were looking for innovative solutions; their decision making process was based on a comparison between services (both mobile and other channel-based), the user interface (easy to use, friendly would be the norm), and on the general attractiveness and appeal of the service design (satisfying customer experience). From a service provision perspective, meeting these

requirements may affect service viability as such services may be expensive to create (i.e., would require more significant initial investment).

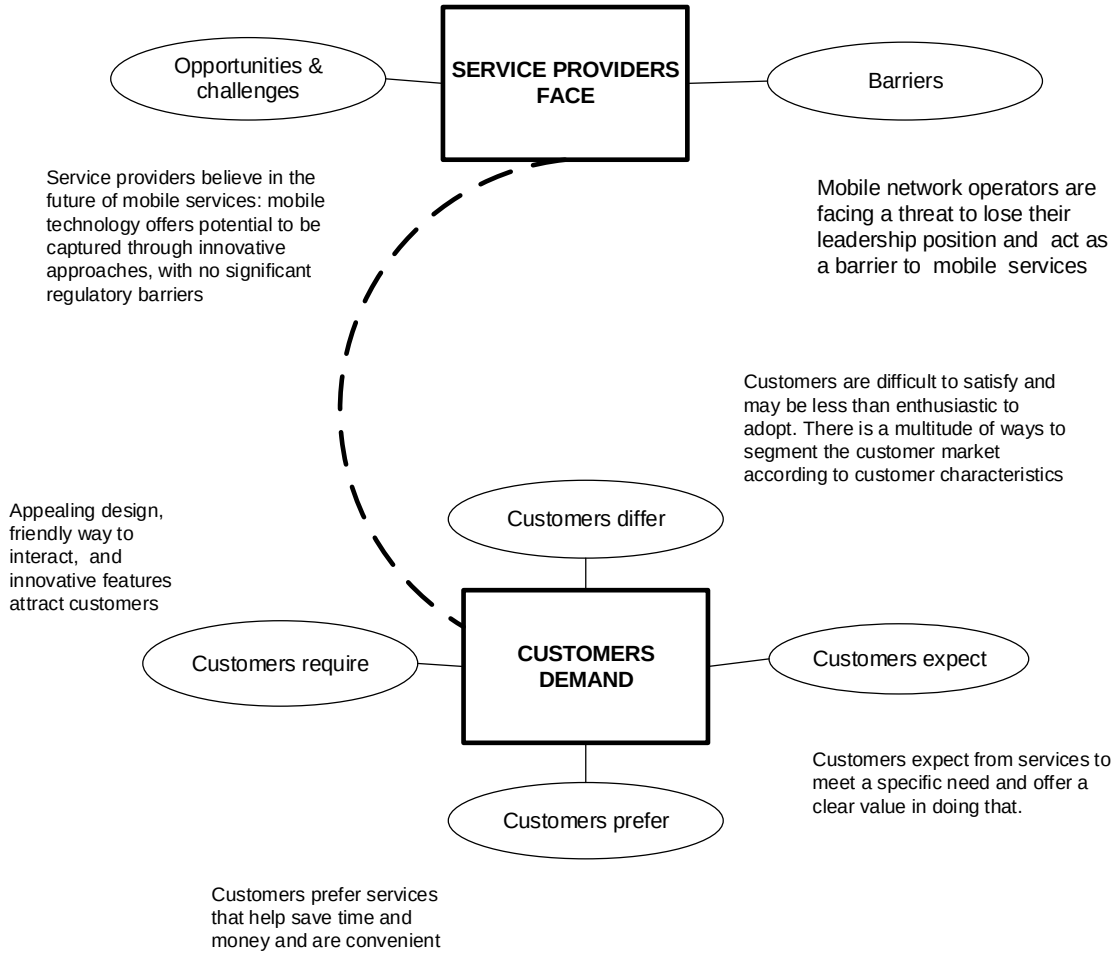

Figure 5-42. Global themes and thematic network (Data map 4)

However, customer decision making was influenced by other factors as well. According to the organizing theme "Customers expect" their expectations were already well formed – customers valued services that were needed and would meet specific needs, i.e., services that offered a clear value proposition. From a service provision perspective meeting these expectations may affect service viability; due to the segmented market a service that attempts to meet some very specific needs may not bring sufficient monetary return in order to be viable.

Finally, according to organizing theme "Customers prefer", customers required services that saved time and were convenient but also cost-effective, as they were not prepared to spend "big" on mobile services. Participants tended to support one of the two somewhat opposing views – that customers would be willing to pay for a service that met their expectations and requirements, and that customers would not be prepared to

pay “too much” for a service anyway. The resulting uncertainty may affect service provider decisions on how to approach service design and implementation – with a focus on meeting specific requirements and high expectations (at a cost for the customer), or to go at least initially for more limited but cheaper service solutions. Participants were similarly divided on the issue of incorporating a free component as a means to attract customers.

5.8.4.2 Global theme “Service providers face”

Global theme “Service providers face” referred to the opportunities and challenges in developing and offering new mobile services, the barriers facing MDS providers, and the role operators (MNOs) play. In this theme participants talk about the players in the MDS supply chain. As seen in Figure 5-42 (top part) its thematic network comprises the two organizing themes summarized below.

According to the organizing theme “Opportunities and challenges” the pervasiveness of mobile technology and the relatively supportive regulatory environment provided opportunities for developing and offering a service within a short-time frame, for example, service in identified niche areas, or services that adopted an already tried and tested model. It was considered critically important to stay ahead of competitors and to focus on customer experience and innovation as a means to achieve sustained use and generate revenue (e.g., innovative approaches to service and customer management). However, MDS development faced specific challenges such as limitations stemming from device design. While these limitations could be overcome by innovative service design, service developers needed a better knowledge of the targeted customer segment (as discussed in the first global theme) in order to align the level of service interface sophistication with the level of customer comfortableness with the technology.

According to organizing theme “Barriers” mobile operators were not interested in supporting MDS development: they saw MDS as a threat and preferred to focus on sustaining standard services. As a consequence, mobile data costs remained high while the data traffic quality of service was not guaranteed; this represented a significant barrier to MDS development and provision as it affected negatively customer adoption and service viability. Different factors contributed to this: on the one side, the telecommunications market in Bulgaria was not traditionally competitive and not all MNOs saw a compelling reason to innovate especially as the investment cost related to improvement and new technology was significant. On the other side, even when MNOs

were aware of the growing competition within the telecommunications sector and were prepared to innovate in order to sustain their leadership in the mobile stakeholder market (as the all-important connectivity provider) their structure lacked the flexibility needed to implement innovative ideas. In addition, while mobile operators were reluctant to commit to cooperation with service providers outside their organization, their own structure MDS development was slowed down due in part to organizational complexity and slow internal processes.

5.8.5 Checking the patterns

After the thematic networks were created the researcher returned to data that were already collected but were not included in the data set analyzed so far: interviews with three professionally connected to the researcher Bulgaria-based academics who had a research interest in the area of MDS adoption (R05BG1, R07BG2, and R13BG3). The interviews with these academics were conducted using the same interview guide as the one used to interview industry participants. However, questions 5 and 6 were removed as not relevant (transcripts available in Appendix P).

The selected interviews were not systematically coded rather they were searched top-down for meanings related to the super codes used to define the emerging themes that underpinned the global themes. The method applied was similar to the "elaborative coding" approach described by Saldaña (2012, p. 229). It is considered suitable for seeking new evidence to corroborate previously identified concepts.

As demonstrated by the examples shown in Table 5-33, the first global theme "Customers demand" was supported in relation to customer diversity, customer preferences, and customer expectations, including the need to balance service cost with service value and the desirability of free services (the relevant excerpts are underlined). Support for the second global theme "service providers face" was provided by R05BG1's data including high service cost due to operators maintaining high mobile data cost, operators not supporting service deployment, and the need to improve the infrastructure (by MNOs) in order to meet the demand for mobile data resulting from the already high and continuing to grow mobile device penetration (Table 5-34 ; relevant excerpts underlined).

Finding out that the thematic map patterns "resonated" with the academics' responses indicated that the findings of the analysis could be transferred to this separate

participant group, as the interviewees were very familiar with the research practice and the literature in the area of research. Furthermore, these participants were experts with a good understanding of the MDS industry, and were from the same geopolitical background as Study 1 participants.

Table 5-33. Academics' responses related to global theme "Customers demand"

R05BG1	R07BG2	R13BG3
"Different customer groups certainly have different requirements. A good example is the App store for iPhone where everything is divided in categories, so if you are a medical practitioner, you will most likely go to the health category to look for relevant apps." [customer attitude influenced by] *The rating, the usefulness and the price.* *Free has always been the best way to make a product/service popular* *Reasonable pricing might be key (although there is always the magic word "free")* *"… as long as the pricing is reasonable and the service/function worth paying for, consumers will want it."*	*"In developed world for the M-Payment to be a success it must offer additional benefit as compared to other payment methods.* *"Furthermore, it is essential to distinguish between age groups, young people are generally more appropriate for mobile services, however, older people also represent an interesting target group. The ease of use and the convenience should be considered for all age groups. The older users should not be overloaded with additional features; generally, they just want to be able to use a basic service."* [customer attitude influenced by] "*Attention, Interest, Desire, but much more important is the additional benefit of mobile services."* *"In my opinion a free access to mobile business product is a precondition for its success. Customers do not want to pay for services unfamiliar to them. The access should be free; the money should be made on transaction fees"*	*"User groups can be divided in different age groups: they are used to different paces of perceiving and considering information; they can be divided also in "technological" groups: some users prefer a simplified phone with basic functions, others – newest technology"* [customer attitude influenced by] *"The financial aspect – if they are profitable or not, and what the usefulness-price relation is."* [free access] *"Yes, this would be the biggest influence"..*

Table 5-34. Academics' responses related to global theme "Service providers face"

R05BG1	R07BG2	R13BG3
"The biggest problems most of the time are not associated with the process of development but with the process of distribution" *"As of now, it does not seem that the regulatory environment has had any influence since one can find various applications. Of course, there are certain rules to be followed but there are always ways to go around."* *"The current stage of mobile network market environment supports the infrastructure but soon enough we will need a faster connection, better reception, more powerful devices, etc. Japan and South Korea are years ahead of North America"*	*"The majority of countries has a contra productive regulatory environment. Frequently there are several authorities that regulate M-Payment and introduce controversial regulations"* *"Mobile business gains in importance, there is a large number of start-ups globally. The mobile penetration in industrialized countries is over 115%, hence everyone has at least one mobile phone. In developing countries, the mobile penetration is over 57% and is constantly growing. Hence there are very good conditions for the diffusion of mobile services. "*	[regulatory environment] *"I am not familiar with the details."* *"Operators do support last technologies, but using these services is not accessible and profitable for most users, thus users are financially limited by the operators."*

Lincoln and Guba (1985) as cited in (Seale, 1999, p. 44) point out that such checks serve as a means of enhancing research rigour. Thus, the outcomes of the check strengthened the confidence of the researcher in the overall direction of the study and more specifically, in the applicability of the methodological approach to data collection and the subsequent analysis to second case, with a comparable setting (Study 2).

5.9 Study 1: Exploring the Thematic Networks

In order to complete the analysis of the data this section explores the thematic networks described above and elaborates on the meaning of the findings in the context of the three specific research questions guiding the study, formulated in Chapter 3.

5.9.1 Views about customers (RQ1)

The characteristics of the first global theme identified above allowed to address explicitly the first specific research question guiding the study: "**What are mobile industry stakeholder views about customer expectations, requirements, and attitude drivers?**". In summary the customer market presented a challenge to service providers and developers as it is dynamic and customer expectations were diverse: *"The developers of a mobile service have to offer far-seeing solutions and be flexible to fit the changing market situation and meet the wide range of customer expectation regarding factors such as money for value, support, availability, technical characteristics, user friendly interface, design.", DUN 266, P12R19).* The range of specific requirements to be met by the service design was also significant *("Indeed, consumers can be divided into groups of expectations – as I said already, some seek security and usability, other entertainment, facility, etc.", DUN 37, P6R11*) and with significantly high expectations about the quality of the service (*"Depending on quality and need, users would also pay for new development in order to get good quality", DUN 123, P8R15).* While looking for "value-for-money", customers were also expecting low service cost services (*"…factors which influence customer decisions are: The applicability of the product, Added value of the service, Popularity, Value for money relation (if paid service), User friendliness and compatibility with other programs/OS/devices", DUN 262, P12R19*).

According to participants, customers were aware of the technology opportunities and the choice of services they had. Customers knew what they wanted and made informed decisions. *("The price is a major factor, but not the only one. Whether they would start using it directly depends on their needs and on what the specific application is "giving" them. Nowadays the user has a choice."(DUN 14, P3R8*). Innovative services had to

compete with existing ones. Their viability was not guaranteed as customer acceptance was difficult to predict (*"In my opinion, development of new services is going ahead of demand.", DUN 120, P4R9*).

A possible misalignment of views emerged with regards to customer acceptance of service cost, and services offered for no charge: according to interview data some participants thought that customers would be prepared to accept the service cost if the service met their expectations and requirements *("Undoubtedly free applications attract the interest of people, but if they are not well made and sufficiently functional, as is usually the case with free stuff, the user would rather not use that application or would consider buying the paid version, which will have a much better good maintenance.", DUN 15, P5R10)* while according to others customers were always prefer service low cost, or free services ("*Especially in our region – yes because it was "not affordable "for everyone to pay to use something [this is also due to mentality – we are usually dissatisfied]."., DUN 16, P6R11*).

5.9.2 Views about mobility support (RQ2)

Less evidence was found related to the second specific research question **("What are mobile industry stakeholder views about the value of customer mobility support features of MDS?")**. According to the participants "mobility" was not necessarily associated with service based on mobile technologies *("Currently the "mobile" or the "mobility" became expression with very wide range and covering services and features which are not based on pure GSM or mobile technology.", DUN 99, P2R4*) as customers were considering mobile services as just a specific type of online (Internet) services that could offer solutions to their personal goal and meet specific needs ("[*private users]They usually use a mobile product in order to save time and be able to manage operations from their mobile, anytime a day, DUN 270, P12R19).* Customers did not differentiate between the technologies. Rather they assumed that services would take advantage of the innovative features offered by technology such as anywhere/any time access *("Accessibility at any time and from anywhere to information resources as well as speed in obtaining information.", DUN 218, P1R2*). Innovative mobile services would need to meet specific requirements and personal goals in order to be accepted. Customers did not value innovativeness per se rather they evaluated services according to their needs *("In my opinion, it is difficult to persuade customers to break with the old routines and influence them towards adopting new innovative products if the need to do so is not urgent.", DUN 31, P11R18).*

5.9.3 Views about the environment (RQ3)

Global theme "Service providers face" provides insights into the third specific research question **("What are mobile industry stakeholder views about the mobile service supply chain, and the regulatory environment?")**. Participants were well aware of the complexity of the customer market and the need to deal with the high customer expectations *("The developers of a mobile service have to offer far-seeing solutions and be flexible to fit the changing market situation and meet the wide range of customer expectation regarding factors such as money for value, support, availability, technical characteristics, user friendly interface, design.", DUN 266, P12R19*) but were somewhat uncertain about what customers really wanted *("There are no clear criteria exactly what the market wants. The developers have to overcome the limitations of mobile devices.", DUN 29, P7R12*).

However, they were relatively optimistic in their views of the future of MDS *("In my opinion, a forthcoming boom in this direction is to be expected.", DUN 111, P4R9*) as a consequence of rapid technological progress *("Yes, of course, this is an intensely developing sphere of IT and there is much potential in it – in order to use this potential effectively, there is a constant need of new services.", DUN 67, P5R10)* despite current slow adoption pace, issues related to service cost including ongoing cost ("*Mobile internet prices in many aspects are making the use of applications expensive and thus unattractive."(DUN 53, P7R12),* and also issues related to the inherent limitations of the technology *("One of the biggest problems for developers of mobile applications is that they are restricted by the limited resources of the mobile device (or most mobile devices), in comparison with PCs – so, with much less options an application has to be developed that does not defer drastically to those, made for PCs.", DUN 76, P7R12).*

They considered MDS viable in the long term *("here is a cost for us but in the long term it will be recovered.", (DUN 257, P12R19)* and saw market opportunities such as offering a service ahead of other competitors *("In the banking sector in Bulgaria, our [company] mobile service is among the first ones which makes it especially valuable for customers.", DUN 264, P12R19),* developing a very specialized service *("Therefore, it is often easy for the developers of a mobile application to fill a 'niche' in the market.", DUN 278, P12R19)* or creating innovative service that took advantage of the technology opportunities *("Innovations of technical nature include very good support and service distribution while using new technologies for distribution…", DUN 73, P6R11).*

Regarding the contribution of MNOs towards MDS development, it was felt that "*Because of competition, the market is contributing to the development of new services and thus keeps the need for operators to constantly amend the products they are offering.*"*(DUN 158, P8R15*). However, MNOs were seen as still reluctant to support MDS ("*The lack of motivation on part of operators to deploy a particular technology.", DUN 1, P3R8; "To persuade the operators to start offering their technology.", DUN 25, P3R8)*, and relatively slow to introduce such services themselves *("From the operator's point of view – the process from: creating an idea > market-analysis > cost-effectiveness calculation > approval by various departments (e.g., financial department in the company) to finally, introducing the new development to customers ", DUN 102, P8R15*).

The regulatory environment was seen as mature (with some relevant legislation already in place), and relatively supportive, or at least not presenting any significant obstacles to MDS development and deployment (*"Specifically, when talking about gambling, in most countries this is clearly regulated and developers have to conform with the given regulations.", DUN 45, P7R12; "I think that the regulatory environment is relatively supportive, except for the area of private data abuse in terms of location based services and private person location information.", DUN 47, P11R18; "In Bulgaria, the regulatory environment does not provide much on the sector of mobile business services and applications. This makes it, on one hand, more difficult for companies to license a new product, but, on the other, this also means that because of the lack of detailed provisions much room is left for new services that are not restricted too much by regulations", DUN 274, P12R19).*

5.10 Summary of Chapter 5

This chapter presents the Study 1 findings following a step-by-step description of the four stages of the data coding and analysis process supported by examples, summaries and graphical illustrations. The thematic analysis was completed by deriving a set of two global themes and their respective thematic networks. The resulting thematic map was explored further in order to relate the findings back to the main research question, by addressing each one of the three specific research questions guiding the study. The next chapter (Chapter 6) presents the process and the outcomes of the second empirical investigation (Study 2) which followed (with some adaptations) the same methodological approach.

CHAPTER 6. STUDY 2

As stated in Chapter 1 the research sets to investigate mobile industry stakeholder perceptions about customer demand for MDS in the context of the MDS market environment. The two objectives set as a means to address the main research question are to develop a conceptual model and a research framework that considers the relationship between customer demand for MDS and MDS adoption and use, and to conduct an empirical investigation. This chapter contributes in part to the second objective: it presents Study 2 – the second of the two empirical studies conducted. Its position within the research process is shown in Figure 6-1. As in Study 1, Study 2 follows the methodology developed and presented in Chapter 4; however, it contains a necessarily detailed account of the coding and analysis approaches used, as in part they are distinct to those used in Study 1. Similarly to Chapter 5, this chapter starts with a synopsis of the study context, i.e., the relevant mobile service and regulatory environments, and describes the study sample including participants' backgrounds. Further it provides a step-by-step description of the data analysis process and its outcomes, illustrated and supported by numerous examples. Towards the end the findings are discussed in relation to the specific research questions.

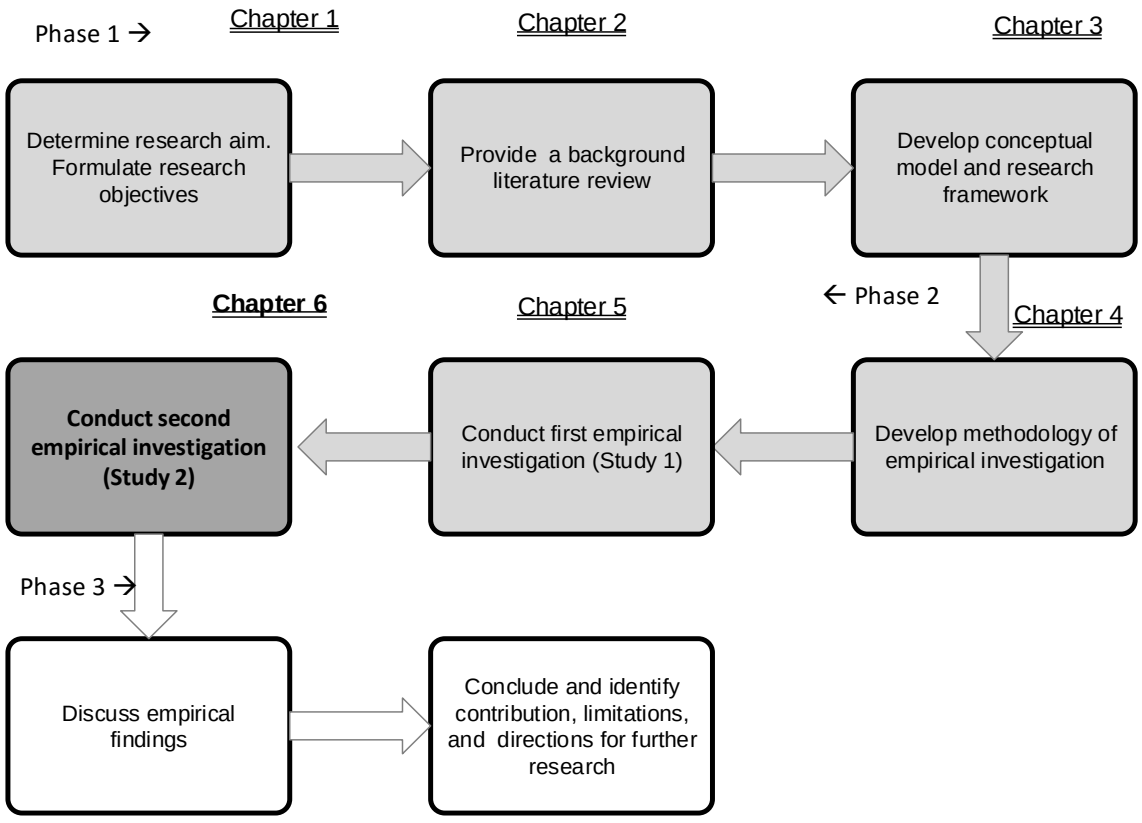

Figure 6-1. Research process path (Chapter 6)

6.1 Study 2: Setting

The data for Study 2 were gathered in New Zealand (population estimated at 4,509,690 in 2014[28]) during the period 2012-2013. Mobile technology use in New Zealand had increased steadily during the preceding decade; the number of mobile phone connections exceeded the population as early as 2008 (population estimate 4,252,277, mobile phones 4,620,000[29]). In 2011, the number of mobile connections exceeded 5,346,000 (Keall, 2012); with a population size estimated at 4,407,500[30], this represented a 15.71% growth in phone ownership compared to 3.65 % population growth since 2008. Nearly 2,000,000 of the connections included mobile data access[31] with the number of smart phone devices estimated at 800,000[32].

The growth trend continued during the period 2012-13 when the Study 2 data were gathered: with a population of 4.43 million in 2012[33], according to the 2012 CIA World Factbook in New Zealand there were 4.222 million mobile phones in use at the time (meaning an average device penetration rate of 111.1%, second in Australasia after Australia)[34]. Furthermore, in 2013 an estimated 60% of the population owned a smart phone[35].

6.1.1 Mobile data infrastructure

The New Zealand mobile infrastructure landscape comprises three MNOs: Spark (which was called Telecom till mid-2014[36]), Vodafone New Zealand (Vodafone), and 2degrees (started in 2009, launched a mobile data network in 2010[37]). By 2013 each of the three MNOs maintained a 3G network (moving gradually to 4G), thus making it feasible to develop and offer services over MI. Vodafone and Spark have built an extensive infrastructure and have achieved nationwide coverage including rural areas, covering around 97% of the population. 2degrees have infrastructure coverage in most major

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[28] http://www.stats.govt.nz/tools_and_services/interactive-pop-pyramid.aspx?gclid=CjwKEAjw7uKwBRDUlJvRo-z6rgMSJACbmSBhnfC7V3Y-KVT2ScDPecKh4XzJxJdq6RapN-Tjg5jsfxoCCsDw_wcB
[29] http://en.wikipedia.org/wiki/List_of_countries_by_number_of_mobile_phones_in_use#cite_note-59
[30] http://www.stats.govt.nz/browse_for_stats/population/estimates_and_projections/pop-indicators.aspx
[31] http://www.stats.govt.nz/searchresults.aspx?q=mobile%20internet%20too
[32] http://blog.jericho.co.nz/new-zealand-smartphone-penetration/
[33] http://www.stats.govt.nz/browse_for_stats/population/estimates_and_projections/NationalPopulationEstimates_HOTPMar12qtr.aspx
[34] http://en.wikipedia.org/wiki/List_of_countries_by_number_of_mobile_phones_in_use
[35] http://marketingweek.co.nz/2013/05/new-zealand-mobile-statistics-2013/
[36] http://www.nzherald.co.nz/business/news/article.cfm?c_id=3&objectid=11305410
[37] http://www.nbr.co.nz/article/2degrees-launches-3g-service-127385

urban centres (where around 88% of the population is concentrated), and provides coverage to other areas using a roaming agreement with Vodafone (*Annual telecommunications monitoring report*, 2014). In New Zealand, the three MNOs who own infrastructure are also direct data service providers. In terms of market share, in 2011/2012 2degrees reached 20%, Spark held 38%, and Vodafone 42% of the market (ibid).

There is also a small number of MVNOs whose estimated combined number of subscribers in 2013 was 20 000 (among them Slingshot, CallPlus, Telstra Clear, Compass, Orcon[38]). Unlike in other OECD countries the MVNO market in New Zealand was not significant, which TUANZ (the very influential, independent non-for-profit Telecommunications Users Association of New Zealand) attributed in part to the relatively large proportion of customers using pre-paid accounts[39] (an estimated 60 percent of all mobile phone users[40]); as of 2013, none of MVNOs offered a prepaid account[39].

In terms of using mobile broadband, MI popularity among users had grown quickly, especially among the young. According to a Nielsen survey of Australia, Hong Kong, Indonesia, Malaysia, Philippines, New Zealand, Singapore, Taiwan and Thailand, as reported in (Corner, 2008) nearly half of all New Zealanders under 25 and nearly a quarter of those older accessed MI, placing New Zealand as the leader in MI usage among the nine Asia-Pacific countries surveyed.

However, mobile broadband use in New Zealand remained relatively costly. For example, in 2008 New Zealand customers were paying "between 23 and 46 per cent more for mobile calls than the average of the OECD countries" (Point-Topic, 2009); according to Keall (2009) a 1 GB mobile data plan offered by a New Zealand mobile broadband provider was almost twice the cost of a comparable plan in Australia. Later reports did not show substantial change from this situation. In 2013 New Zealanders were still paying top price per 1 GB, very close to Canada and more than Australian, UK and USA customers paid for a comparable data plan (unlimited data, 4G network), with smart phone prices also the highest across these five OECD countries[41]. Several

[38] https://www.mvnodynamics.com/mvno-companies/asia-pacific-mvno-companies/new-zealand-mvno-companies/
[39] http://tuanz.org.nz/blog/2013/4/9/virtual-competition
[40] http://www.roymorgan.com/findings/5087-nz-pre-paid-mobile-market-shares-june-2013-201308120448
[41] http://www.whistleout.co.nz/MobilePhones/News/Why-is-New-Zealand-mobile-so-expensive

factors may have contributed to the high cost to mobile broadband customers. First, the mobile market in New Zealand was one of the least competitive among OECD countries (Point-Topic, 2009). The two "old" players (Vodafone and Telecom) dominated the market till 2009; the third MNO (2degrees) still faces stiff competition from Vodafone and Spark[42]).

Second, national legislation in the form of the Resource Management Act (1991) imposed restrictions on tower height and tower co-location that had implications for the building of network infrastructure. A lower tower generally has a lower coverage, therefore, a large number of towers were needed; using the same tower by more than one MNO was somewhat limited as it was allowed only for towers higher than 20 meters. Thus the cost of investment in infrastructure remained high. Finally, New Zealand's distant geographic location meant that importing was costly especially given the relatively small size of the potential market. These factors contributed to high device cost and also to high data cost, exacerbated by the low ROI: according to (OECD, 2013) the revenue per subscriber for New Zealand MNOs was less compared to similar providers in Australia, Canada, UK and USA.

According to a New Zealand Commerce Commission report[43], in 2013 a "typical 1.5GB per month" data plan was about 10% above the average OECD price, with the 6GB data plan about twice the average. According to the report "mobile broadband is not at present a strong competitor for fixed line broadband"; in other words, mobile broadband cost continued to present an impediment to the adoption of the MI as an active mCommerce channel in New Zealand (Petrova & Huang, 2011).

6.1.2 Mobile data services

As early as 2001 the international telecommunications company Ericsson and New Zealand-based software provider Synergy formed a mobile application joint venture (delivering mCommerce and MI applications, such as the share-price FastAlert mobile service with ASB Bank, and mGaming software)[44]. Among the MNOs, Vodafone showed support for mCommerce activity by launching (in 2003-2004) Vodafone Live!

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[42] http://www.budde.com.au/Research/New-Zealand-Mobile-Communications-Statistics-Analysis-and-Major-Operators.html
[43] http://www.comcom.govt.nz/the-commission/media-centre/media-releases/detail/2014/new-zealand-mobile-phone-plans-rate-well-across-oecd-countries
[44] http://www.computerworld.co.nz/article/512917/ericsson-synergy_mobile_app_venture_thin_corporate_clients/

– a mobile entertainment and services portal (Vodafone, 2008). A popular early MDS was the SMS parking ticket payment service TXT-a-Park (Petrova & Mehra, 2010). It was a joint initiative between Vodafone, the system development company Synergy (renamed Fronde in 2007), the parking meter manufacturer Cash Handling Systems, and the Auckland City Council (who owned the parking lots)[45]. The parking fee was charged instantly to the customer's account and incurred an additional 50cent cost per transaction. Telecom joined the consortium two years later; TXT-a-Park is still available in a number of New Zealand cities[46].

At the time SMS was also used for services such as marketing campaigns and selling event tickets. For example, TXT2GET (established in 2006) ran a number of successful campaigns; it was reported that its Children's Day campaign (2009-2010) increased participation by 45%[47]. Around the same time the event booking and ticket selling company Ticketek started selling SMS supported mobile tickets in both Australia and New Zealand (Ticketek, 2011), and later added a mobile Web site[48].

As early as 2004 ASB (a leading New Zealand bank) started using text messaging for the purposes of authentication (by sending a secure code to the customer's mobile phone), and developed an SMS banking customer interface in 2006[49] in partnership with Telecom and Vodafone. Following this pioneering example, by 2009 all major banks had added an SMS banking option (Petrova & Yu, 2010). The trend continued and by the end of 2012 all New Zealand banks were offering at least some mBanking services for smart phone users [50]. According to the TNS Mobile Life survey, in 2012 the use of mBanking in New Zealand was twice as popular as the global average (at 28%), although the absolute number of users was understandably not very high[51].

While ASB developed their SMS banking software in-house, some of other banks engaged with companies that specialized in developing mobile services (Petrova & Parry, 2008) such as the software company Run the Red; originally established (in 2001) as a WAP applications developer it later partnered with leading MNOs and banks

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[45] http://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=10113968
[46] http://www.fronde.com/success/public-sector/txt-a-park/
[47] http://cms.txt2get.co.nz/Case-Studies/New-Zealand-Case-Studies-and-Ad-Creative/Case-Studies/Child-Youth-and-Family/default.aspx.html
[48] http://premier.ticketek.co.nz/content/aboutus/aboutus.aspx
[49] http://www.fronde.com/nz/people/who-we-are/ ttps://www.asb.co.nz/about-asb/our-history
[50] http://www.stuff.co.nz/business/money/8479200/ASB-tops-mobile-banking-survey
[51] http://www.stuff.co.nz/business/money/6799151/Mobile-commerce-on-the-rise

to develop SMS banking applications and text marketing software and support services[52]. (The company was purchased in 2014 by the USA based mPayment services provider PushPay[53].) The already mentioned Synergy (Fronde) continued developing mobile applications and solutions including mBanking (for the Bank of Philippine Islands), and a parcel tracking mobile application for New Zealand Post[54]. A successful mobile financial service developer was the start-up company m-Com (established in 2001, sold to the international financial services and technology provider Fizerv in 2011) who had developed a multi-functional mBanking software product implemented by several New Zealand banks[55].

Later, in 2011-2012 the three MNOs (Telecom, Vodafone and 2degrees) established a trusted service manager (TSM) in an mPayment joint venture supporting a mobile wallet service for NFC-capable smart phones, in collaboration with Paymark. Paymark is a company owned by the four major New Zealand banks ANZ, BNZ, Westpac and ASB which are responsible for the maintenance of the nationwide point-of sale transaction network – EFTPOS[56]. The contactless payment system was trialled by Auckland Transport (a transport services provider) as a method of paying for tickets and goods at the till, in cooperation with Westpac, Thales (a French company which developed an integrated ticketing system), and Gemalto (who developed the mPayment infrastructure)[57] but it gained little traction at the time.

Concurrently, 2degrees and the mobile service provider company Snapper, which already operated a contactless card service for bus travel, started an mPayment service for non-NFC phones called “touch2pay”; customers could pay for their travel fare if they had downloaded the Snapper application and had a touch2pay SIM card installed[58]. A much smaller number of mobile services were developed in areas other than financial and retail – such as StudyTXT that was developed in 2005-2006 as a commercial on-demand SMS service which students could use while studying for a test[59]; it was

[52] http://runthered.com/about/#history
[53] http://www.scoop.co.nz/stories/BU1406/S00001/pushpay-announces-purchase-of-run-the-red.htm
[54] http://www.stuff.co.nz/business/money/74800298/anz-launches-digital-wallet-for-tapandgo-smartphone-payments
[55] http://www.nzherald.co.nz/business/news/article.cfm?c_id=3&objectid=10710376
[56] https://www.paymark.co.nz/about-paymark/our-company.html
[57] https://www.paymark.co.nz/case-studies/mobile-wallet-trial
[58] http://billbennett.co.nz/2012/09/26/nz-mobile-wallet-edges-closer/
[59] http://www.computerworld.co.nz/article/500534/aut_pulls_texting_generation_studytxt/

operational till the end of 2007. However, the mobile game development industry grew significantly, with an above 80% increase in downloads in 2012[60].

Recently there has been an increase in mPayment initiatives and launches, and the sector has become very competitive: one of the participating banks (Westpac) withdrew their support for the TSM as it developed its own mobile wallet that utilized cloud based host card emulation (HCE) technology[61]. Similarly, another leading bank (ANZ) started a mobile wallet service called goMoney[62] while yet another mobile wallet was launched by an independent mobile service provider – Semble, in collaboration with the three MNOs, two of the major banks (ASB and BNZ), and Snapper[63]. The two market-leading MNOs developed their own products. In 2014 Vodafone launched SmartPass – a mobile wallet supported by the Bank of New Zealand and Visa while Spark launched a specialized mPayment device that allowed business owners to accept payments while on the go; Spark's method of payment was in direct competition with the country's well established, bank-owned EFTPOS that also offered a mobile payment terminal[64].

6.1.3 Regulatory environment

The mobile industry sector in New Zealand is governed by the Telecommunications Act[65] (currently under review). Additional obligations in relation to interception and network security were imposed by the Telecommunications (Interception Capability and Security) Act[66]; radio spectrum and frequency licencing is managed by the Radiocommunications Act[67] and by the Radiocommunications Regulations[68] (also under review). At the time of data gathering the regulatory environment allowed for competition and new entrants as it provided a flexible regulatory regime designed to enable low transaction cost spectrum use, and meeting changing and new demand patterns by providing innovative services; mobile number portability was introduced in 2007-2008 (Vodafone, 2008).

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[60] http://nzgda.com/news/nz-made-video-games-industry-grew-86-in-2012/
[61] http://www.stuff.co.nz/technology/digital-living/60258994/westpac-whips-out-digital-wallet-early
[62] http://www.anz.co.nz/personal/ways-bank/mobile-phone-banking/gomoney/
[63] http://getsemble.semble.co.nz/snapper
[64] http://stoppress.co.nz/didge/will-gatekeepers-electronic-pay
[65] http://www.comcom.govt.nz/regulated-industries/telecommunications/
[66] http://www.police.govt.nz/advice/businesses-and-organisations/ticsa
[67] http://www.rsm.govt.nz/about-rsm/spectrum-policy/acts-and-regulations/a-guide-to-the-radiocommunications-act-1989
[68] http://www.rsm.govt.nz/about-rsm/spectrum-policy/acts-and-regulations/a-guide-to-the-radiocommunications-regulations-2001

The current laws and regulations relevant to MDS (i.e., the Fair Trading Act[69], the Consumer Guarantees Act[70], the Privacy Act[71], the Reserve Bank Act[72], the Credit Contracts and Consumer Finance Act[73], and the Electronic Transactions Act[74]) provided, and still do provide, a dependable regulatory framework; however, challenges in the future may be expected, for example, in regard to the way payments fees and charges are collected and distributed[75], and also with customer data sharing and security[76]. More recently the industry body setting domestic self-regulation guidelines (Payment NZ) created "Mobile Device Rules and Standards"; compulsory for its members (i.e., all New Zealand major banks), the rules and standards also provide guidelines for third party payment providers[77].

As should be evident from the above analysis, at the time of data gathering the MDS landscape in New Zeeland was structured similarly to the model in Figure 1-1 (Chapter 1). Mobile services were developed and offered by mobile service providers, with a strong emphasis on financial MDS. MNOs were involved as stakeholders providing the infrastructure, but also as independent MDS providers. The regulatory environment did not include MDS-specific acts of law, although existing laws and regulations were applicable to MDS, and supported competition.

Overall the Study 2 setting was similar to the setting of Study 1 in terms of infrastructure ownership and MNO mix; in addition, mobile service development and adoption was comparable in terms of service spectrum and actual use, with New Zealand having a slightly more developed mobile financial services sub-sector. However, as commented upon in many of the participant responses, the emergence of Google and Apple Inc. as dominant suppliers of devices and mobile service development platforms, was also affecting New Zealand.

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[69] http://www.legislation.govt.nz/act/public/1986/0121/latest/whole.html
[70] http://www.legislation.govt.nz/act/public/1993/0091/latest/whole.html
[71] http://www.legislation.govt.nz/act/public/1993/0028/latest/DLM296639.html
[72] http://www.legislation.govt.nz/act/public/1989/0157/latest/DLM199364.html
[73] http://www.legislation.govt.nz/act/public/2003/0052/latest/DLM211512.html
[74] http://www.legislation.govt.nz/act/public/2002/0035/latest/DLM154185.html
[75] http://www.wigleylaw.com/assets/Uploads/Introduction-to-NZ-mobile-payments-regulation-and-law.pdf
[76] http://www.wigleylaw.com/assets/Uploads/Mobile-payments-and-the-slippery-slope-of-privacy-loss.pdf
[77] http://www.wigleylaw.com/assets/Uploads/Introduction-to-NZ-mobile-payments-regulation-and-law.pdf

6.2 Study 2: Data Gathering

As in the previous study participants were recruited from the employees of companies and organizations that were involved in mobile service design, development and provision as outlined above. The interview instrument used in Study 2 (see Appendix C2) was a streamlined version of the instrument used in Study 1 with questions reworded and regrouped based on field observations made in Study 1; the purpose was to avoid confusing, duplicating and sensitive questions, while retaining the overall focus of the interview. More specifically, questions 5 and 6 (about participants being involved in a current project) were removed as it was anticipated that the participants would consider them somewhat sensitive and would be reluctant to elaborate on them (as occurred with the Study 1 participants). Questions 10 and 13 were combined as they were overlapping in part. Finally, one new question was added to reflect the fact that the responses obtained in Study 1 contained a significant amount of information related to its topic ("what makes MDS attractive"). The interview guide was re-sequenced to improve the interview flow: the new sequence continued to maintain a transition from probing to more direct questions but led to reduced interview duration as participants seemed not to need too much probing in order to start sharing their views and opinions. The question order adhered as well to Patton's (2002) recommendation to leave questions that require significant speculation towards the end (p. 353).

6.2.1 Recruiting and interviewing participants

In order to recruit participants, the researcher used her personal contacts to seek introductions to potential participants within organizations involved in mobile services design and provision. A lesson learnt from the first round of data collection (Study 1) was that potential respondents at relatively lower hierarchical positions did not always feel comfortable accepting the invitation unless obtaining some sort of approval by a senior manager. Eisenhardt (1989) notes that adjusting data collection protocols to include more suitable data sources would be acceptable where it would help the researcher to understand better and in "as much depth as possible" the case study data (p. 539); thus the researcher sought to contact individuals who were more likely to be able to make a decision about participating in the research without the need to obtain their manager's agreement (or would be comfortable consulting them). The approach limited to a degree the number of potential participants but increased the response rate: 15 out of the 37 invitations were accepted. Ultimately 13 participants, from nine different organizations, were recruited (two participants withdrew after initially

accepting the invitation). The sample size and the number of organizations were comparable to the sample in Study 1 (12 participants from eight organizations), and met the minimum sample size requirement of ten participants as set in Chapter 4.

Table 6-1 lists participants (anonymized with IDs used further in the text as a reference)[78], their respective organizations, and the file names of the transcribed interviews. All participants were interviewed by the researcher. Most interviews (11) were conducted face-to-face at the respective participant's business premises. Two interviews were conducted using Skype® at participants' request (NZInt7 and NZInt9).

The interviews lasted 45 minutes on average. Participants were asked about their background and expertise first; next the interview proceeded with the 12 pre-formulated interview questions (Appendix C2), asked in the same sequence to all participants. The responses to the interview questions were audio recorded electronically. All recordings were of good quality except the interview with participant NZInt13 in which some content was irretrievably lost (from responses to questions 1 and 2).

Table 6-1. Participants, organizations and interview records

Participant	Organization	Filename
NZInt1	NZORG1	NZInt1.docx
NZInt2	NZORG2	NZInt2.docx
NZInt3	NZORG3	NZInt3.docx
NZInt4	NZORG4	NZInt4.docx
NZInt5	NZORG5	NZInt4.docx
NZInt6	NZORG3	NZInt6.docx
NZInt7	NZORG6	NZInt7.docx
NZInt8	NZORG4	NZInt8.docx
NZInt9	NZORG7	NZInt9.docx
NZInt10	NZORG3	NZInt10.docx
NZInt11	NZORG8	NZInt11.docx
NZInt12	NZORG9	NZInt12.docx
NZInt13	NZORG4	NZInt13.docx

6.2.2 Transcribing and preserving the interview data

Once all the interviews were completed the electronically recorded responses to the interview questions (Q1 to Q12) and to the additional questions asked by the researcher during each interview were transcribed using the services of professional transcribers from the Auckland based company Academic Consulting[79]. The transcribers followed an intelligent verbatim approach which preserves the richness of the responses but removes non-meaningful utterances such as "hmm". Following practical guidelines for preparing interview data for computer aided qualitative data analysis such as those

[78] The prefix NZ was used to avoid any possible confusion with the identifiers used in Study 1.
[79] http://www.academic-consulting.co.nz/

provided by McLellan, MacQueen, and Neidig (2003), each transcript was verified by the researcher through a comparison to the original recording. Short segments of inaudible text identified by the transcriber was either transcribed or left flagged. The transcripts were stored as identically formatted MS Word documents, with labels identifying the portions of the text attributed to the interview participant and the researcher, respectively. Short self-explanatory question names (tags) (Table 1-2) were used in order to provide context to interviewee responses, while additional questions asked by the researcher were kept in their entirety. The formatting of the first four interviews was performed by a research assistant (O. A.) and was checked by the researcher, who formatted the rest of the transcripts herself.

Table 6-2. Interview question tags

Question	Tag	Question	Tag
Q1	Attraction	Q7	Innovation
Q2	Benefits	Q8	Obstacles
Q3	Requirements and expectations	Q9	Future
Q4	Features	Q10	Regulatory environment
Q5	Pricing	Q11	Industry
Q6	Attitude	Q12	Further comments

Questions 1-11 were answered by all participants with two exceptions: (i) Participant NZInt3 was not comfortable talking about pricing strategies (Question 5); (ii) Participant NZInt5 did not feel they had any specific knowledge about the regulatory environment in order to reply to Question 10. Three participants (NZInt5, NZInt8, and NZInt13) answered Question 12 (i.e., they voluntarily contributed further comments). The interview transcripts were stored and can be reviewed in Appendix Q[80]. A preliminary reading of the transcripts confirmed that the answers to the interview questions contained data relevant to the research perspectives and the specific research questions of the investigation as formulated and discussed in Chapter 3; a high-level mapping is shown in Table 1-3.

Table 6-3. Research perspectives and questions, and related interview questions

Research Perspective/Question	Related interview questions	Related content
A (RQ1)	1, 2, 3, 4, 5	Customer requirements and expectations
B (RQ1, RQ2)	4, 5, 6, 7, 8	Mobility related service value in innovative services
C (RQ3)	8, 9, 10, 11	Supply and regulatory environments

[80] The transcripts are shown formatted and with numbered lines, as explained later in the chapter.

6.2.3 Participant profile

The sample composition was analyzed based on information derived from participant responses to the opening introductory questions of the interview, and from the notes taken by the researcher during the recruitment process and the interview itself. Table 6-4 contains a summary of participant characteristics.

The organizations in which participants worked were classified as small to medium or large, applying the definition of an SME used by the New Zealand Ministry of Economic Development (having 0-19 employees)[81]. Even though this definition is different from the EU definition of an SME used in describing the Study 1 sample (Chapter 5), in both countries (Bulgaria and New Zealand) SMEs as defined comprise approximately 99% of the local economy[81,82].

As required by the design of the study, all participants were employed by companies or organizations that were engaged in mobile service and/or application design and provision, with six participants working in telecommunication companies, six in companies developing mobile services and applications, and one in an educational institution. Also similar to Study 1, in Study 2 four participants were employed by a small to medium sized company while nine were employed by a larger organization.

All participants identified themselves as being employed in senior managerial or specialist positions. They had background experience and expertise in one or more of the areas of software development, telecommunications, and management; all were involved in the decision making processes at their respective place of employment and were highly knowledgeable about the topic area of the investigation. The sample included participants involved in MCS (e.g., mLearning, mobile entertainment, mBanking, mGaming), as well as in EMS (mPayment).

Similarly to Study 1, participant background data were coded applying attribute coding (Saldaña, 2012, p. 70) in order to identify each participant's type as a stakeholder in the mobile service value chain (using the stakeholder types introduced earlier as attributes). As in Study 1, most participants belonged to more than one type as indicated by the description of their responsibilities (Table 6-4, last column).

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[81] http://www.med.govt.nz/business/business-growth-internationalisation/pdf-docs-library/small-and-medium-sized-enterprises/structure-and-dynamics-2011.pdf

[82] https://eurofound.europa.eu/sites/default/files/ef_files/pubdocs/2012/4710/en/1/EF124710EN.pdf

Table 6-4. Participant characteristics

Participant/ Organization	Organization type	Role	Experience/expertise	Stakeholder type
NZInt1/ NZORG1	Service and application development and provision (small)	Founder and CEO (mLearning; mobile social networking services)	Extensive background in developing applications various platforms including Android.	MAD, MSCD, MCSP
NZInt2/ NZORG2	Service and application development and provision (small)	Technical director – product design and project management	Security and platform aspects	MAD, MSCD, MCSP
NZInt3/ NZORG3	Mobile operator/service provider (large)	Data services manager	Extensive background in different areas in the mobile communications sector	MSCD, MCSP, MCSA, EMSP
NZInt4/ NZORG4	Mobile operator/ service provider (large)	Acting head of architecture	Software architect, software developer, assistance architecture builder.	MCSP, MCSA
NZInt5/ NZORG5	Software development (small)	Director (new mobile product development).	Front end user interface, content for mobile applications, bridging providers and customers	MSCD, MCSA
NZInt6/ NZORG3	Mobile operator/service provider (large)	Client manager.	Consulting services, sales planning, understanding needs and particularly value for the client.	MCSP, MCSA
NZInt7/ NZORG6	Mobile content development (small)	Director (mobile phone film making).	Film making – creative and commercial.	MSCD
NZInt8/ NZORG4	Mobile operator/service provider (large)	Innovations manager (mobile products and services)	Telecommunications, customer relationship management	MCSP. MCSA
NZInt9/ NZORG7	Financial mobile service developer (large)	Vice president market development	Product and services market adoption, growth and innovation. Mobile banking, mobile payment	MSCD, EMSP
NZInt10/NZORG8	Mobile operator/ service provider (medium)	Senior business analyst (mobile applications)	Telecommunications, sales and services, customer needs	MCSP, MCSA
NZInt11/NZORG3	Mobile operator service provider (large)	Head of products – wholesale voice and mobile	Telecommunications/IT industry, market strategy, industry and regulatory affairs, insight-driven product development	MSCD, MCSP, MCSA
NZInt12/NZORG9	Educational institution (large)	Senior academic and industry consultant.	Software development; mobile technology use in education; design and development of educational mobile games	MAD, MSCD
NZInt13/NZORG7	Financial mobile service developer (large)	Manager of professional services	Software development, design and development of large scale distributed systems.	MAD, MSCD, EMSP

A simple frequency count showed the following type distribution: MSCD (mobile service content developer) – nine participants; MAD (mobile application developer) – four participants; MCSP (mobile customer service provider) – eight participants; EMSP (enabling mobile service provider) – three participants; MCSA (mobile customer service aggregator) – seven participants. Similarly, to the sample in Study 1, the sample in Study 2 conformed to the expected participant profile described in Chapter 4. In contrast to Study 1, however, distinct participant classes did not emerge and so all data were treated as belonging to the same data domain.

6.3 Study 2: Data Analysis Overview

As noted in Chapter 4 the data analysis process in Study 2 included the use of CAQDAS (Computer Aided Qualitative Data Analysis Software). The expertise and skills developed during Study 1 allowed the researcher to take advantage of the referencing, documenting and visualizing capabilities provided by CAQDAS while retaining the rigor of the analysis and adhering to the study's methodology. The CAQDAS tool selected in this research was NVivo10 (QSR International©[83]) as it was supported by the researchers' university.

6.3.1 NVivo10

St John and Johnson (2000) warn that when choosing a qualitative data analysis support package, the researcher needs to take into account the tool's suitability for their research approach and methodology as well as their own proficiency. Support for the adoption of NVivo as the CAQDAS of choice was found in the literature. For example, De Wet and Erasmus (2005) had demonstrated how NVivo could be used to organize data, to support systematic analysis, and to record and visualize thematic cluster development in a large qualitative study. Furthermore, Frost (2008) specifically recommended the use of NUDIST 4 (an earlier version of NVivo) for inductive coding: as the system keeps source data (transcripts) and codes separate, it facilitates an efficient iterative process by allowing multiple updates of the codes and their descriptions, preparing the data for the subsequent theme identification. With regards to researcher proficiency, the researcher had received initial training in NVivo by experts form Academic Consulting, and had made arrangements with them for ongoing support. The detailed account of the research process that follows shows how NVivo was used to code and analyze data, keep track of

[83] http://www.qsrinternational.com/default.aspx

the intermediate steps of the coding and analysis, and document and visualize the analysis outcomes.

6.3.2 Data coding

The pre-coding examination of data showed that the transcripts contained some text likely to be found redundant during the coding – phrases such “yes right”, greetings and other social discourse exchanges common for a face-to-face dialogue, plus the interview questions and a number of additional questions asked by the researcher. When combined, the 13 interview transcript files added up to about 55 500 words, including redundant and/or irrelevant text.

The size of the data set was given consideration when determining the coding unit (which is the portion of the text to be segmented and assigned a code). Boguraev et al. (1998) suggest that in order to analyze a large text with the purpose of reducing it to a summary of meanings, the granularity of the linguistic analysis (phrase, sentence, paragraph) may need to vary along with the variations in the depth of the content. Given the objectives of the analysis (to identify themes), the size of the text (relatively large), the inevitable presence of some “noise” in the data, and the relative ease of data referencing when supported by CAQDAS, it was decided in Study 2 to code emerging meanings at the appropriate level of granularity (phrase, sentence, paragraph) depending on the context.

6.3.3 Data analysis stages

As in Study 1, a multi-step iterative process was followed, and which included both manual and software-supported coding and analysis. The analysis process was modelled on that implemented in Study 1, modified to take into account the outcomes of Study 1, as well as Study 2 participant profiles.

More specifically, first it was not considered necessary to apply the theory-driven deductive coding used in Study 1 (Stage 1) as it was evident from the outcomes of Study 1, and from the pre-coding reading of the data gathered in Study 2, that the interview questions allowed participants to generate responses relevant to the main research question.

Second, the Study 2 data set was not split into two domains (as no specific domains related to participant type emerged, as noted above) thus removing the need to perform twice a significant part of the coding process. Overall, the number of coding and

analysis stages was consequently reduced from four in Study 1 to three in Study 2 (Figure 6-2).

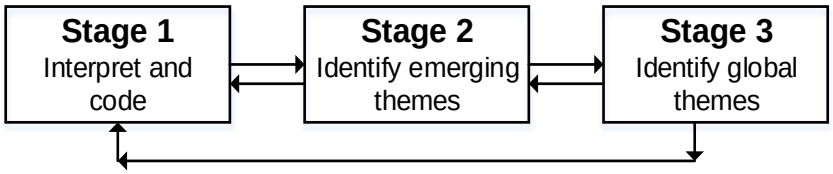

Figure 6-2. Data analysis stages

Each stage required iterative interpreting and coding both within the stage and back to preceding stage(s) in order to refine the interpretation and the coding, and to identify and interpret relationships in the context of the study topic and objectives. The stages are described in Table 6-5.

Table 6-5. Data analysis stages and objectives

Stage	Objective	Description
1	Interpret and code	A highly iterative process. The data set is reviewed and each transcript is examined in order to ensure that participant responses can be interpreted. The code hierarchy is updated. The two outputs – the coded data set and the code hierarchy (including definitions) – are used as input to the next stage.
2	Identify and develop emerging themes	An iterative process. The coded data are systematically reviewed in order to identify relationships between codes and to define emerging themes. Coding and code definitions are revised and refined, the code hierarchy is updated. The output of the stage – the set of themes with their descriptions, is used as input for the next stage.
3	Identify and develop global themes	An iterative process. Emerging themes are reviewed, organized in groups and used to identify the overarching global themes. Each global theme is based on an underlying thematic network. The thematic network summaries are visually represented as a thematic map. The thematic map is explored to address the specific research questions.

At Stage 1 it was deemed plausible to use in part the coding scheme developed in Study 1 by transferring it to Study 2 and modifying it as needed, as the two studies were contextually comparable (Saldaña, 2012, p. 250). At Stage 2 the meanings represented by the codes were explored in order to establish relationships between the codes and to identify emerging themes (in NVivo). At Stage 3 the researcher explored the relationships between the themes, developed a thematic map and addressed the specific research questions, applying mostly a pen and paper method in doing so. A similar mix employing computer-aided and manual coding and analysis methods was adopted by Frost (2008), who found that the initial "in-breadth" computer aided coding needed to be supplemented by "in-depth" manually performed analysis and theme development.

6.4 Study 2: Interpreting and Coding using NVivo (Stage 1)

At the outset of the analysis process the existing four-level Study 1 code hierarchy (Appendix O) and the outcomes of Study 1 were examined in order to design an

approach for sensibly and systematically applying it to Study 2. As shown in Chapter 5, the Study 1 themes were derived through an analysis of the relationships between the super codes, and the themes emerged across the sub categories (and categories) of the code hierarchy. While categories and sub categories served as useful super code organizers, having in place two upper classification levels did not seem to be of any particular advantage. Therefore, retaining the 18 subcategories but removing the five overarching categories would simplify the code hierarchy without losing the benefit of having a well-organized and grounded classification.

Furthermore, the Study 1 super codes were defined as a contextual abstraction of groups of meanings represented by groups of Study 1 codes, while the codes themselves (forming the bottom layer of the code hierarchy) represented meanings and were very close (verbally) to the source data. Therefore, it was considered appropriate to retain the super codes rather than the underlying granular codes; removing the codes would not limit the thematic analysis provided that the super codes' descriptions were clear and explicit. The rest of the analysis process is explained next.

6.4.1 Setting up the NVivo project

First, the transcript files were rechecked for consistent formatting and they were then imported into NVivo as internal sources (NVivo project *dataround*2, folder Sources/Internals/Study2Data). Applying the auto code feature, the data were rearranged so that all answers pertinent to a main interview question were gathered together (including the additional questions asked by the researcher). Second, the Study 1 code hierarchy (Appendix O) was reorganized (flattened) as signalled above:

1. The category level was removed;
2. The subcategory level was retained and the term study category rather than subcategory was used;
3. The code level was removed;
4. The super code level was retained and the term study code was used rather than super code;
5. The super code descriptions were renamed study code descriptions;
6. The subcategories LIMITATIONS and OPPORTUNITIES were renamed TECHNOLOGY LIMITATIONS and TECHNOLOGY OPPORTUNITIES, respectively. The resulting code hierarchy was named Study 2 Initial Codes (shown in Appendix R).

6.4.2 Iterative interpreting and coding, Cycle A

Following the experience of coding the data in Study 1, the researcher decided to start the analysis by creating a comprehensive but broad picture of the data, in order to obtain an initial understanding of the text, and then continue with identifying meanings and coding within the groups emerging from the broad picture. Thus, the data analysis was conducted in two cycles. First, data were explored and coded deductively (cycle A, described in this subsection), then coded inductively in a series of iterations (cycle B, described in the subsections following). The process is depicted diagrammatically in Figure 6-3.

As a method that lays the foundation for a more detailed coding and analysis in subsequent cycles, holistic coding (Saldaña, 2012, pp. 142-144) was selected as the coding approach in Cycle A. Holistic coding involved reading and interpreting the data in order to identify segments that could be classified under one or more of the categories in Study 2 Initial Codes. To facilitate the process, a set of empty nodes named after the categories was created in Nodes/Study2Codes (NVivo project *dataround2).*

Coding started with the responses to question 10, chosen as it was likely to contain relatively straightforward, easier to interpret text and therefore, suitable to master the coding technique as applied in NVivo. All interview data were read, interpreted and coded systematically. Texts that could not be interpreted as belonging to one of the existing categories were gathered under new nodes in the same folder.

Figure 6-4 shows a portion of participant NZInt2's interview transcript coded under SERVCE MARKET. NVivo does not provide a reference to the location of the coded data segment within the interview transcript, therefore, further in the chapter data quotes are referenced by the name of the file containing the participant's interview (the same as the participant's ID). A data excerpt can then be traced within the interview using the line number pointing at the text segment as it appears in the participant's transcript (Appendix Q). The screenshot in Figure 6-5 illustrates this option - the highlighted text can be found in Appendix Q, Interview NZInt2, at or around line 844 (shown at the bottom of the screen).

Generally, the questions asked by the researcher were not coded as meanings were constructed based on each participant's perceptions, with the researcher's utterances considered "functional rather than substantive" (Saldaña, 2012, p. 16). Where meaning

was created in an interactive dialogue with the researcher, the researcher's question or comment was kept alongside the interviewee response, to provide the context needed for interpreting the meaning (also recommended by Saldaña). An example is shown in Figure 6-6 (where a researcher's comment was retained to preserve the reference to "smaller provider").

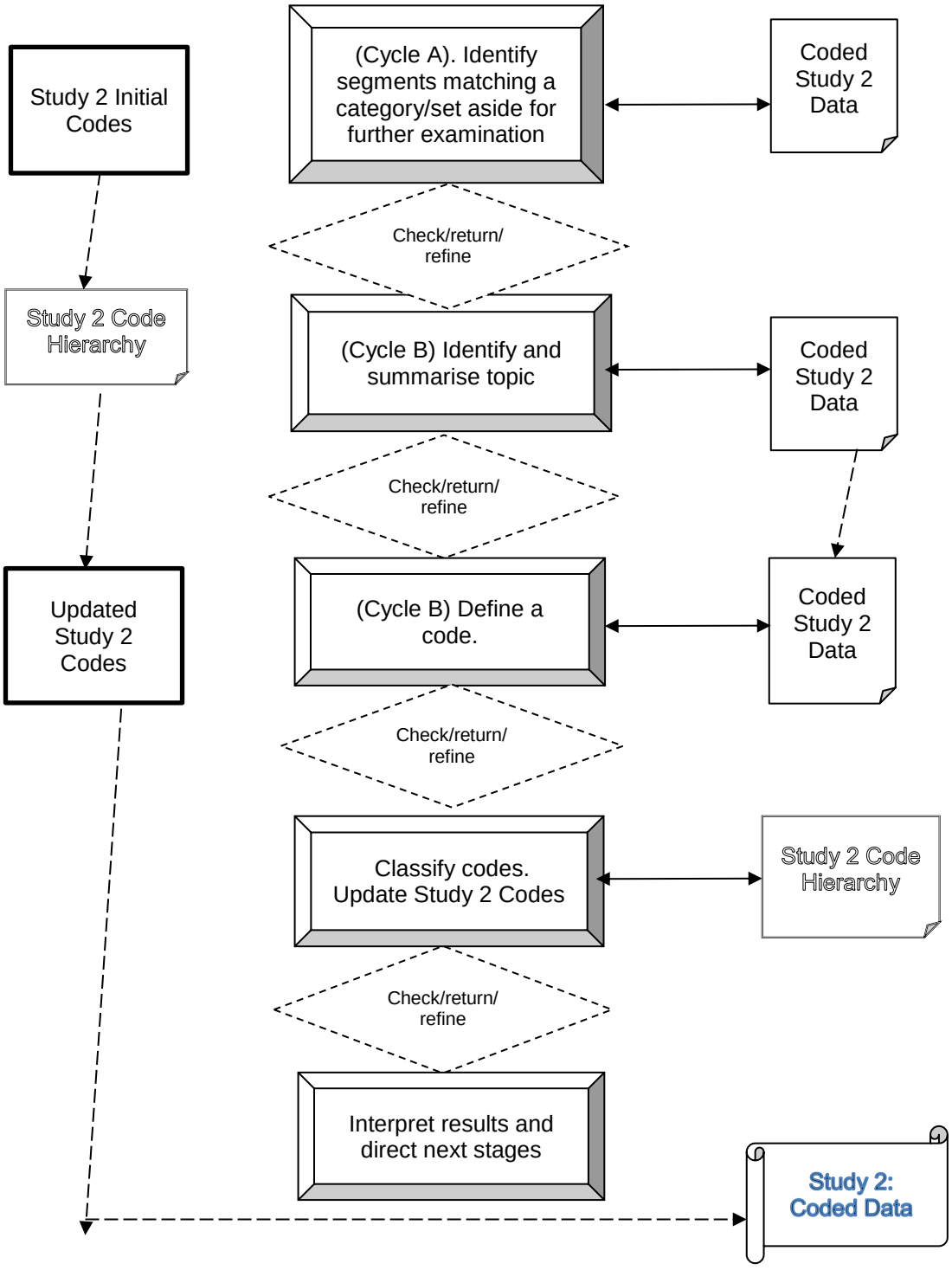

Figure 6-3. Data coding (Stage 1)

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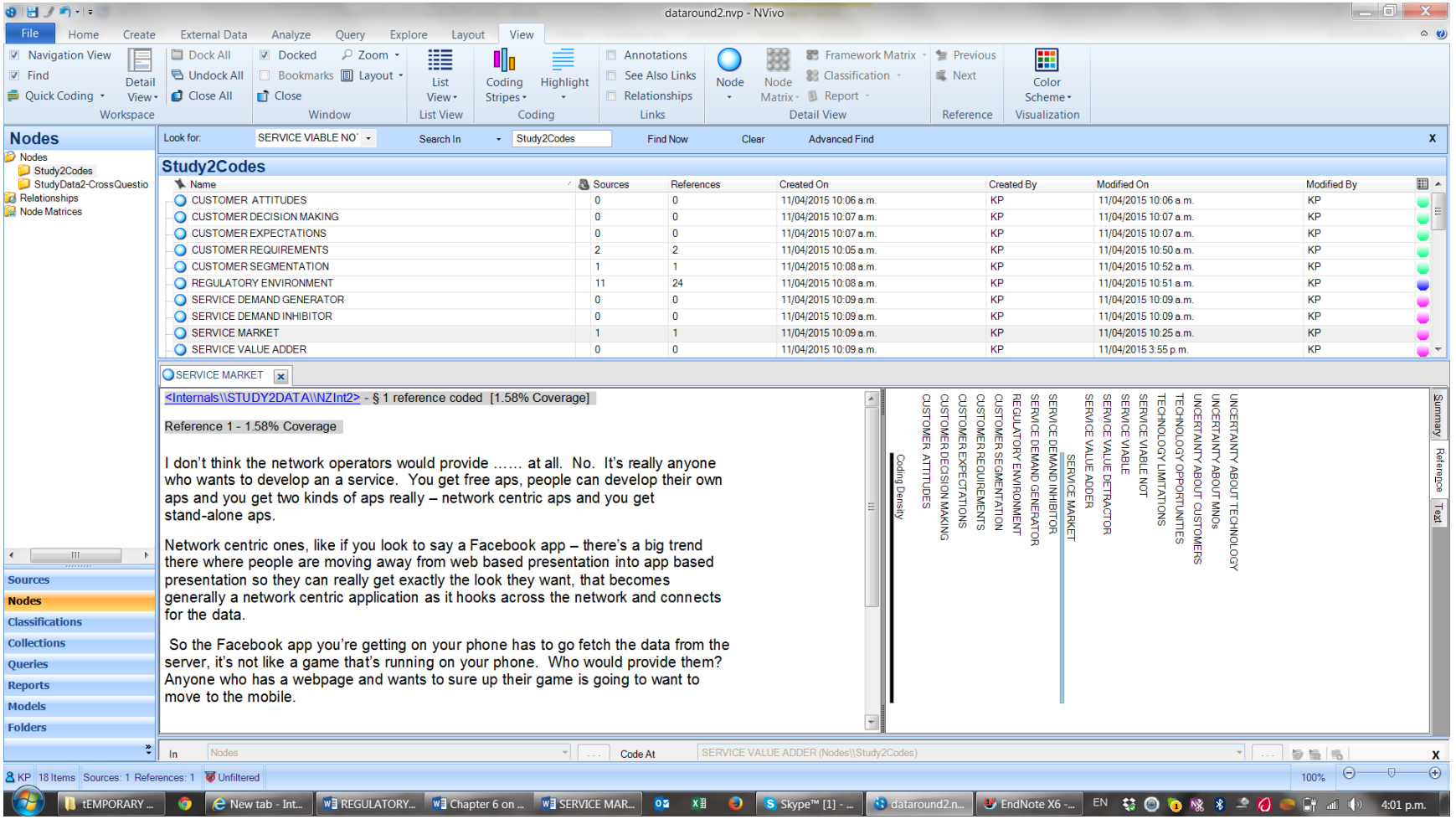

Figure 6-4. Node SERVICE MARKET containing a response from one participant's interview

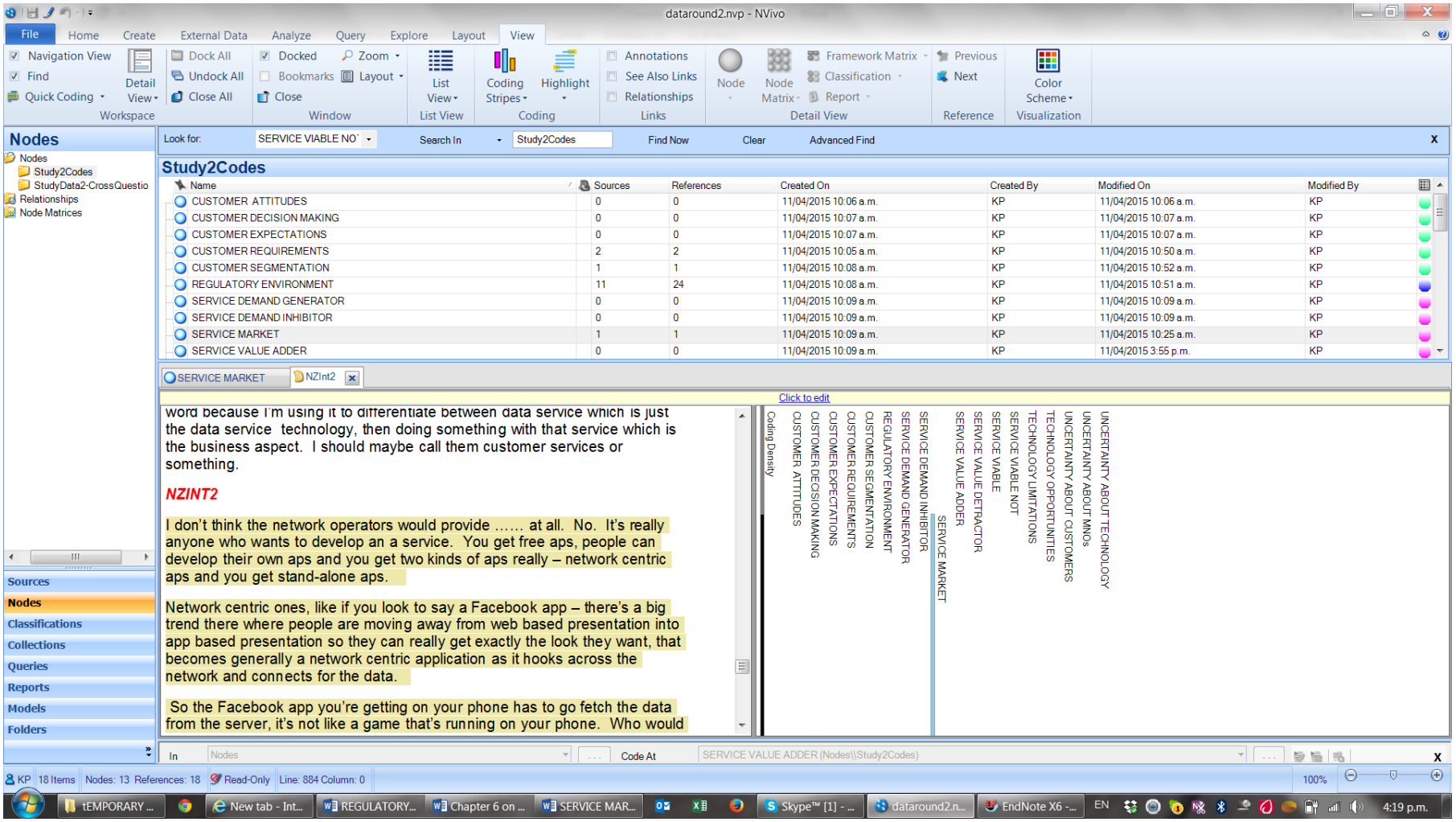

Figure 6-5. The text coded in node SERVICE MARKET highlighted in the interview transcript (with a reference to line 884)

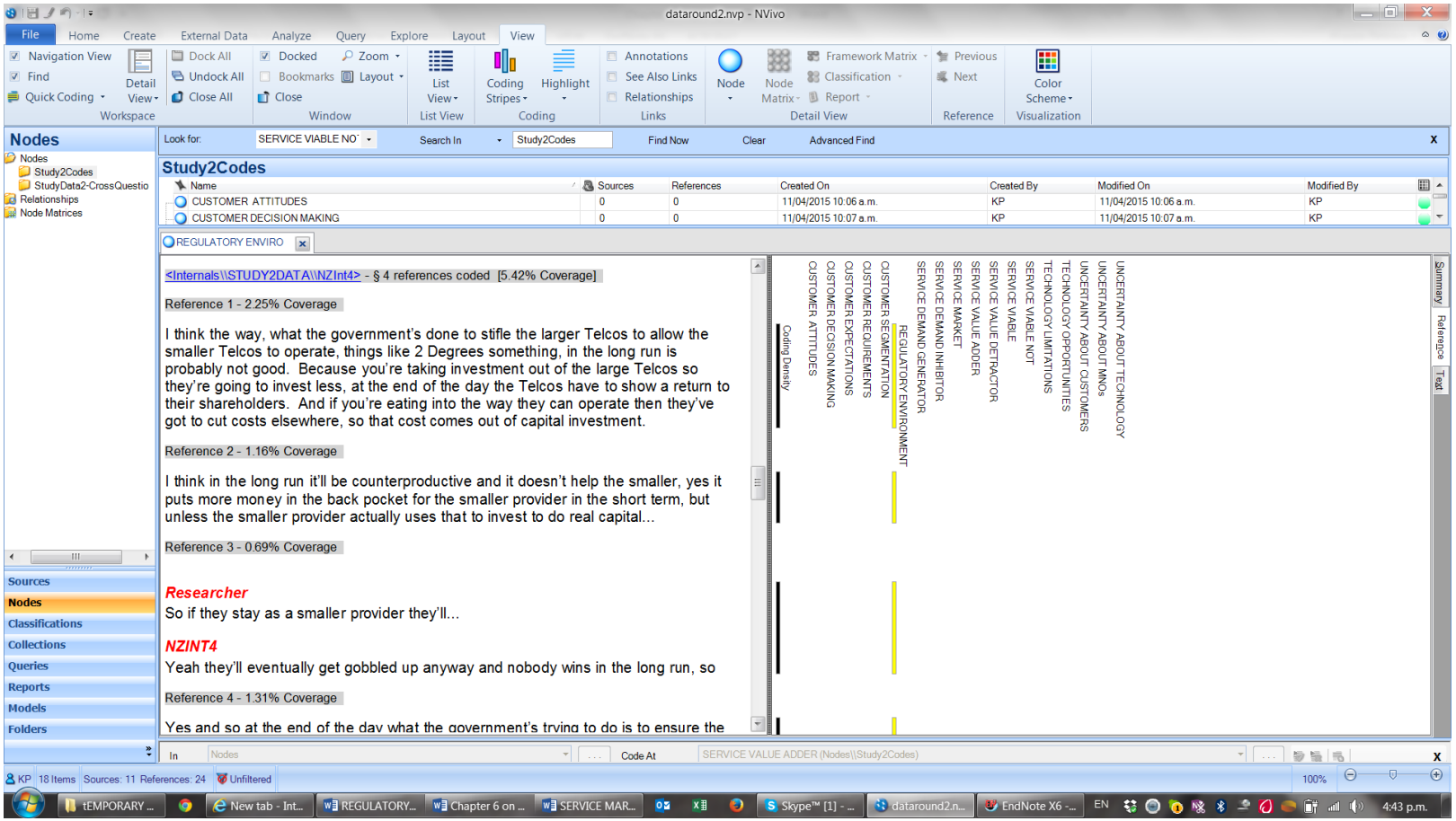

Figure 6-6. A researcher's comment coded alongside with NZInt4's response, in node REGULATORY ENVIRONMENT

Next the researcher coded the responses to Question 6, which was expected to generate remarks related predominantly to ATTITUDE but also to other categories. The graphic representation of the data set after coding the responses to questions 6 and 10 is shown in Figure 6-7.The coding continued with the researcher examining the rest of the responses in a similar manner to that just described.

The final outcome of the cycle was an initial, rather rough (or at least broad or high-level) picture of clusters of meanings organized in 22 categories: 18 existing and four new (Business customers, Customer input, Service vs application, and Best service). A visual representation of this initial categorization can be seen in Figure 6-8.

The data depicted in Table 6-6 shows the relative density of the coding in terms of the numbers of coding references and numbers of words, and the relative spread of the categories across the sources. (These data were obtained using the node summary report tool in NVivo.)

As the deductive coding cycle leveraging the adapted Study 1 code hierarchy was primarily intended to organize the data for the subsequent inductive coding it was not deemed necessary to involve a second coder. However, the researcher discussed the outcomes, and especially the emergence of new code categories, with her supervisors.

Table 6-6. Coding categories at the end of Cycle A

Category	Number of sources	Number of references	Number of words coded
CUSTOMER ATTITUDES	12	26	2213
CUSTOMER DECISION MAKING	12	27	2533
CUSTOMER EXPECTATIONS	12	25	4048
CUSTOMER REQUIREMENTS	12	49	4423
CUSTOMER SEGMENTATION	11	34	3458
REGULATORY ENVIRONMENT	12	27	3184
SERVICE DEMAND GENERATOR	11	17	1663
SERVICE DEMAND INHIBITOR	6	7	548
SERVICE MARKET	13	72	8205
SERVICE VALUE ADDER	13	54	5358
SERVICE VALUE DETRACTOR	9	16	1193
SERVICE VIABLE	7	9	1869
SERVICE VIABLE NOT	13	41	3584
TECHNOLOGY LIMITATIONS	3	6	867
TECHNOLOGY OPPORTUNITIES	5	8	879
UNCERTAINTY ABOUT CUSTOMERS	4	5	381
UNCERTAINTY ABOUT MNOs	3	3	257
UNCERTAINTY ABOUT TECHNOLOGY	3	3	288
Business customers	1	3	176
Best service	2	2	199
Customer input	6	10	1484
Service vs application	1	1	122

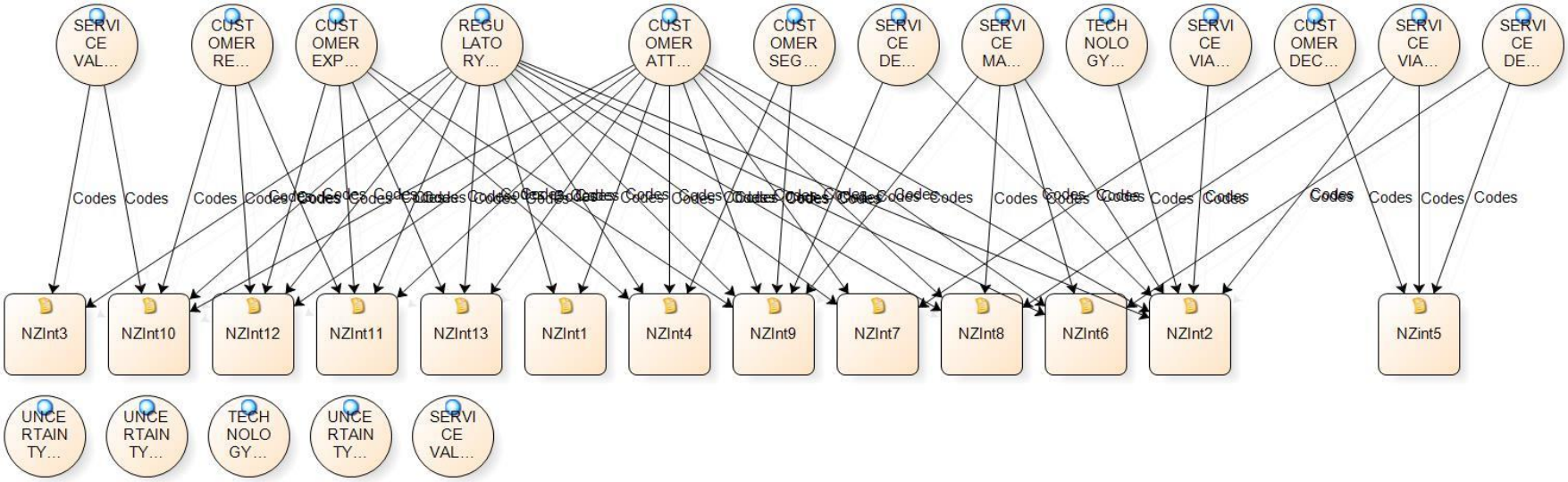

Figure 6-7. Text coded into categories (Questions 6 and 10 only)

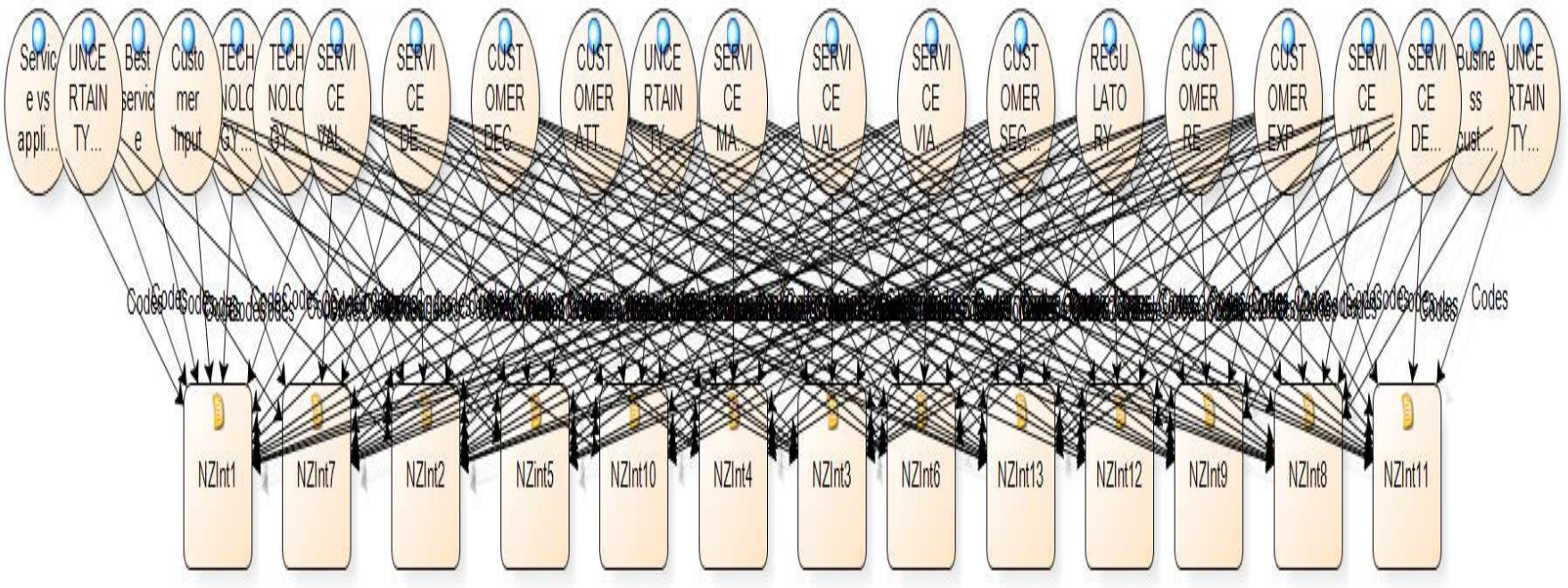

Figure 6-8. Text coded in categories at the end of Cycle A

6.4.3 Iterative interpreting and coding, Cycle B

The objective of the coding in Cycle B was to create a detailed representation of the data set that could be used later to identify and define the themes emerging from the data. The researcher first used descriptive coding (Saldaña, 2012, pp. 87-91) followed (where appropriate) by nested coding (or sub coding) (ibid, pp. 77-80). Descriptive coding is an inductive coding method where the code represents a summary of the topic of the data segment; the code label reflects the summary, but not necessarily the particular language used; it prepares the text for further thematic analysis as it allows for a reasonable reduction of the text while keeping the codes relatively close to the data. Nested coding serves to enrich an existing code by detailing its important aspects and so supports the development of a comprehensive code hierarchy.

During this cycle the data coded into each of the existing category nodes were (re-)read and (re-)examined in order to identify meaningful topics. To allow for flexible further iterative coding (and recoding), it was decided to create a series of consecutive folders representative of the iteration steps, with the latest folder representing the most recent state of the coded data set. After several trials a coding protocol emerged (as enumerated below); it was followed throughout the coding process. The first folder in the series was Study2CodesCycleB. Subsequent folders were named simply CodesB2, CodesB3, and so on.

1. A not coded yet category node from the latest folder containing the coded data set was selected and copied to the next folder to become current (e.g., Regulatory environment from Study2Codes to Study2CodesCycleB)[84];
2. The data excerpts gathered under the category were examined and coded by the researcher, identifying emerging descriptive codes and storing them as child nodes to the parent category node. Once all text in a category was coded, the coding was revised and refined. To illustrate, Figure 6-9 and Figure 6-10 show how the category Regulatory EnvironmentS2 changed from one iteration to the next[85]. Where emerging meanings supported it, an appropriate super code from the Study 1 code book was used (e.g., Expectations for appealing service design

[84] In Cycle B and onwards, category nodes were renamed to contain the suffix S2 (for Study 2), e.g., Regulatory environmentS2, Service marketplaceS2.
[85] Initially the researcher considered it would be useful to indicate whether an emerging inductive code was similar or nearly identical to an inductively developed code in Study 1 and used # in the coded label to denote *similar*, ## to denote *nearly identical*. This was discontinued as it became unworkable.

under category Customer expectationsS2, Service needs to be convenient under category Customer requirementsS2, and some others);

3. If the category contained a relatively large amount of data (5-6 pages or more) the coding was printed out, re-examined and marked up on paper, then the necessary changes were made in NVivo. The labels and the definitions of the descriptive codes were stored in NVivo (an example is provided in Figure 6-11);
4. Where applicable, the descriptive codes were enhanced by developing a nest of associated subcodes in order to add explicit detail to the code hierarchy and to facilitate further analysis. In order to keep nested codes close to the meanings identified, their labels were self-explanatory (as per the examples provided in Figure 6-12);
5. Once all data excerpts in a category were coded all previously examined categories were also re-examined in order to consider them again in light of the new codes. Where applicable, data were recoded, with categories and codes added, deleted or modified. Notes about the current state of the coding with a category were kept in the NVivo category node description (see Figure 6-12);
6. The process was repeated for another category. As coding progressed new folders were created in order to keep a stable fall back version of the coding: all coded categories (including descriptive codes and nested codes if any, plus the data excerpts) were copied to the new folder, and a new (empty) category node denoting the next category to be considered was created. Meanings that were deemed to be related to the study but that did not seem to fit any existing category well were gathered in a special category "To code later" and were re-examined periodically to assess their ongoing relevance and fit.

To illustrate, the screen shot in Figure 6-13 shows an early mapping of the descriptive code **Customers creators** to the associated data references in category Customer inputS2, with the coloured vertical stripes "pinpointing" the code attached to the meaning. The data excerpts were extracted originally from NZInt7 and NZInt13's responses (interview questions 9 and 12). In Cycle A, the data were gathered under category Customer input. At the current iteration (CodesB3) the data were coded with the descriptive code **Customers creators,** with the highlighted text belonging to two codes – **Customers creators** and **Customers enabled**. As such coding may become potentially confusing the researcher used it with caution and only when necessary for the purpose of preserving meanings that would be lost otherwise.

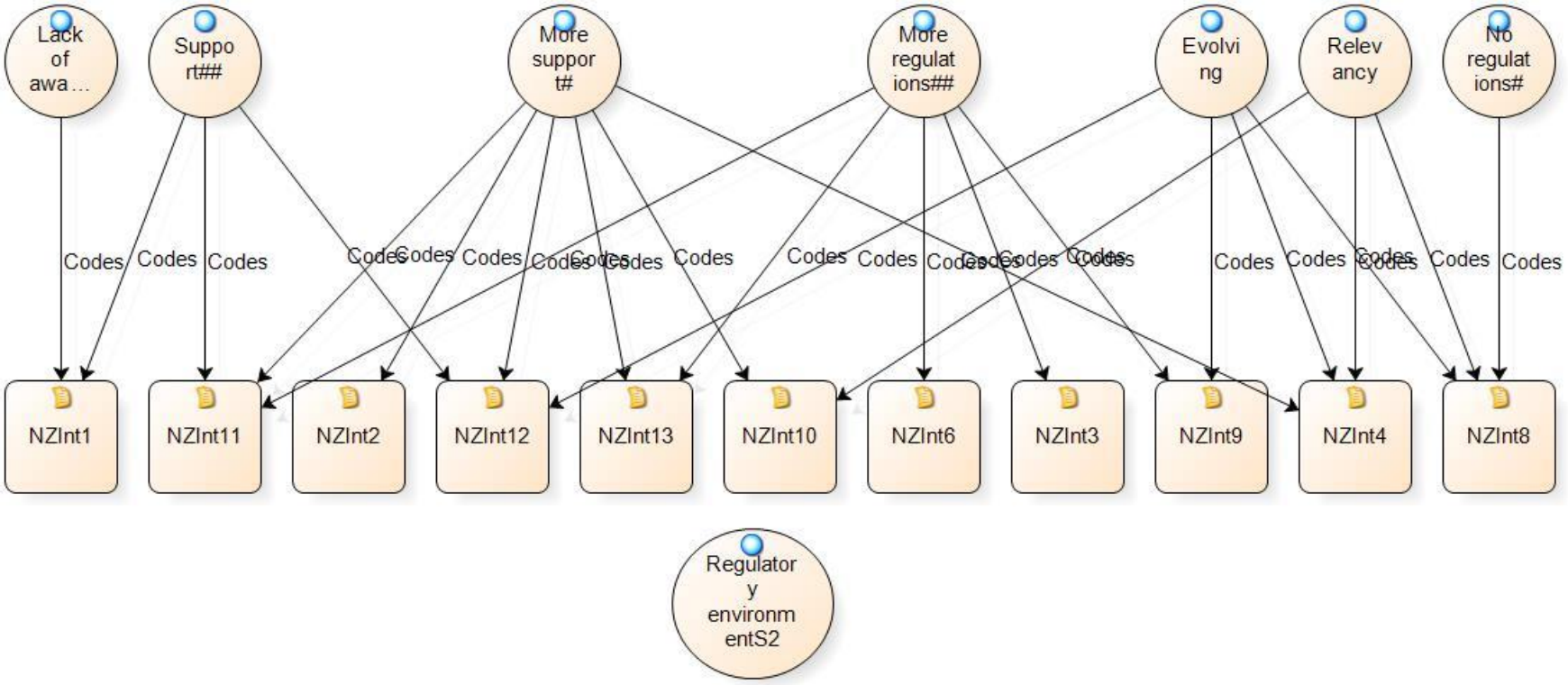

Figure 6-9. Category Regulatory EnvironmentS2 comprising descriptive codes Lack of awareness, Support##, More support#, More regulations##, Evolving, Relevancy, No regulations#

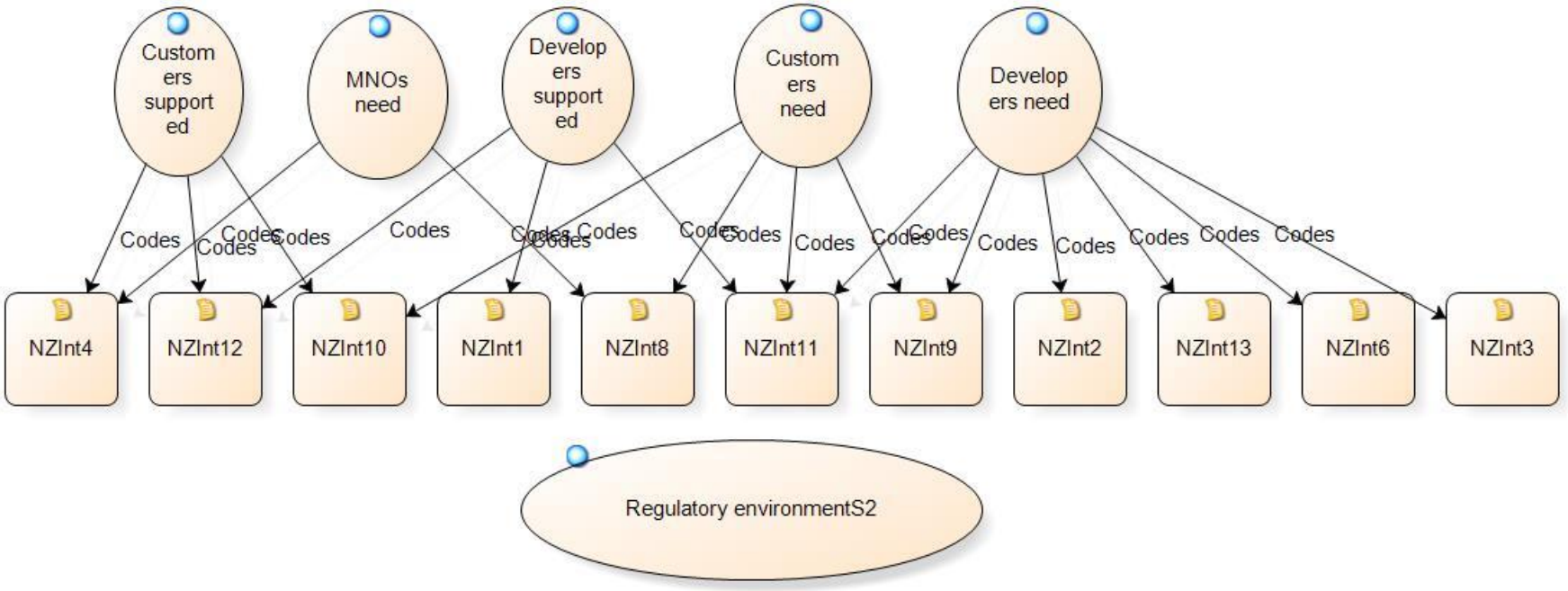

Figure 6-10. Category Regulatory EnvironmentS2 – next iteration (comprises descriptive codes Customers supported, Customers need, Developers supported, Developers need, MNOs need)

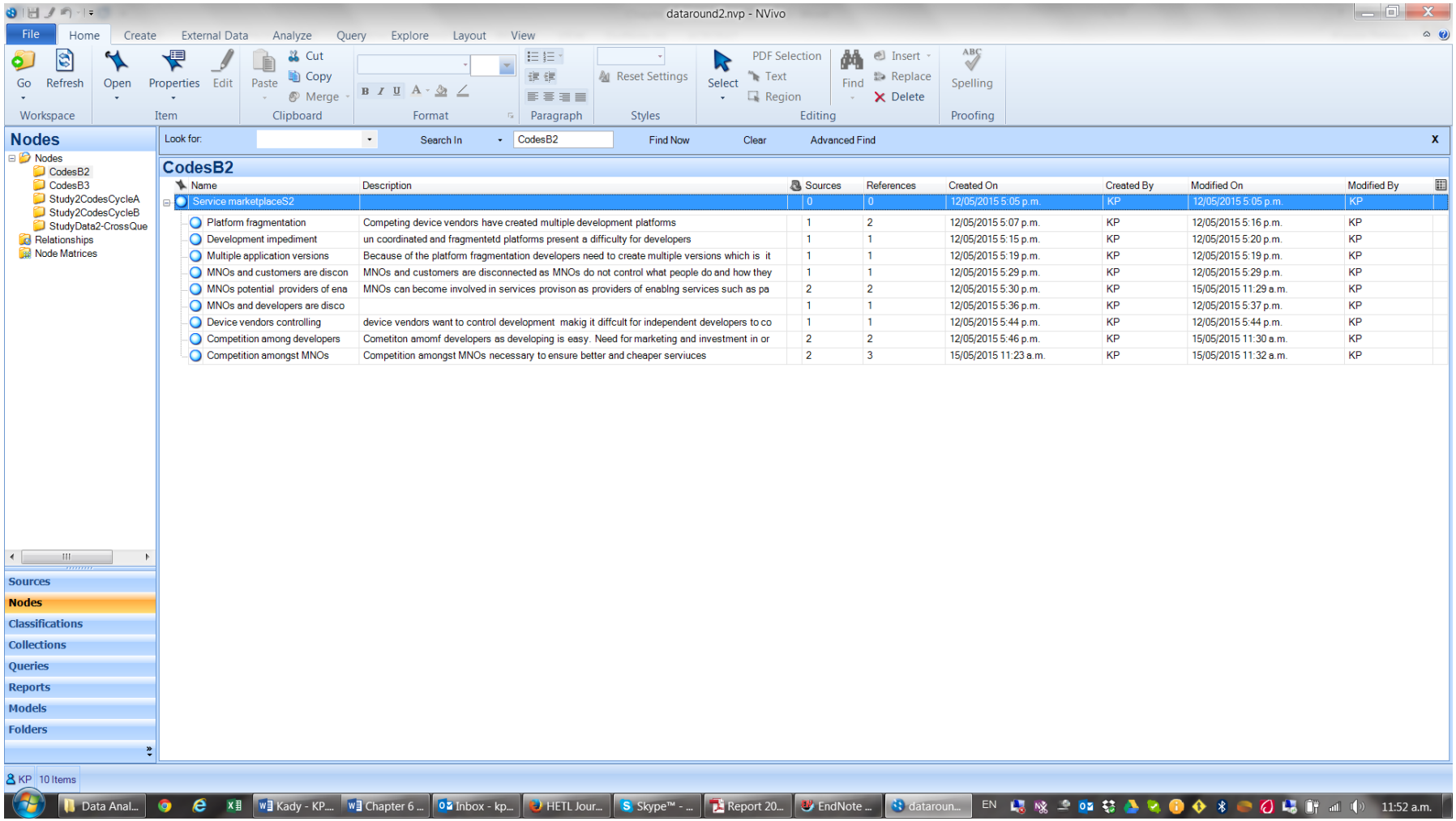

Figure 6-11. Intermediate code definitions in category Service marketplaceS2 (iteration CodesB2)

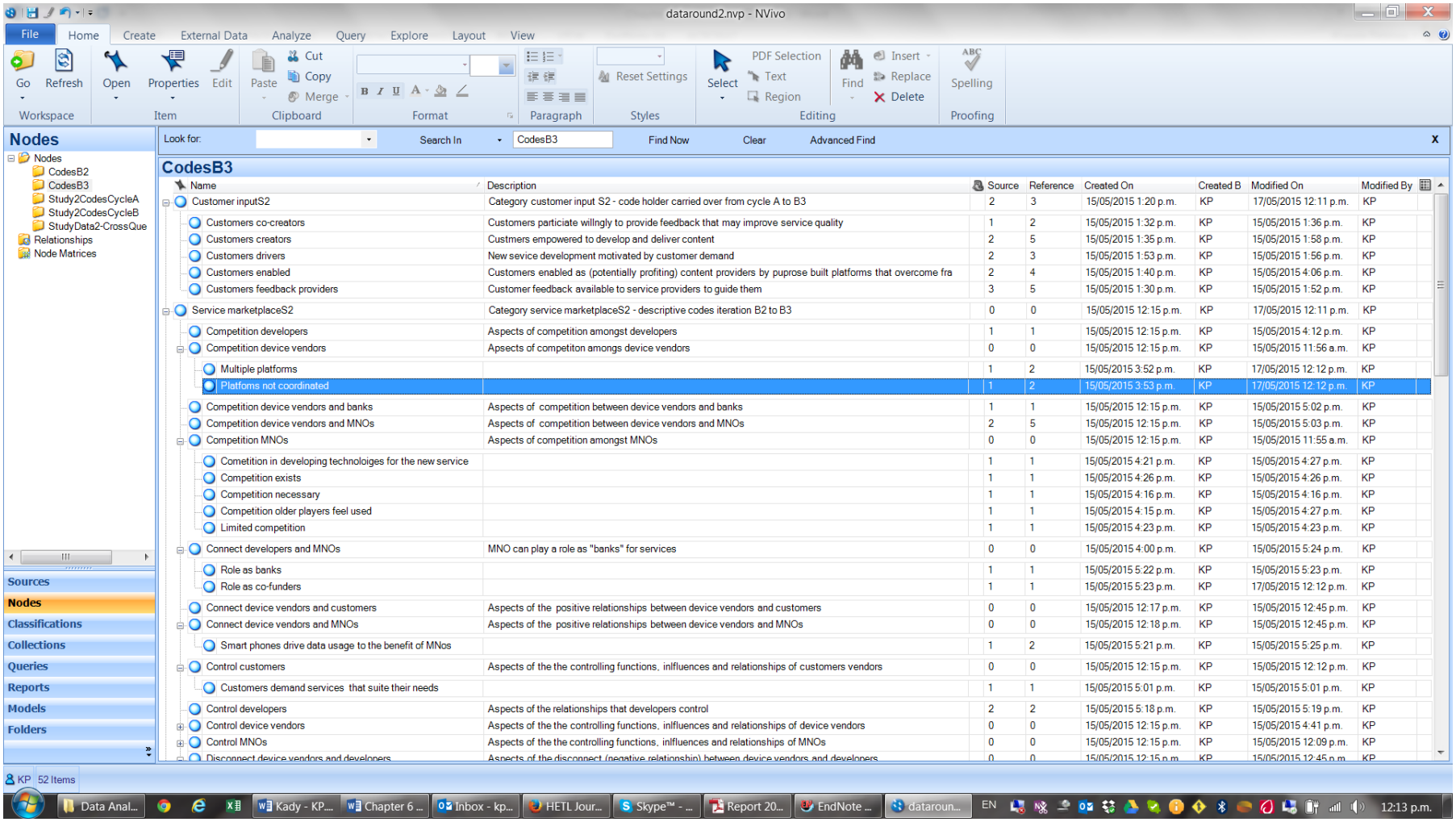

Figure 6-12. Examples of descriptive codes within a category (e.g., Customer inputS2) and descriptive codes expanded with nested codes (e.g., Competition device developers in category Service marketplaceS2) (iteration CodesB3)

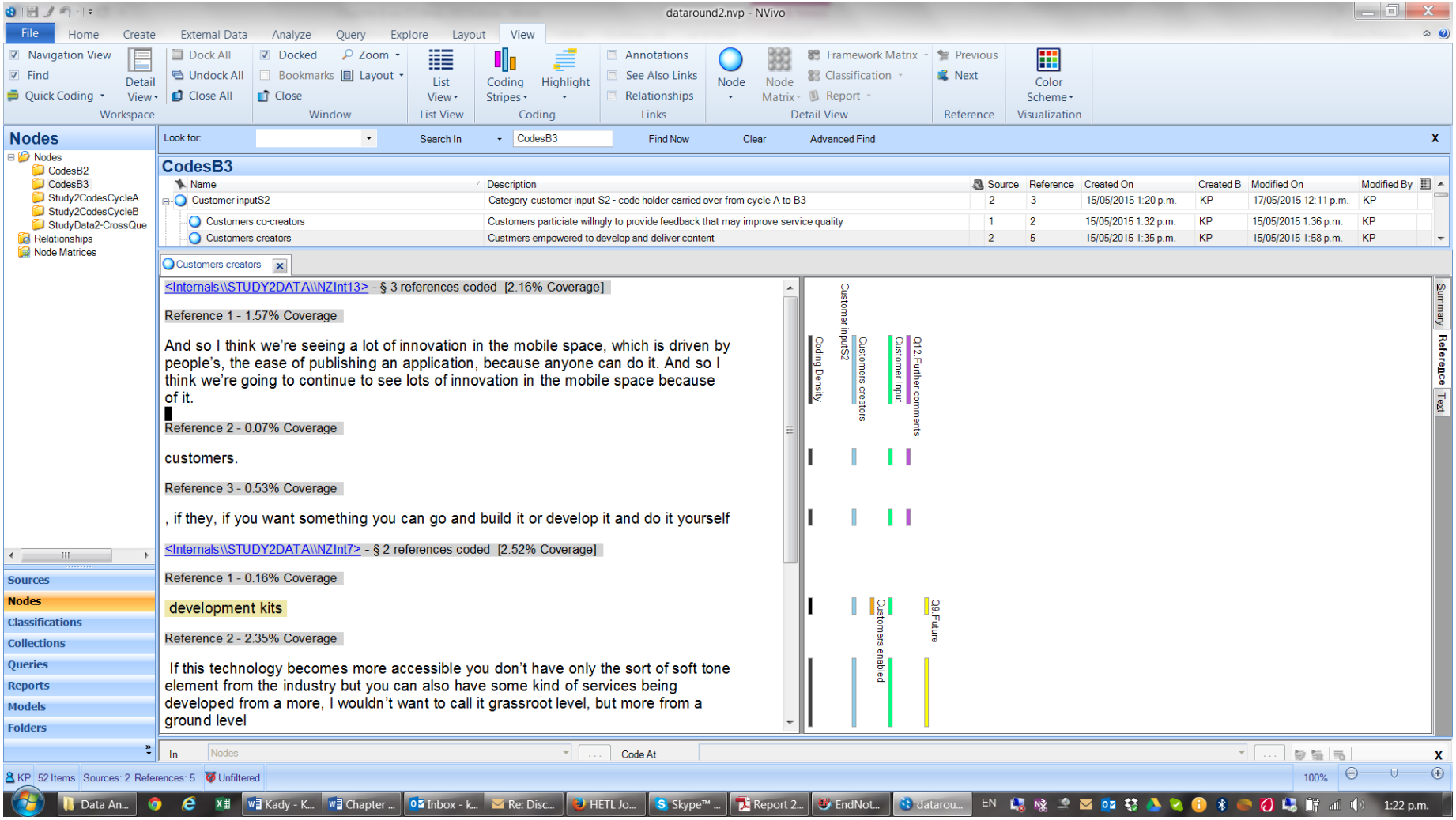

Figure 6-13. Code Customers creators: definition and supporting data excerpts

Deploying a multiple folder model as just described was based in part on the researcher's experience in Study 1, where consecutive spreadsheets were used for the same reason – to preserve the audit trail and to allow for "ease of coding", especially important for inductive coding where data may be re-examined and recoded multiple times. NVivo provided good support for the approach as the relevant coded data set (codes and associated meanings) and code hierarchy (categories, descriptive codes, and nested codes if any) were available as reports or on screen at any stage of the analysis, and were stored persistently as internal documents. Overall the process was highly iterative and involved multiple passes through the data on screen and through the reports produced by NVivo, with each pass involving the researcher reading, interpreting, coding and recoding data excerpts. As NVivo offered a gamut of tools that could be used to keep track of the process (e.g., aggregating, encoding, highlighting) there was no need for manual record management.

That said, the researcher also used pen and paper to create diagrams, provisional mappings, tentative coding and groupings to support the analysis, following a process similar to that used successfully in Study 1. The researcher kept notes about provisional code relationships that could be used later to define themes emerging from the data, and notes about data excerpts that were excluded from further analysis, or whose coding was postponed. For example, the statement: *So while my work has changed in terms of its subject matter to a certain extent as a result of the mobile initiative developments in the field, I am switching in my career essentially from servicing a corporate software need to serving a personal software need* (NZInt1) was excluded from further consideration on the grounds of it being a personal account rather than an expert's opinion. However, a preceding sentence in the same response (*From my perspective software always is providing a service whether it is providing it on a mobile platform or whether it is providing it from access to the internet or even if it is just something purchased at a store – carried in a shrink-wrapped box and installed on a computer somewhere or a laptop. It is still is essentially a service that is being rendered by the software, it's the way I view it)* was moved to a node under the category "To code later" as being potentially relevant to the investigation.

Two examples of intermediate outputs illustrate the process. The first example (Figure 6-14) shows a relatively complex category (as developed at iteration CodesB4): Service marketplaceS2, composed of 21 descriptive codes, 18 of which with nested codes. Table 6-7 illustrates the content of the descriptive code Competition MNOs and its set of

nested codes. The second example (Figure 6-15) provides the associated data and the structure of a "simpler" category (no nested codes): Customer inputS2 with six descriptive codes (iteration CodesB5). These two quite different examples serve to illustrate the somewhat uneven nature of qualitative data coverage that may result when utilizing expert interviews.

The coding of the entire data set was completed at iteration CodesB8. The structure of the NVivo folders that were used to preserve snapshots of the iterative process is shown in Figure 6-16. The folder Code taxonomy and data dictionary under STAGE 1 DOCUMENTATION contains subfolders within which the intermediate versions of the coded data set and the code hierarchy were stored as Microsoft® Word documents[86].

6.4.4 Finalizing the coding, Cycle B

As a means of providing a degree of independent validation of the coding a highly qualified and experienced qualitative data analyst[87] reviewed the coded data (cycle B, midway through iteration CodesB6) and examined the coding for consistency and appropriate representation in NVivo. The expert produced a written report (Appendix S) in which the thoroughness of the coding and the attention to the organization of the coding iterations in NVivo were noted positively. Also noted was the relatively high number of NVivo nodes that was causing significant fragmentation, and the need to add formal descriptions to all bottom-level child nodes.

The report was discussed with the thesis supervisors and options to reduce the code fragmentation were considered. As the coding had been almost completed by the time the report was produced it was considered more appropriate (and less risky) to examine and consolidate the coding once the whole data set was coded (i.e., in iteration series CodesB9). The consolidation aimed to reduce (where appropriate) the overall number of codes by ensuring that data interpreted as pertaining to the same topic were indeed gathered under the same category, in order to prepare the coded data set for the next stage of the analysis (identifying emerging themes). The protocol followed is described below.

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[86] The documents were generated using NVivo reporting tools (Coding Summary by Node report and Node Structure report), exported as .docx files, and imported back to the NVivo project as internal sources.

[87] Dr Lyn Lavery, Director, Academic Consulting Ltd., www.academic-consulting.co.nz . The researcher sent a formal reply to Dr Lavery outlining the actions taken, with which she was in agreement.

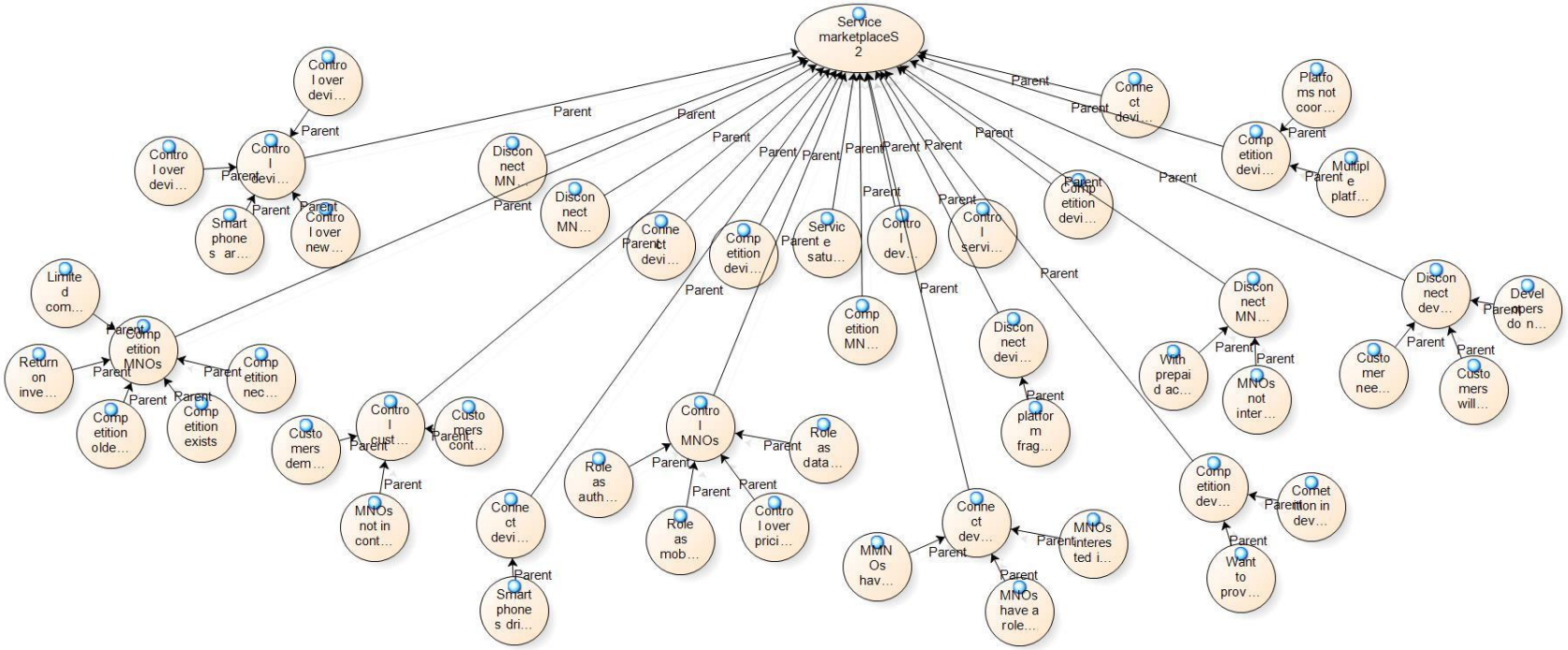
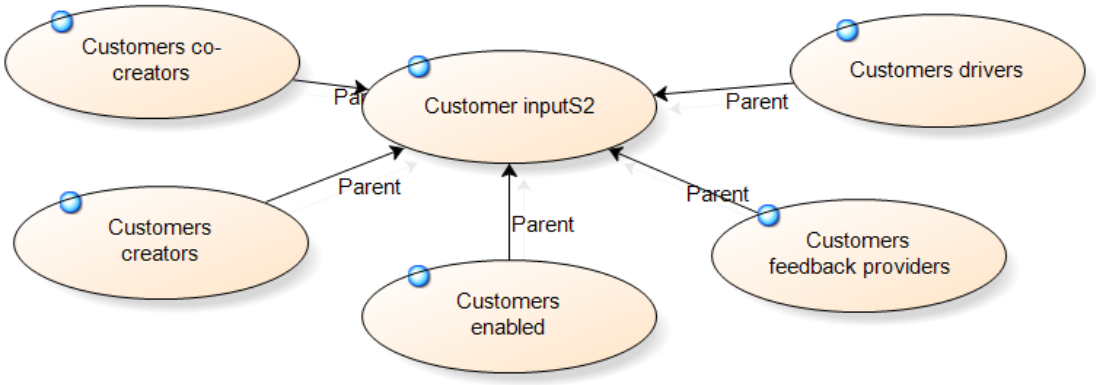


Figure 6-14. Category Service marketplace at the end of iteration CodesB4

Table 6-7. Descriptive code Competition MNOs (iteration CodesB4)

Category: **Service marketplaceS2:** Meanings related to players and relationships between them	
Descriptive Code: ***Competition MNOs:*** *Aspects of competition amongst MNO**s***	
Nested codes & data excerpts	
Competition exists	<Internals\\STUDY2DATA\\NZInt10> – § 1 reference b*ecause everyone's trying to outdo each other. I mean we released the new mobile plans recently, and I'm just, I'm waiting for Spark and Vodafone to follow, because they'll go, "Oh shit, we can't be out priced by 2degrees." So we're constantly trying to better the rivals.* <Internals\\STUDY2DATA\\NZInt13> – § 1 reference *Well again it's not, there's a lot of competition in that market now as well. So it used to be where there was, maybe where there was a sole network operator, they don't have the dominance now that they used to have because there's a lot of competition in the market for providing that service* <Internals\\STUDY2DATA\\NZInt6> – § 3 references Reference 1: *There are cell sites all over put up by one operator. There are also similar cell sites in the same neighbourhood by another operator out to compete (0:25:30.3). All cell site are wired to a network, these are wireless, but from the base to this there's a wired system. These are called backhauls, the more and more users get between these cell sites the more bigger pipe you need here. It's not so simple I mean, I'm putting it in very layman terms, there are several controllers that control different things, then the backhaul comes into play. So the more data requirements are there, voice is very minimal requirement, how many hour time you talk it's very little minimal bandwidth requirement, it's the data that requires bigger bandwidth.* *So today Telecom in this country, as like in the AT&T in the USA and a few others in Telstra in Australia, have a backhaul of one gig pipe, just raw pipe from here to each one. One gig is more than sufficient for each, it probably will become five gigs in another two, three years, six years. Most ones like Vodafone and others have less than 250 meg backhaul. So what happens is when you're using ten services of a particular type on this network on the same device, iPhone, you'll find that you're able to reach Telecom network faster and feedback faster to you, because ten of you are using the one gig haul.* Reference 2: *The same ten of you are using the 250 meg backhaul that much slower it is because responses. So that's the investment, that is the technology obstacle, so this is one basic problem that we're going to have. Second thing we're going to have is in the radio network controllers that are available to control the network.* *So they're highly sensitive, they fail often, how stable the network is, radio network controllers are the ones that control the network and they fail often. And they are both in this ground at the stable site and there is key locations in certain areas, because they're exposed all the time to the elements you don't know how soon or how quickly they can degrade.* *So like in a large, a country this size with so many cell phone users, Telecom when they started the XT two years ago thought they would have enough RNCs and put only one in the South Island and two in the North Island, and they didn't provide for …that's why they had that serious outage in the beginning.* Reference 3: *No not only South Island, even North Island, I mean south of Taupo everything failed because the North Island one RNC and the South Island RNC both failed. But an RNC approximately costs fifty million dollars, Vodafone on the other hand despite the fact that the other areas were bad they had six RNCs for this place.* *So quickly Telecom had to reinvest and …so there is different components in the network technology capabilities that keep coming. And in the meanwhile there's companies like Nokia and Alcatels suddenly bring better advanced technology to say, "We can do faster networks," so the backhaul one gig becomes redundant it's too little they need more, so it's a constant game*

Category: **Service marketplaceS2:** Meanings related to players and relationships between them	
Descriptive Code: ***Competition MNOs:*** *Aspects of competition amongst MNO**s***	
Nested codes & data excerpts	
Competition necessary	<Internals\\STUDY2DATA\\NZInt10> – § 2 references Reference 1: *What's most supportive is the cutthroat nature,* Reference 2: *So I think that supports the development and implementation of services, because they're constantly trying to get better and better and better. No one's resting on their laurels. When we had a monopoly and a duopoly, people rested on their laurels. So the existence of the three players* <Internals\\STUDY2DATA\\NZInt12> – § 1 reference *But as we know, it's very clear that if you don't have competition, you don't get the services, you don't get the prices.*
Older players feel used	<Internals\\STUDY2DATA\\NZInt12> – § 3 references Reference 1: *Well I suppose it's fairly straightforward, isn't it, I mean you've still got what's left of the incumbent and it's still the case that even though everything's been split up, Chorus is still the rump of that centralized infrastructure ownership. So they've always been the drag, if you like, on everybody else.* Reference 2: *And then of course the other major players which these days would be Vodafone, 2degrees, I suppose, in the mobile space, have been trying against that to do more in the market. But of course it is a problem, because those other players want to do that on the back of someone else's infrastructure. Someone else has put all the money into building the physical infrastructure. They bung up a few masts and sell a few phones and say, "Oh we want this full market."* Reference 3: *And of course, you can see why those who've been involved in building up a national government funded infrastructure for decades were not very happy about doing that*
Limited competition	<Internals\\STUDY2DATA\\NZInt13> – § 1 reference *Well I think, the difference between New Zealand and overseas is that there's probably a lot more competition and it's a bigger market, and here, although we have, we have limited competition* <Internals\\STUDY2DATA\\NZInt3> – § 1 reference *We're too small a place. Over the top players will kill us*.
Return on investment	<Internals\\STUDY2DATA\\NZInt3> – § 3 references Reference 1: *It's something we have, from the telecommunications perspective, is how do we try and monetize all of this bandwidth. Obviously we're building bigger networks with fatter and fatter pipes to carry more and more and more content but how do we make money and how to we try and get return on our investment?* Reference 2:*not just from the NZ perspective but International Broadband Forum last year, it was a big talking point. How do we monetize bandwidth? Broadband is exactly the same as mobile broadband. We're building more and more infrastructure but how do we get a return. We can't charge our end customers more for it.* Reference 3: *Everyone's expecting MFI and cellular phone, they're also getting data plan included. The problem is there's a real cost to providing that infrastructure and it is a massive problem and I don't think that the world understands how we decide what [inaudible 33.31] communications to keep building but at some stage*



Category:

Customer inputS2: Meanings related to the role of customers in service creation and provisioningDescriptive Code:

Customer feedback providers: *Value of customer feedback to service providers*

Data excerpts

<Internals\\STUDY2DATA\\NZInt13> - § 1 reference

One of the things that is specific to mobile application delivery, is instant customer feedback. And so I think that's, it's very important and a very useful tool in content or application providers being able to get response and feedback to the services and the, that they've put out

<Internals\\STUDY2DATA\\NZInt2> - § 3 references

Reference 1: *trying to get that feedback is quite hard on a mobile phone because people don't want to give you their phone number and it's very hard to get someone to enter stuff in using a keypad and to break their usage of it to give you feedback is very hard.*

Reference 2: *data about usage*

Reference 3: *We can actually see but it still doesn't tell you everything you need to know about a particular service, like what don't they like about it, how could it be improved and all those soft questions. It's very hard to get people to answer that. We've got another company in India that we use for testing. They're on the ground and they can give us some feedback but they're not necessarily from our segment. They're all programmers and a totally different cast that they have there.*

<Internals\\STUDY2DATA\\NZInt3> - § 1 reference

… clunky. I've actually provided some feedback on Facebook BNZ. When they asked for feedback on the application, I provided that via social media by Facebook, that I thought it was poor and these are the reasons I thought it was poor. I was giving the application provider feedback specifically.

Figure 6-15. Category Customer inputS2 with data excerpts for descriptive code Customer feedback providers (iteration CodesB5)

1. All descriptive codes were revisited and examined within and across categories and similar codes were aggregated where appropriate. The descriptions of the respective topics were amended or redeveloped and added to the NVivo project;
2. Where appropriate, nested codes were absorbed by an appropriate parent (descriptive) code and the meanings were aggregated. All remaining nested code labels were edited in order to ensure that the content of the associated meanings was explicitly represented in the label itself;
3. Content-related summary definitions were created for each category, replacing the draft descriptions that reflected the coding process rather than the category content;
4. For each category a linked memo was created that contained notes about the category, compared it if appropriate to a relevant category in Study 1, and flagged potential relationships between the codes within the category as well as with codes in other categories.

Examples illustrating the application of the protocol formulated above are provided in Table 6-8. In the first example, nine descriptive codes and one nested code were combined to create just two aggregated codes; in the second example, five descriptive codes and one nested code were combined into three codes. The definitions are explicit; the linked memos contain notes that may be of interest later.

As a result, at the end of iteration CodesB9 the fragmentation was significantly reduced and a more compact coded data set was created. Nested codes in all categories excluding Service marketS2 were subsumed by the appropriate descriptive codes. The organization and the readability of the coded data set was improved further by recoding category Service marketS2 data and splitting this “overloaded” category into three separate categories.

Two examples illustrating the structure and the content of the code hierarchy are shown in Table 6-9. The table contains two complete categories (Customer segmentationS2Final and Regulatory environmentS2Final) and includes the underlying descriptive and nested codes. Descriptions are provided for all categories and descriptive codes; as already noted, nested code labels are self-explanatory. The number

of sources (interview transcripts) and data excerpts supporting each descriptive (or nested) code are shown in the last two columns of the table, respectively[88].

Table 6-8. Reducing fragmentation and improving definitions

Iteration CodesB8	Iteration CodesB9 – pass 2 (numbers in brackets indicate number of NVivo data references)	Notes kept in linked memos
	Example 1	
Customer attitudesS2 • For customers less is more • Customers conservative • Apps trendiness • Customers distrustful of innovation • Customers distrustful of phones • Customers like mobile banking • Customers loyal to phone brand not to MNO brand • Customers interested in new services • Customers interested in connectivity **Service marketS2** • Control customers ○ Customers demand services that suit their needs	**Customer attitudesS2Final** *Summary of topics: Customers are perceived as both (i) conservative, and (ii) interested in innovation if it matches their requirements and meets their expectations* • **Conservative (15)** Customers tend to be conservative in the way they use new technology and somewhat distrustful of innovation • **Interested (9)** Customers are interested in new services; like these existing ones that suit their needs such as mobile banking and services that offer connectivity with others.	In S1 this category was similarly identified, as subcategory Customer attitudes of category Customers. "Conservative" in S2 matches four of the super codes in S1. The 5th code "Difficult" in S1 does not match S2. Only in part "Interested" in S2 has the same ring as in S1 ("choosy"). Overall customers perceived in a more positive light, possible link with some of the codes under customer inputS2.
	Example 2	
Customer inputS2 • Customers feedback providers • Customers co-creators • Customers creators • Customers enabled • Customers drivers **Service marketS2** • Control customers ○ Customers drive new service development	**Customer inputS2Final** *Summary of topics: Customers are perceived as (i)source of valuable feedback, (ii) drivers of service development, (iii) service co-creators empowered by the technology* • **Feedback (8)** Service providers value and rely on customer feedback that is facilitated by technology • **Co-creators (10)** Customers empowered to develop and deliver content and become service co-creators facilitated by technology • **Drivers (18)** New service development is driven by perceived customer demand as providers use technology opportunities to meet customer requirements, expectations, preferences	This category is new to S2. Shows the dynamics in the relationship between customers and providers as facilitated by technology; indicates active customer involvement as service co-creators, from more passive feedback to content development.

It can be seen that the total number of descriptive codes in the two categories was reduced to seven (compared to 15 in the previous iteration) while the number of nested codes went down to five (from 22 previously). Notably, two codes (one nested and one

[88] The number of data excerpts as shown in NVivo may be larger than the number of actual meanings due to the way the software handles splitting paragraphs and sentience when re coding.

descriptive) each supported by one reference only were preserved as the associated meanings were considered significant and relevant. (This also illustrates the principle of data retention based on meaningfulness rather than just frequency of occurrence.)

6.4.5 Cycle B summary

Overall the coded data set contained approximately 70% (39,211 words) of the text in the original interview transcripts[89][90]. The data were coded using 93 descriptive codes grouped under 19 categories, with seven descriptive codes containing nested codes (27 overall). The codes were supported by a total of 790 NVivo data references extracted from the 13 interviews.

Table 6-10 shows a summary of the analysis outcomes including category name/ description and number of relevant sources, descriptive/nested codes, and words associated with each category. The complete Study 2 code hierarchy (Codes-S2), comprising all category and code labels and descriptions (as at the end of Stage 2) is found in Appendix T. An NVivo generated report containing the fully coded data set was stored in folder B9, under Internals – STAGE 1 DOCUMENTATION[91].

[89] All counts were generated using NVivo reports. The total word count of the imported interview transcripts was 56,403 words

[90] The total word count of the coded data set includes 2273 words under "To code later".

[91] Due to its excessive length (over 200 pages) the report could not be included as an Appendix. An electronic copy is available upon request.

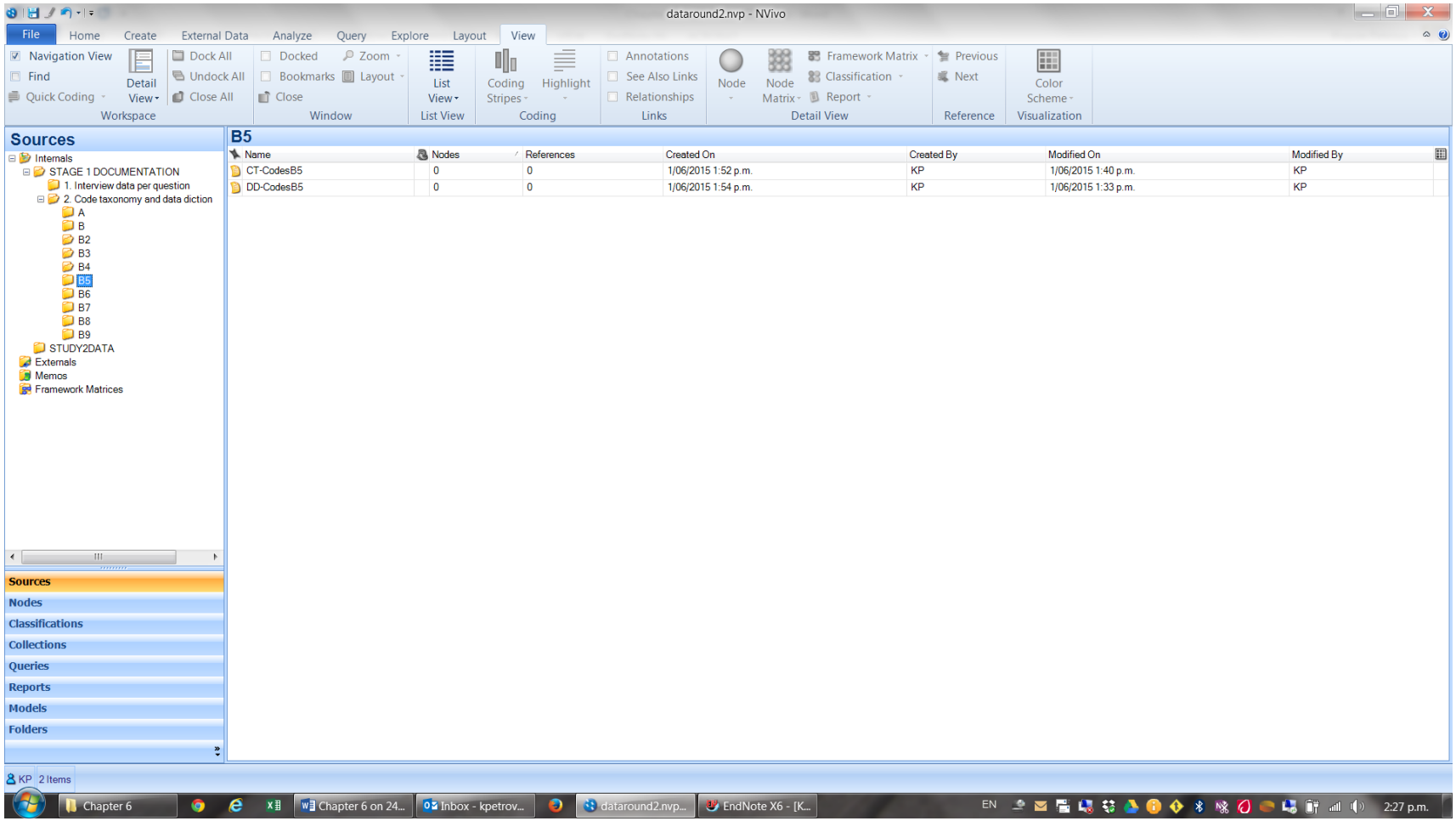


Figure 6-16. Study 2 documentation – storage organization

Table 6-9. Code hierarchy sample

Name	Description	S[92]	R[92]
Regulatory environmentS2Final		0	0
	Summary of topics: (i) Accessibility – while aimed first of all at giving customers choice and option regulations are seen as affecting negatively large MNOs and infrastructure owners; this may lead to a negative impact overall on the industry (lack of incentives to invest, capital decrease); (ii) Customer protection – regulations needed, need to be aligned with global trends, without heavy compliance costs locally; (iii) Regulations need to support service import.		
Customer perspective	At present customers are the winners as regulations aim to provide choice, decrease cost, ensure safety and privacy protection	0	0
Regulations (bandwidth) aim to provide best deal for customers		4	10
Regulations (security and privacy) aim to protect customers and customer rights		5	9
Provider perspective	Legislation ensures access to bandwidth enabling competition and ultimately customers benefit	0	0
Large MNOs affected negatively in terms of return on investment and income		2	5
Small developers may have high compliance costs (with customer privacy rights)		1	1
Regulations aim to provide best deal for customers		4	10
Global perspective	Local regulations cannot have a significant effect over globally provisioned services and should encourage service import and service development and provision export and import. Local regulations not restrictive.	6	9
Customer segmentationS2Final	Summary of topics: Multidimensional segmentation resulting in microsegments. Main segmentation factors are (i) Demographics; (ii) Specificity of requirements, (iii) Socio economic status.	0	0
Demographics	Age influences requirements and expectations; providers perceive differences between younger and older customers. Gender is not very pronounced as a segmenting factor	8	32
Micro segmentation	As a result of main factor interplay the resulting segments are relatively small (niche?)	1	1
Requirement specific	Specific requirements related to: (i) Personal characteristics (socio economic and demographic) which means that services need to be developed with different personas in mind, even for the same service such as banking; (ii) Occupation; (iii) Personal preferences based on earlier experience	10	14
Socio-economic status	Status has a two foiled influence: (i) Mostly different status leads to different service needs; (ii) Status may determine level of access to any service (but this is not too relevant to New Zealand)	4	8

[92] Here and further in the chapter: where used in table title rows, S denotes Number of sources, R denotes Number of data references, and W denotes Number of words

Table 6-10. Study 2 Categories at the end of Stage 1 (Cycle B)

Category name	Category description	S	R	W	Number of descriptive codes	Number of nested codes
01. CUSTOMER ATTITUDES S2FINAL	Summary of topics: Customers are perceived as both (i) Conservative, and (ii) Interested in innovation if it matches their requirements and meets their expectations.	9	24	964	2	n/a
02. CUSTOMER DECISION MAKINGS2 FINAL	Summary of topics: The factors playing a role when a customer decides to try and/or use a service include: (i) how much value the service provides for the money paid, and how much the service is needed; (ii) Is the customer aware of the service, is it recommended, and provided by a trustworthy provider, is it safe to use; (iii) is the service affordable; (iv) is the service of the expected high quality to be worth the money paid	12	93	3356	10	n/a
03. CUSTOMER EXPECTATIONSS2 FINAL	Summary of topics: Customers expect services to; (i) Bring clear value, (ii) Provide an enjoyable experience, (iii) Perform at very high standard, (iv) Be of higher quality compared to services offered via alternative channels	13	62	2485	5	n/a
04. CUSTOMER INPUT S2 FINAL	Summary of topics: Customers are perceived as (i) Source of valuable feedback, (ii) Drivers of service development, (iii) Service co-creators empowered by the technology	8	35	1645	3	n/a
05. CUSTOMER REQUIREMENTSS2 FINAL	Summary of topics: Customers require services that are: (i) needed and convenient; (ii) easy to use; (iii) supporting their everyday life, and/or their mobile lifestyle	12	66	2634	5	n/a
06. CUSTOMER SEGMENTATIONS2 FINAL	Summary of topics: Multidimensional segmentation resulting in microsegments. Main segmentation factors are (i) demographics, (ii) specificity of requirements, (iii) socio economic status.	12	55	2426	4	n/a
07. REGULATORY ENVIRONMENTS2 FINAL	Summary of topics: (i) Accessibility – while aimed first of all at giving customers choice and options regulations are seen as affecting negatively large MNOs and infrastructure owners; this may lead to a negative impact overall on the industry (lack of incentives to invest, capital decrease); (ii) Customer protection – regulations needed, need to be aligned with global trends, without heavy compliance costs locally; (iii) Regulations needed to support service import.	12	41	2172	8	n/a
08. SERVICE DEMAND GENERATORS2 FINAL	Summary of topics: Possible demand generators are: (i) mobile phone penetration, (ii) entertainment needs. To prosper services need (iii) encouraging environment, (iv) appropriate pricing models (free trials)	12	26	1391	5	n/a
09. SERVICE DEMAND INHIBITORS2FINAL	Summary of topics: Possible service demand inhibitors are (i) services not seen as useful and/or meeting a need, not continuing to meet the need; (ii) not seen as safe to use as safe to use	5	17	690	3	n/a
10. SERVICE VALUE ADDERS2FINAL	Summary of topics: (i) Lifestyle oriented,;(ii)simple, seamless, integrated; (iii) offered at no cost; (iv) use the unique features of mobile technology	12	52	2262	4	n/a

Category name	Category description	S	R	W	Number of descriptive codes	Number of nested codes
11. SERVICE VALUE DETRACTORS2FINAL	Summary of topics: (i) Free services may not be attractive to cautious customers who perceive them as less valuable compared to paid ones, and also hidden cost laden; (ii) data network service quality/cost makes using services not attractive	6	10	293	2	n/a
12. SERVICE VIABLES2 FINAL	Summary of topics: Service viability is affected by (i) Developing a significant customer base; (ii) Offering incentives to customers including merchants adopting mobile payment; (iii) Pricing services to be affordable and aligning them with market segments.	9	32	1935	6	n/a
13. SERVICE NOT VIABLES2FINAL	Summary of topics: (i) Inadequate business model, in a way the mobile channel is not yet well understood; (ii) Technology moving faster than businesses can cope with; (iii)	7	18	1144	4	n/a
14. TECHNOLOGY LIMITATIONSS2FINAL	Summary of topics: Identified limitations include (i) inherent device limitations, (ii) application layer protocol (HTTP) limitations, (iii) backhaul limitations	5	16	1085	3	n/a
15. TECHNOLOGY OPPORTUNITIESS2 FINAL	Summary of topics: (i) current and future functionality including GPS, NFS, camera, other specific capabilities; (ii) advanced application development environment	10	30	1842	5	n/a
16. UNCERTAINTYS2 FINAL	Summary of topics: Perceptions of uncertainty about: (i) innovation in services/technology, and (ii) customer preferences; (iii) Changing role of MNOs	11	22	804	3	n/a
17. SERVICE DEVELOPMENT AND PROVISION S FINAL	Summary of topics: (i) The main players have different attitudes towards customers and to service development; some synergies exist but more are possible; (ii) Innovation in services not straightforward any more, emerging economies next easy to reach market	11	52	3090	11	5
18. COMPETITION S2 FINAL	Summary of topics: (i) Strongest competition is amongst MNOs; (ii) To a lesser degree amongst service providers (have many opportunities), and device vendors (have established a global “near duopoly“); (iii) some competition between device vendors and banks, between MNOs and (static) wireless network providers	12	76	3576	5	16
19. CONTROLLING INFLUENCES S2FINAL	Summary of topics: (i) MNOs control pricing, have opportunities to play new roles; (ii) Device vendors rule the market as their product drives it; want to keep apps and service development to themselves as service demand drives in turn smart phone adoption	11	63	3144	5	6
TO CODE LATER[93]	Meanings that are potentially useful but have not been used it in a theme and are not in a mainstream category	10	29	2273	11	2

[93] The category “To code later” was used as a repository of meanings that did not fit under any of the current categories but could be used in subsequent iterations.

6.5 Study 2: Identifying Emerging Themes (Stage 2)

Overall, 18 emerging themes were identified at this stage of the study, using the sane process as in Study 1 (described in detail in Chapter 5). The descriptive codes and their associated data were systematically examined; by applying pattern coding (Table 5-16) the researcher identified distinctive groups of codes that could be interpreted as a coherent theme. Typically, emerging themes were composed of codes belonging to different categories. The researcher used hand-drawn diagrams to visualize the pattern coding and kept a running record of notes about potential relationships between the themes and other observations that may be of further interest. As in Study 1, each theme was described using a "what-how-why" framework (Figure 6-17) and was represented in the NVivo project file by a node in folder Nodes/STAGE 2/Emerging themes.

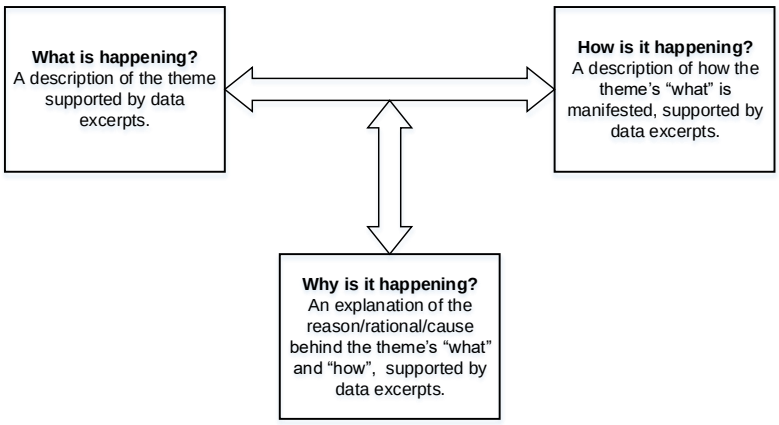


Figure 6-17. Theme description framework

6.5.1 Emerging theme "Customer role"

A theme that revolved around customers being perceived as active participants in the process of offering a service emerged, based on relationships between seven descriptive codes in four categories. A diagram visualizing the theme development, including pattern codes, is shown in Figure 6-18[94]. The theme was supported by 74 NVivo data references extracted from 13 sources (Table 6-11)[95]. For each code, the table provides its description, and the number of supporting sources (interview transcripts) and data references. All relevant data for this theme were aggregated in Nodes/STAGE2/Emerging Themes/Customer role. A summary NVivo report was

[94] The theme was initially named Customer voice.
[95] Here and further, in theme description tables, category descriptions were omitted as they were not theme specific (i.e., themes emerged across categories). Code descriptions were preserved as relevant to the theme being supported.

stored as Sources/Internals/STAGE 2 DOCUMENTATION/Emerging themes/Customer role – data (also available in Appendix U1).

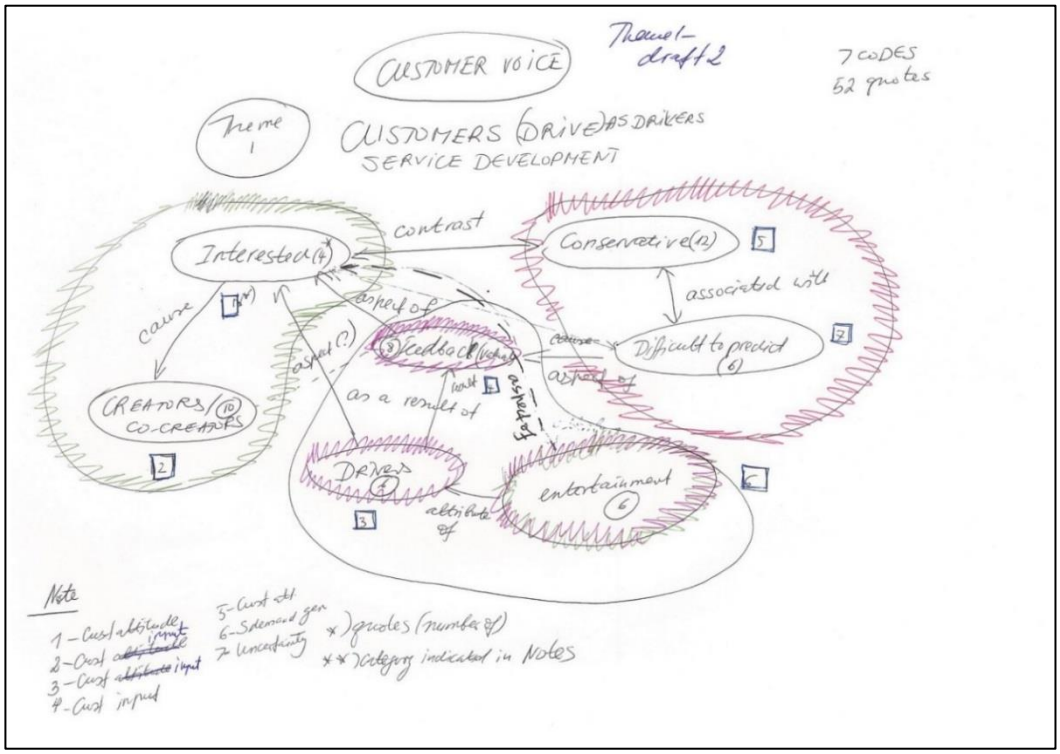


Figure 6-18. Developing theme "Customer role"

Table 6-11. Theme "Customer role"

Label	Description (codes only)	S	R
Uncertainty S2 Final		6	9
Difficult to predict	Uncertainty about changing customer preferences and needs makes customer behaviour difficult to predict	6	9
Service demand generator S2 Final		3	6
Entertainment	There is a confirmed need for entertainment services	3	6
Customer input S2 Final		8	35
Co-creators	Customers empowered to develop and deliver content and become service co-creators facilitated by technology	3	10
Drivers	New service development is driven by perceived customer demand as providers use technology opportunities to meet customer requirements, expectations, preferences	7	17
Feedback	Service providers value and rely on customer feedback that is facilitated by technology	3	8
Customer attitudes S2 Final		9	24
Interested	Customers are interested in new services; like these existing ones that suit their needs such as mobile banking and services that offer connectivity with others.	5	9
Conservative	Customers tend to be conservative in the way they use new technology and somewhat distrustful of innovation	7	15
	Total number of sources and NVivo data references:	**13**	**74**

What was happening? According to research participants, customers influenced mobile service development to a significant degree. Two related but distinctively different theme facets emerged: about customers in the role of (i) service users, and (ii) service creators: "… *some of the interesting things for mobile devices is that the innovation is no longer produced by big enterprises, by big companies, but by what we could call*

independent creators or rather networks of independent creators and sometimes user communities… It's not driven by the industry but it's driven by the users … the people [who] have mobile technology" (NZInt7);" …a lot of what we do is born from consumer pressure in the market, even for the businesses" (NZInt6); "And so I think we're seeing a lot of innovation in the mobile space, which is driven by people's, the ease of publishing an application, because anyone can do it. And so I think we're going to continue to see lots of innovation in the mobile space because of it" (NZInt13).

How was it happening? (i) First, customers made their preferences and wishes known by employing the feedback channels available to them. Customers expected changes to be made to suit their needs: *"… I think with the availability of information it allows us to respond much faster, so it allows us to respond to our customers much faster. Our customers know that this technology is available, so our customers demand that we respond much faster" (NZInt4).*

(ii) Second, customers used their skills and knowledge to contribute value: "… *the sort of terms that we use that can be actually quite critical, like if you talk about the user it almost sounds like a drug user or something. So it's very like[ly] some people call them pro users … because users is normally passive … but now I think the most important thing with mobile devices is that it's not only a media consumption device but also media production device" (NZInt7).* Customers created value for others ("*And so you've got a lot of young minds, real sharp minds that are thinking about how they can, how they want to work and how they want to do things. And if they have a good idea for themselves, then it's like, it's not necessarily too hard for them to deliver something which also has the benefits for other people*", *NZInt13);* it was anticipated that, in the future, service development would increasingly become customer driven *("If this technology becomes more accessible you don't have only the sort of soft tone element from the industry but you can also have some kind of services being developed from a more… more from a ground level", NZInt7).*

Why was it happening? (i) First, even though customer behaviour was considered to be somewhat difficult to predict ("*And of course you can do all of these things, but none of it's, none of it really, really tells you what it will actually be like when the customers are out there in their millions trying to use the damn thing", NZInt12)* as customers were traditionally conservative (*"… It's mass behaviour okay, so sometimes a few things have been invented twenty years too early and they were not very well received or*

understood by the public or customers", NZInt5), their attitude was changing *("…So we say it's mass psychology or it's human factor, the main obstacle is the human mind but it will change", NZInt5)* and they were becoming increasingly happy to adopt services they found useful: "…*adoption of mobile financial services is somewhere between five and ten times what anyone expected five years ago. So if you talk about adoption, we really don't have an adoption problem" (NZInt9);*

(ii) Second, "…t*he user groups are changing, fundamentally there's a change in the user group… and there's a group that is thinking the only way going forward is devices that's going to set me free from the shackles of all that I have and I need that. It's not any more a question of choice it's a question of I want it, I need it…*" *(NZInt6).*

The theme's concept was summarized as "**Customers perceived as drivers of service development as (i) service users and (ii) service contributors**", illustrated by: "*The consumers, a lot of consumers have wants and desires, …I told you, it's consumers that are driving the market and not the business." (NZInt6).*

The following additional notes were recorded by the researcher:

Note 1. In "Interested" the data point at a connection to lifestyle preferences (personal goals – a code under Requirements).
Note 2. "Entertainment" may create a connection to another theme (customer needs?)

6.5.2 Emerging theme "Customer segmentation"

A theme centred on the perceived segmentation of the customer market emerged based on relationships between seven descriptive codes in three categories. A diagram visualizing the theme development, including pattern codes, is shown in Figure 6-19. Overall the theme was supported by 81 NVivo data references extracted from 13 sources (Table 6-12). All relevant data were aggregated in Nodes/STAGE 2/Emerging Themes/Customer segmentation. A summary NVivo report was stored in Sources/Internals/STAGE 2 DOCUMENTATION/Emerging themes/Customer segmentation – data (also available in Appendix U1).

What was happening? According to participants, services needed to meet specific needs rather than target the customer market as a whole ("…*the focus on small segments required to succeed in the model I outline above", NZInt11).* However, due to customer diversity, such an approach may require more investment (*… You can't develop just one application, it almost needs to be three applications to cater for the different markets*" *(NZInt3)* yet without a guarantee of success ("…*another 490,000 apps really are failed*

experiments and despite in some cases the substantial investments in trying to create something that seems to be the killer app for some particular business niche", NZInt1). In addition, providers needed to make their service affordable for the targeted segment(s): "… *you want enough people to be able to afford to do it. … Otherwise you can't get critical mass." (NZInt12).*

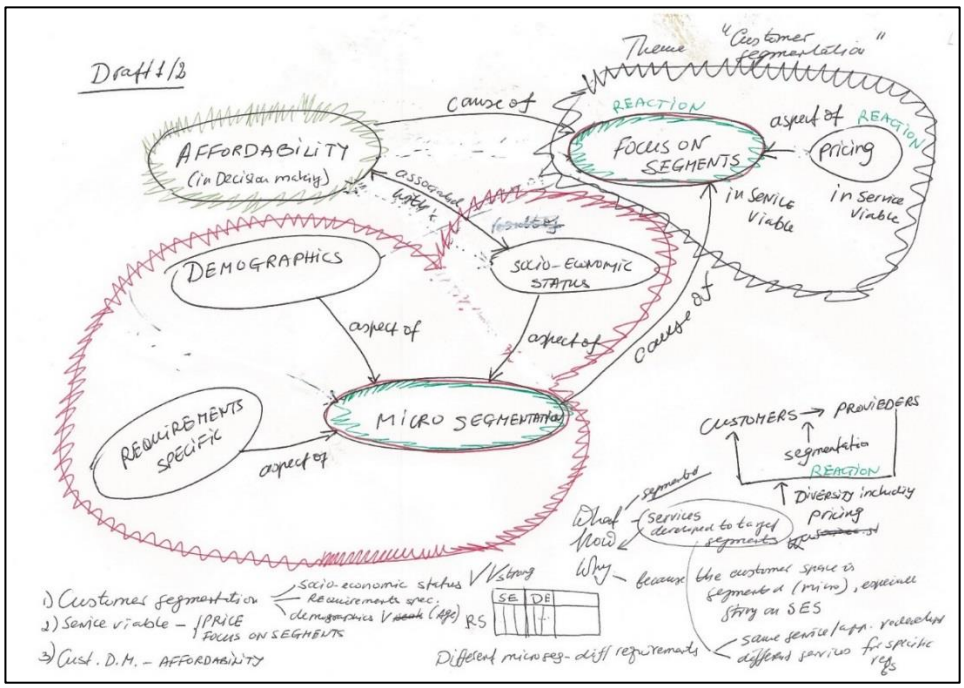


Figure 6-19. Developing theme "Customer segmentation

Table 6-12. Theme "Customer segmentation"

Label	Description	S	R
Customer segmentation S2 Final		12	55
Demographics	Age influences requirements and expectations; providers perceive differences between younger and older customers. Gender is not very pronounced as a segmenting factor	8	32
Micro segmentation	As a result of main factor interplay the resulting segments are relatively small (niche?)	1	1
Requirement specific	Specific requirements related to: (i) personal characteristics (socio economic and demographic) which means that services need to be developed with different personas in mind, even for the same service such as banking; (ii) Occupation; (iii) Personal preferences based on earlier experience	10	14
Socio-economic status	Status has a two foiled influence: (i) mostly different status leads to different service needs; (ii) status may determine level of access to any service (but this is not too relevant to New Zealand)	4	8
Customer decision making S2 Final		7	12
Affordability as a factor	Customers adopt services the can afford to buy (subscribe to) and/or use	7	12
Service viable S2 Final		7	14
Pricing	Service viability depends on the pricing model and the trade-off offered to customers	4	5
Responsive	Services and applications need to be aligned with market segments	4	9
	Total number of sources and NVivo data references:	**13**	**81**

How was it happening? Service providers had started to realize that "…*the time-saving/money-saving categories of mobile apps that replace pre-existing offline or desktop use cases are running out" (NZInt11)* and therefore, it was time to provide services that more closely met specific customer demand, taking advantage of the opportunities offered by technology: "*Yes different requirements and expectations on the demand side, also fuelled by the capability to cater to those differences at lower and lower cost on the supply side (NZInt11*). Pricing was seen as an important adoption factor; "…*the cost of getting their data to the phone is … going to be one of those things which drives whether those services take off or not", NZInt13*). Customers would be prepared to accept a trade-off ("*I think the trade-off is there. I think if it's priced fairly, people will continue to pay", NZInt3)* if a specific service was needed (*"… finding things on a map, for example, we've been able to do for a long, long time, but it's only relatively recently that people have had affordable devices and connectivity to do that, NInt12).* Some participants explicitly referred to segmentation while making statements about the respective service business models: "*That's economical segmentation you've plugged into and found that there is a market there." (NZInt2);* "*We're a big believer in segmentation. We use a [particular] model in financial services…" (NZInt9).*

Why was it happening? The customer space was perceived as containing a number of small segments created as a result of the interplay between several factors, such as socio-economic status, demographics (age), and specificity of requirements (*"…one has to think about for different categories of people that, you know, related to age groups, financial backgrounds and I think it's very difficult to generalize mobile media because the way that different people use mobile technologies I think it's more specific to their local, or like their personal characteristics", NZInt7).* According to NZInt9 "… *the problems for different segments that you're solving are different"* and therefore, if services were promoted in "*a segment-specific way*", a "*very high level of adoption "*could be expected. Older customers, not as familiar with the technology, would "…*have far different expectations of what those applications would deliver" (NZInt3).* However, age was not "*the dominant factor*" (NZInt7), and similarly neither was service cost as "*if people …. like it, they will spend money on it" (NZInt5).* The "*micro-segmentation"* that was seen as a characteristic of the customer market *(NZInt11)* was based on attitude and requirements: *"So I think, yes it's very important to think about what your different personas might be with mobile apps, because not all the customers are going to be the same…they won't have the same requirements and they won't have*

the same, if you like, well buy-in" (NZInt12);" So those are really quite different I can see that and there is no way that you can develop one thing for everybody." (NZInt5).

The theme concept was summarized as "**Customer segmentation by specificity of requirements guides service development**", illustrated by: "*And that requires segment-centric approaches, which we've talked about already. So you can't just sort of say, 'Mobile banking's here.' You've got to say, 'This is the specific need for you, Mr Customer, that we are addressing'(NZInt9).*

The following further observations were made:

Note 3. Gender was not seen as having an important influence on segmentation.
Note 4. This theme may be related to themes about service viability.

6.5.3 Emerging theme "Enabling competition"

This theme, focused on perceptions about the regulatory environment, was based on relationships between ten descriptive codes in four categories. The theme was supported by 55 NVivo data references extracted from 12 sources (Table 6-13).

Table 6-13. Theme "Enabling competition"

Label	Description	S	R
Customer decision making S2 Final		4	11
Privacy as a factor	Customers adopt services they perceive as safe to use (protecting their personal information)	4	11
Regulatory environment S2 Final		12	41
Broadband	Regulations (bandwidth) aim to provide best deal for customers	5	11
Content	The New Zealand regulatory environment is not restrictive for content development	5	6
High compliance costs	Small developers may have high compliance costs (with customer privacy rights)	1	1
International	Regulations need to facilitate import of services and global providers setting camp here	2	2
Roaming	Regulations need to facilitate affordable access to local services through roaming	2	4
ROI and income	Large MNOs affected negatively in terms of return on investment and income	2	5
Security	Regulations (security and privacy) aim to protect customers and customer rights	4	9
Service importer	It is likely that in the future NZ customers will use imported services	3	3
Uncertainty S2 Final		3	3
MNOs	MNOS may be limited to a data carrier role only; or may become retailers rather than stand-alone network operators	3	3
	Total number of sources and NVivo data references	**12**	**55**

Figure 6-20 visualizes the theme development, including pattern codes. Relevant data were aggregated in Nodes/STAGE 2/Emerging Themes/Enabling competition. A summary report was stored in Sources/Internals/STAGE 2 DOCUMENTATION/ Emerging themes/ Enabling competition – data (also available in Appendix U1).

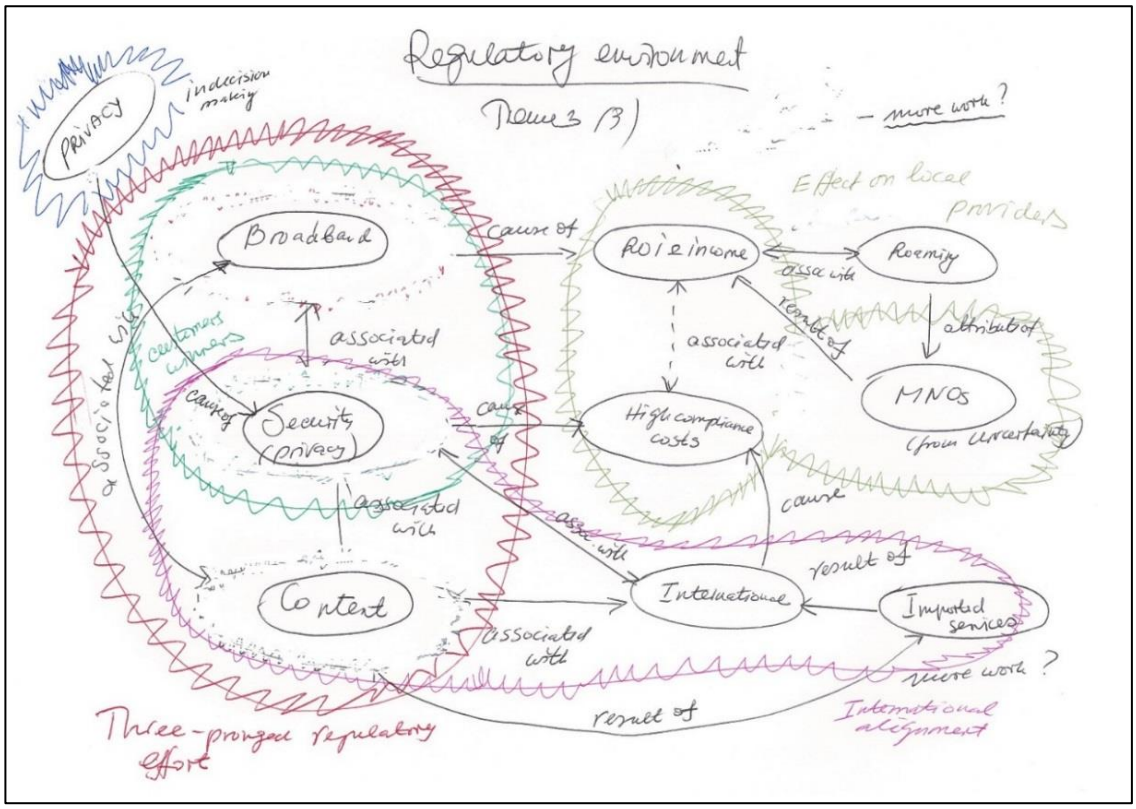


Figure 6-20. Developing theme "Enabling competition

Although supported by a smaller number of data references compared to those considered previously, this emerging theme was relatively more complex as the codes that it comprised contained meanings supporting the two distinctive facets.

<u>What was happening?</u> Recent changes to the regulatory environment affecting the structure of the sector may have made some MNOs reluctant to invest in new infrastructure: *"Because you're taking investment out of the large Telcos so they're going to invest less, at the end of the day the Telcos have to show a return to their shareholders. And if you're eating into the way they can operate then they've got to cut costs elsewhere, so that cost comes out of capital investment" (NZInt4).* Furthermore, it was very likely that New Zealand customers would begin to make increased use of imported services (*"…we are likely to be net importers of mobile services", NZInt11)* including financial services from competitive new entrants ("*Google will just apply for a banking licence in New Zealand… The question is will the regulators invite that or will they fight it… whether the regulators will either encourage or discourage people like Google and PayPal and others from playing in the banking space", NZInt9)* and therefore, there was a need to address service internationalization issues ("…*the need to ensure our consumer market and local regulations facilitate easy import of services from overseas, while safeguarding the rights of New Zealand consumers and also helping local developers to export overseas, NZInt11).* Suitable regulations were needed

in order to align the country with "*global developments in the area of identification and authentication, and tax and payments"* in order not to *"…stifle innovation for their constituents by not enabling them to participate in global modalities" (NZInt11).* However, due to the fact that mobile services transcend legislative boundaries, regulations around content may be difficult to implement ("…*apps get created all around the world and available anywhere in the world, so it's probably one that's quite hard to legislate or regulate", NZIntr8).*

How was it happening? Regulations already in place had made the regulatory environment *"…more supportive…. it's gradually become more conducive to competition" (NZInt12*) by "*for example, …the Commerce Commissioner making sure that all mobile telcos have similar bandwidth spectrum and things like that…" (NZInt10)* with customers getting "*the best deal" (NZInt4*); however, some stakeholders may have been negatively affected by these regulations and may have become less competitive, for example, small service developers ("*We do need to be very careful in balancing the need for consumers right to privacy with the ability for small developers to innovate without unduly high compliance costs", NZInt11).* The introduction of competition-encouraging regulations had changed the sector*; "…the industry constructs are changing. I mean likewise for Telecom, how they've become now more of a retail business as opposed to a big sort of network business", NZInt8; "...a fundamental change is happening in the place that MNOs are no longer as important", NZInt6).* While there were no specific regulations around service content and apps ("…*the New Zealand's regulatory environment is quite restrictive for many industries, think electricity, health, etc. but currently it is not too restrictive for apps" (NZInt11),* service developers and providers had to comply with the existing high standards in the area of customer safety and privacy, for example, when working with banks which "*have got … very, very specific requirement …" (NZInt5).*

Why was it happening? According to participants the existing regulatory environment supported competition. There was some concern, however, that in the long run MNOs and service providers could be negatively affected by regulations about broadband provision: "*I think in the long run it'll be counterproductive and it doesn't help the smaller, yes it puts more money in the back pocket for the smaller provider in the short term, but unless the smaller provider actually uses that to invest to do real capital…it's no use…they'll eventually get gobbled up anyway and nobody wins in the long run" (NZInt4).* The expected internationalization was considered to be inevitable due to the

relatively small local market ("… *we're very small. Because of that …not going to get a huge amount of NZ specific applications working…", NZInt3).*

The theme concept was summarized as **"Current legislation benefits some stakeholders, though more work is needed to ensure a balanced regulatory environment able to support competition while ensuring mobile network infrastructure growth and providing adequate transaction safety and privacy protection to New Zealand customers",** illustrated by: "*You can't leave it to the market and you can't just have a thing where the government tells you, you've got to have some kind of balance in order to get things happening", (NZInt12).*

The following additional observations were noted:

Note 5. This theme is related to themes about service viability (small market) and customer preferences (low risk services).
Note 6. This emerging theme will generate two basic themes – Infrastructure growth, and Customer protection.

6.5.4 Emerging theme "Active vendors"

Next the researcher considered the three service market categories across which four themes seemed to emerge. Visualizations of the intermediate development stages are shown in Figure 6-21 and Figure 6-22; the themes are described in this and in the following three subsections.

The first of the four themes – "Active vendors" – arose based on the perceived influence of device (platform) providers; it was derived from six descriptive codes in three categories, with two of the descriptive codes each composed of three nested codes. The theme was supported by 41 NVivo data references extracted from nine sources (Table 6-14. The relevant data were aggregated in Nodes/STAGE 2/Emerging Themes/Active vendors. A summary NVivo report was stored as Sources/Internals/STAGE 2 DOCUMENTATION/ Emerging themes/Active Vendors – data (Appendix U1).

What was happening? According to participants, the globally established companies providing mobile service development platforms as part of the software embedded in mobile devices (e.g., phones, tablets) were competing with each other to capture a greater share of the customer market and to achieve a market leader position ("*A lot of the space is also just evolving too in the sense that you've got these people providing platforms and they're all fighting one another to try and dominate and get more customers", NZInt2; "It'll be like the VHS and Betamax kind of thing, where you had*

lots of different technologies", NZInt13). However, the currently competitive positioning of device vendors had resulted in significant platform and network interface fragmentation that inevitably slows down mobile service development ("…*the first particular obstacle is ensuring that the applications can work across different networks and different platforms", NZInt3).*

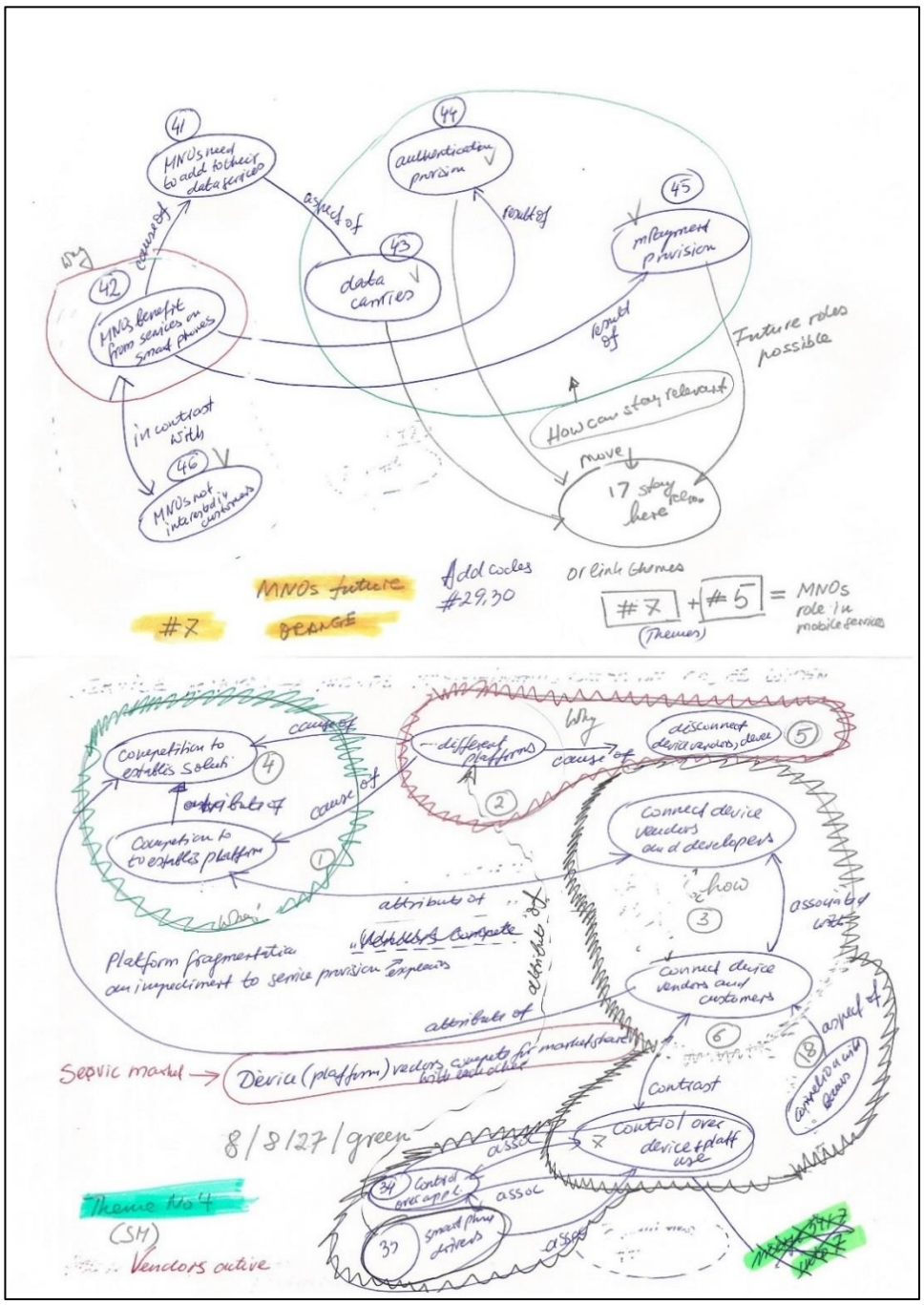


Figure 6-21. Developing themes "Active vendors" and "MNOs future"

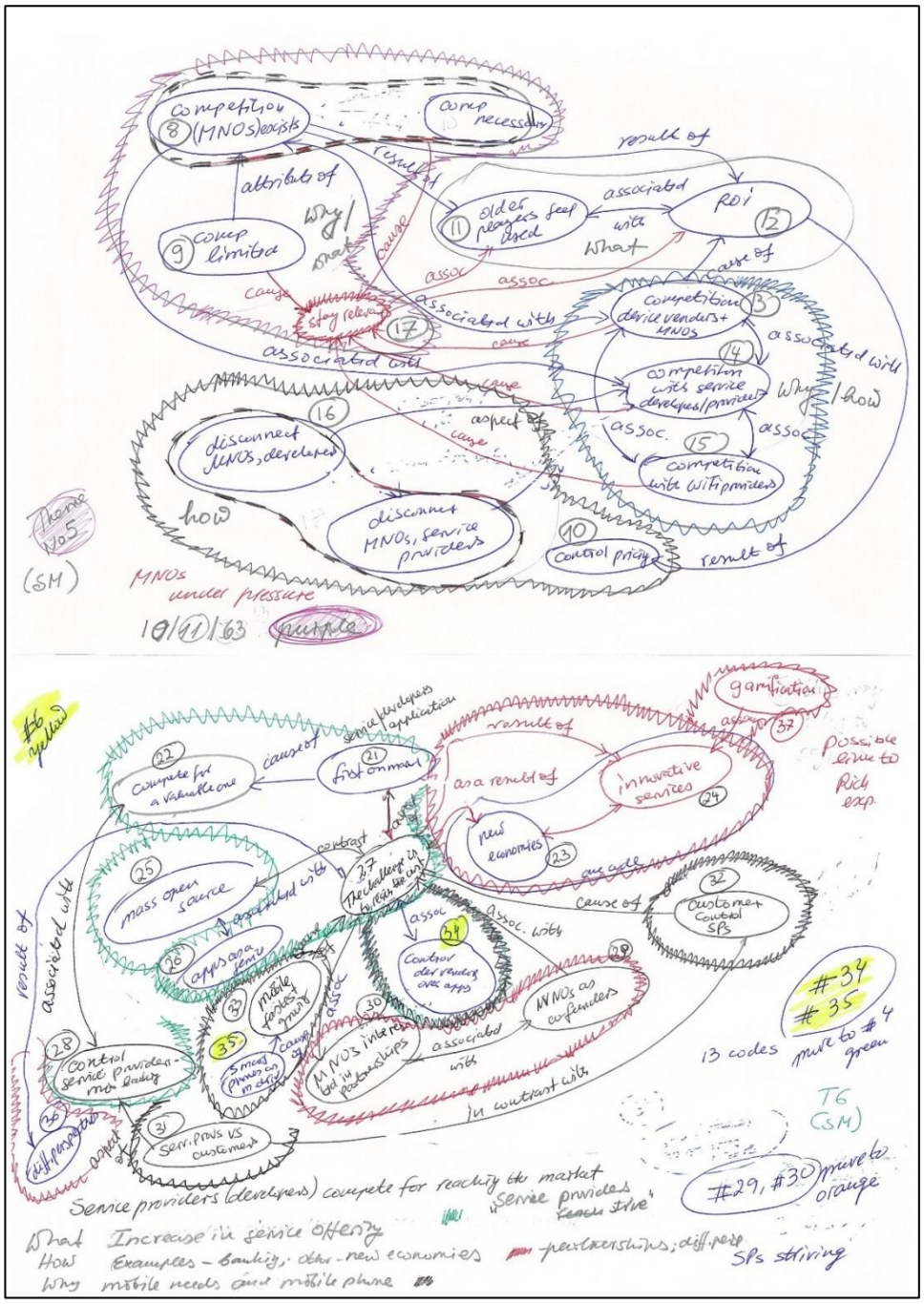


Figure 6-22. Developing themes "MNOs under pressure" and "Services difficult"

How was it happening? Device vendors maintained a strong focus on customer needs ("*They spend their money on things that consumers want, because they are consumer-centric organizations, IntNZ9).* They provided "…*incentives for people to write applications for mobile" (NZInt13)* and innovate (*"I think Android has allowed people to be a bit more innovative and it's a more accessible platform. Apple is a bit more closed… Apple sets the parameters that you can work in, whereas Android doesn't have those, NZInt3);* however, vendors were careful to retain control over the way applications and services could use their platforms: "*… If they start to bring in IT governance into mobile platforms, the mobile developers like the Apples and Androids*

will lose control, NZInt6). Vendors were also looking at expanding as mobile service providers, for example, in the apparently lucrative area of mobile banking:" *So banks will be part of the eco system, but the biggest disruptors will be the likes of Google and Amazon and PayPal, who will, who see banking as an enormous, I mean banking's the world's biggest industry", NZInt9).*

Table 6-14. Theme "Active vendors"

Label	Description	S	R
Service development and provision S2 Final		6	14
Incentives	Device and platform vendors provide incentives for developing apps/services for their platforms	3	3
Platform fragmentation	Platform fragmentation is an impediment to service provision	3	9
Customer oriented	The two big device platform vendors are strongly customer oriented	1	2
Competition S2 Final		4	11
Between device vendors and banks	The big two device providers may want to become banks	1	2
Amongst device vendors	Device vendors are competing to establish their own technology and lock in service developers, providers and customers	3	9
Competition to establish vendor's platform to lock in customers		1	3
Device vendors have different platforms – strong platform fragmentation		2	4
Competition to establish vendor technology for popular services		2	2
Controlling influences S2 Final		5	16
Control device vendors	Device vendors in a very strong position as smart phones are driving the service market	6	16
Smart phone benefits can be made visible through applications and services only		1	1
Smart phones are the market drivers		4	9
Device and platform vendors limit the ability of other parties to control how the device operates and protect their own apps		3	6
Total number of sources and NVivo data references		**9**	**41**

Why was it happening? As a result of the mass penetration of smart phones their cost had gone down ("*…things like Smartphone penetration… The price of those Smartphones are coming down…", NZInt*3), and customers had started using them more for both voice and mobile services ("*…you look at the Asia market, Vietnam and all those, Cambodia, nobody is using computers any more they're all using a mobile phone. They check the emails, they talk on mobile phone, they do their banking transaction on mobil*e, *NZInt5*). The consequent increase in data traffic had benefitted MNOs, who naturally had continued to heavily promote smart phone use ("*…as a whole, the [mobile network] industry is driving the market to smartphone. Obviously there's net benefits for the carriers to do that", NZInt8*), while developers had also become more active ("*…it's starting to hit critical mass and now developers are*

jumping into it and so that's a piece that's happening fast. ", *NZInt2*). As platform fragmentation was an impediment to service developers ("*There's no coordination between the providers of how these platforms are going to operate, you're just left with all these individual platforms", NZInt2; "The other thing I guess is that it's quite hard to test this stuff…", NZint12),* native applications may be better positioned to create further demand for smartphones: "… *the applications are really driving the benefits of smartphones, which I suppose is why you've seen …the rise of Apple and Samsung", NZInt8).*

The theme concept was summarized as "**Device vendors/platform providers compete to establish their product (device and platform) as a market leader**" illustrated by "*We've got windows, android, Apple, there's going to be a winner and a loser and that sort of fragmentation is going to be difficult in bringing stuff to market.", NZInt3).*

Note 7. To explore further – are there other consequences of fragmentation?

6.5.5 Emerging theme "MNOs under pressure"

A visualization of the development of this theme is shown in Figure 6-22 above. It was derived from four descriptive codes in three categories, with one of the descriptive codes composed of seven nested codes. The theme was supported by 69 NVivo data references extracted from 11 sources (Table 6-15).

All relevant data were aggregated in Nodes/STAGE2/Emerging Themes/MNOs under pressure. A summary NVivo report was stored as Sources/Internals/STAGE 2 DOCUMENTATION/ Emerging themes/MNOs under pressure – data (Appendix U1).

What was happening? (i) First, MNOs who owned extensive mobile infrastructure faced a slow rate of investment recovery related to the changing data usage patterns *("…operators are trying to recover their cost of investment in their networks that they've built, that's billions of dollars. Their recovery rates are a lot slower now because the usage of this is no more the traditional voice [or] traditional data* ", *NZInt6*).

(ii) Second, these MNOs had to consider the growing dominance of device vendors and "*…figure out how they're going to keep their business going because I think people like the Apples and the Googles are going to eat …. their lunch "(NZInt4)*. Thus, as data carriers, MNOs faced *"… one of the biggest challenges … how do you stay relevant to a*

consumer?" (NZInt8) and had to "… *ensure that they survive in this world … to provide reasons for people not to go onto the other networks" (NZInt4).*

Table 6-15. Theme "MNOs under pressure"

Label	Description	S	R
Service development and provision S2 Final		4	10
MNOs vs services	MNOs not particularly supportive to application and service developers and perceive them as a threat	4	10
Competition S2 Final		9	50
Between Wi-Fi providers and MNOs	Wi Fi providers a threat as customers may switch to their networks	3	6
Amongst MNOs	MNOs are competing to stay relevant on the market and to ensure profit to shareholders	8	43
Old players lose on investment while new players do not invest in infrastructure		1	
ROI eroded due to changes in the roles of the players		4	8
Customers chose device rather than network provider and MNOs have to consider all choices customers make		2	7
Service developers and providers push MNOs down to a carrier role		1	2
Operators face the challenge to be stay relevant		2	7
Competition to retain a position is cutthroat		6	14
Competition is limited as country size cannot allow for too many operators		2	2
Controlling influences S2 Final		7	10
Data plans	To ensure revenue MNOs control prices through bundling (plans)	7	10
	Total number of sources and NVivo data references	**11**	**69**

How was it happening? (i) First, the MNOs who owned infrastructure had continued *"…building more and more infrastructure" (NZInt3)* in order to meet data demand ("*So quickly Telecom had to reinvest …[in] different components in the network technology capabilities that keep coming", NZInt6)* which was highly costly *("…there's a real cost to providing that infrastructure and it is a massive problem and I don't think that the world understands how we decide what …. communications to keep building", NZInt3)*.

(ii) Second, these MNOs were remodelling their business to include the offering of additional services, to enhance the "*stickiness of the client*" and "*…do the same thing before the systems integrators …who are developing mobile applications, mobile platform applications" (NZInt6)*. For example, by offering bandwidth-hungry data content services to use which customers had to change their plan *("…suddenly need to upgrade from my thirty gig broadband plan to a hundred gig broadband plan, because I'm using another seventy gig worth of content", NZInt10).*

Why was it happening? (i) First, while it was not feasible for infrastructure owners to stop investing *("… if you take a mobile operator's perspective, I think your cost of infrastructure is too great to give stuff away", NZInt8*) they could not *"…charge our end customers more for it"* even though customers were expecting *("…MFI and cellular phone, they're also getting data plan included" (NZInt3).* At the same time, they faced an extremely fast pace of network technology development that required even more investment ("… *meanwhile there's companies like Nokia and Alcatels suddenly bring better advanced technology…so the backhaul one gig becomes redundant it's too little they need more, so it's a constant game", NZInt6)* while operating in a dynamic market ("…*there's a lot of competition in that market now as well…", NZInt12*). Even with some beneficial limitations (*"…, and here, although we have, we have limited competition", NZInt13)* these circumstances increased the pressure on MNOs (*"…everyone's trying to outdo each other… we're constantly trying to better the rivals", NZInt10*). Some of the new players wanted to expand *"…on the back of someone else's [physical] infrastructure" (NZInt12).* In addition, MNOs were having to face competition from "…*companies like Apple and Google who are starting to corner the smart phone markets will have, at some point, enough of a market share to actually start building their own networks across Wi-Fi and data …bypassing the mobile operators. Who's to say someone like Apple doesn't build a worldwide IP network?", (NZInt4).*

(ii) Second, data carriers had become "*secondary to the devic*e" as customers chose their network provider after they had chosen a mobile device brand ("…*Right, "What's the best deal I can get on an iPhone?" Then you go, "Okay, because that carrier's offering me the best deal and the service plan is enough for me to do, then I'll just go with that deal.", NZInt8; "… Now, although the telecom provider's providing your service, you might buy the device from any store you like. And so the telecom providers aren't necessarily in control over the devices which are using their network, and so the customer now has a lot more choice over what they were going to use to", NZInt13).*

The theme concept was summarized as **"MNOs (mobile infrastructure owners) under pressure to maintain viability due to (i) increased sector competition, and (ii) changes in market dynamics",** illustrated by*: "So it beholds then the Telcos to figure out how they are going to play in this brave new world", NZInt4.*

Note 8. This theme is related to the previous one and to themes on customers' expectations and also regulations.

Note 9. This emerging theme will generate two basic themes – Increased competition, and Customer protection.

6.5.6 Emerging theme "Services difficult"

A visualization of the development of this theme is shown in Figure 6-22. The theme was derived from six descriptive codes in three categories, with two descriptive codes comprising three and six nested codes, respectively. The theme was supported by 41 NVivo data references extracted from 11 sources (Table 6-16). All relevant data were aggregated in Nodes/STAGE 2/Emerging Themes/Services difficult. A summary NVivo report was stored as Sources/Internals/STAGE 2 DOCUMENTATION/ Emerging themes/Services difficult – data (Appendix U2).

Table 6-16. Theme "Services difficult"

Label	Description	S	R
Service development and provision S2 Final		5	18
Open source	Massive open source development is the future not top players such as telcos and device vendors	1	1
Different perspectives	Service providers not attentive to customer expectations and needs and have different perspectives on how services need to be provided	3	9
Innovate	Service developers are looking for new market opportunities	2	8
Emerging economies are attractive as a market for new services		1	4
Innovative services are needed for emerging markets, targeting specific market characteristics		1	3
Software as a service		1	1
Competition S2 Final		8	15
Amongst service developers cum service providers	Service developers/ providers compete to provide an identified valuable service; the app and service market is difficult to compete in.	8	15
To be successful you need to be the first on the market		2	4
Want to provide the same, most needed or most valuable service		3	4
The challenge is to reach the customer		2	2
Mobile needs fastest growing		1	2
Application developers have different perspectives on how to develop successful applications		1	1
Service gamification as an attempt to attract customers		1	2
Controlling influences S2 Final		5	10
Secondary channel	Mobile banking is more like a secondary channel rather than a truly innovative service	2	5
Banks slow	Customers expect service providers to respond quickly but banks are not used to it	2	3
Total number of sources and NVivo data references		**11**	**41**

What was happening? Service providers who endeavoured to meet customers' "*personal software need"* were uncertain about how "*to be successful" (NZInt8)* and had different perspectives*:* "…*Some of them think it's all about the technology. Some of them know that it has to be the user experience, and others are just marketers" (NZInt1).* Maintaining a dialogue with customers ("… *our customers want us to respond much faster so we need to respond much faster", NZInt4*) was seen as important ("*You deliver people what they want, therefore, they listen to you and therefore, you can guide their* [*expectations*]", *NZInt9)*; however, service developers were finding it difficult to identify specific needs and provide fitting solutions "… *solving a big problem for a known customer, solve it quickly and elegantly, and so that you can test the proof of concept with real world adopters and refine from the top*" (*NZInt11).* This was particularly so for smaller providers who "…*do everything from A to Z, they design the interface, they create the codes, the language and quite often they've got a very limited ability to do usability tests or to test simply the app",* resulting in a service that *"…doesn't really work well in the background" (NZInt5).*

How was it happening? Some service developers were trying to compete and attract customers by adding features enhancing the customer experience (*"… you can have gamification within your application in terms of a sense of gaming in terms of doing things…", NZInt8)* while others were simply following competitors (*"… they're not being innovative at all. What they're doing is they're saying, "Okay, Bank A has a mobile solution that does X, we're Bank B so we better have a mobile solution that does X., NZInt12),* or avoiding local competition altogether and looking for opportunities to innovate in emerging markets ("*…. What we're trying to do is hit these new emerging economies……. we made the choice of not going into first world, like iPhone android type markets…", NZInt2).*

Why was it happening? Despite the recent proliferation of apps ("…*such a large number of apps, and people creating them every day. The number of app developers, it's exploding…", NZInt8),* service developers had insufficient understanding of the customer market (*"… people who come up with these mobile services are clever technology people… But what they don't understand is how do they solve the business problems, how would they market their products, NZInt4).* Services offered (for example, mobile banking) were not innovative; rather, they were using the technology as *"…another channel to get to their customers…" (NZInt2)* and did not add too much mobility-related value (*"… the value still isn't on the phone necessarily, it's still held*

elsewhere", NZInt13), and in addition, some businesses that had chosen to operate via the mobile channel were not "*accustomed to being publically assessed*" by customers who had "*very high expectations" (NZInt9).*

The theme concept was summarized as "**Difficult to develop and offer new services**", illustrated by **"***But to be successful, how do you market it, how do you take it to the consumer, how do you get that cut through above everything else that's being launched out there in the marketplace?…" (NZInt8)* and echoed by *"…we [need] … a creative producer that's someone who is able to understand the technical aspect, the parameters, but also understanding the needs of the customer" (NZInt5).*

Note 10. Possible links to Vendors active, Customer roles, Customer expectations, any theme related to innovation.

6.5.7 Emerging theme "Future MNOs"

As noted in one of the themes already described ("MNOs under pressure") participants were concerned over the future of MNOs: (*"…the hard question, is what will be the relevance of the carrier in years to come?" (NZInt8).* A theme emerged around the future of MNOs as seen by participants, depicted in the visualization in Figure 6-21. It was derived from five descriptive codes in two categories, with two descriptive codes composed of two and three nested codes, respectively. It was supported by 38 NVivo data references extracted from ten sources (Table 6-17).

Table 6-17. Theme "Future MNOs"

Label	Description	S	R
Service development and provision S2 Final		5	12
MNOs need to invest	In order to benefit from service us MNOs will need to develop further their data services in order to support data intensive mobile services	1	1
Cheap smart phones	Cheap smart phones use through services and apps benefits MNOs	1	1
MNOs vs customers	MNOs not interested in customers once they have them	1	1
Work with MNOs	MNOs can become partners in service development	4	9
MNOs have a role as co-funders of service and application development		2	2
MNOs interested in partnerships recognizing the importance of services		3	7
Controlling influences S2 Final		8	27
Future MNOs	In addition, to being data carriers MNOs can play a role as service developers (or may not) and provide enabling services	8	26
MNOs will continue as data carriers		8	19
MNOs can provide authentication services		4	5
MNOs can provide payment services		2	3
	Total number of sources and NVivo data references	**10**	**39**

All relevant data were aggregated in Nodes/STAGE 2/Emerging Themes/Future MNOs. A summary NVivo report was stored as Sources/Internals/STAGE 2 DOCUMENTATION/ Emerging themes/Future MNOs- data (also available in Appendix U2).

What was happening? As *"…existing data network owners …sell plumbing…"* and *"make their money by how much data you send across their pipes" (NZInt4)*" MNOs would not and should not "…*have a big role to play in mobile service development. The network operators role should stop at the pipe" (NZInt1).* Rather, they should continue *"…providing fast network performance" over a "solid network platform" (NZInt3*) and support service development as partners *("…we as a business encourage it and even support it in terms of sometimes co-funding it" …, NZInt8).*

How was it happening? Operators would continue to engage in partnerships with device (smartphone) vendors to capitalize on smartphone penetration: (*"…as an industry… we're working with device vendors")* as *"smartphones [are] a reality for pretty much everybody… ", NZInt8)* and also provide access to customer data for providing value-added enabling services (e.g., user authentication and location-based services): "…*the network operators will… have a customer base, the third parties will need access to the customer base and the network operators will …allow these services to be sold through that customer base while taking a cut in the fee" (NZInt4).*

Why was it happening? Given the current trends there will be an ongoing demand for high speed mobile networks (*"… data requirements from a mobile perspective is highly sought after, high speed data requirements …. because [of] data intensive phones or smartphones", NZInt6)* but it was important to develop partnerships in order to retain customers (*"…I think all the network players in New Zealand are incredibly supportive of development and implementation, …they have to, … if you don't your customers aren't going to stay with", NZInt4*); in fact, operators *"…could do more to open APIs and interconnection for authentication, location and payments between carriers, between banks and carriers, between apps and carriers…", NZInt11).*

The theme concept was summarized as **"MNOs will have a core function – to provide a reliable and fast network; but they will have to operate in partnerships with other players",** illustrated by: "*If I was a network provider that's what I'd be doing and that's what you need to do … you can't stop it from happening, you've got to join the party" (NZINt4).*

Note 11. The theme is closely linked to "MNOs under pressure".

6.5.8 Emerging theme "Motivating customers"

This theme was identified as a "response" to the challenges described in theme "Services difficult". It was derived from seven descriptive codes in two categories and was supported by 32 NVivo data references extracted from 11 sources (Table 6-18).

Figure 6-23 shows a visualization of the development process concerning this and two other prospective themes. All relevant data were aggregated in Nodes/STAGE 2/Emerging Themes/Motivating customers. A summary NVivo report was stored as Sources/Internals/STAGE 2 DOCUMENTATION/ Emerging themes/Motivating customers-data (Appendix U2).

Table 6-18. Theme "Motivating customers"

Label	Description	S	R
Service demand generator S2 Final		10	18
Current use by customers	Important to reach a critical mass – need for marketing and/or other ways to increase customer awareness,	4	4
Environment encouraging	Service use can be encouraged by creating an conducive environment: e.g., affordable use of phones overseas, free wireless zones in rural communities, service co-participants ready (e.g., merchants)	3	4
Free trial increases popularity	Free services are a way to attract more customers and create the critical mass needed before collecting revenue	3	5
Mobile device penetration	Mobile device ownership has reached extremely high levels and may become a service driver as people want to use their devices	3	5
Service viable S2 Final		8	16
Customer base	As applications are cheap there is a need for a large customer base in order to make some profit	3	3
Incentives needed	Bundling and other incentives to motivate customers	4	5
Mobile payment	Mobile payment enables adoption of other mobile services	4	8
	Total number of sources and NVivo data references	**11**	**32**

What was happening? High levels of smart device penetration had prepared the ground for service use as *"… there's already a population of …smartphone users",* and *"… not only does everyone have the technology, but everyone's familiar with how to use it. when they think about mobile banking, they think of it as quite an easy, obvious thing" (NZInt9*). However, customers needed additional motivation, such as free access to some services (*"… this bit's free and you pay for the next bit. Or the alternative is it's free up to a point and then you have to start paying", NZInt12*) or service bundling ("… *You may need to stimulate early adoption not just through give-aways but bundling with another in-use service or other incentives to try it out", NZInt11).*

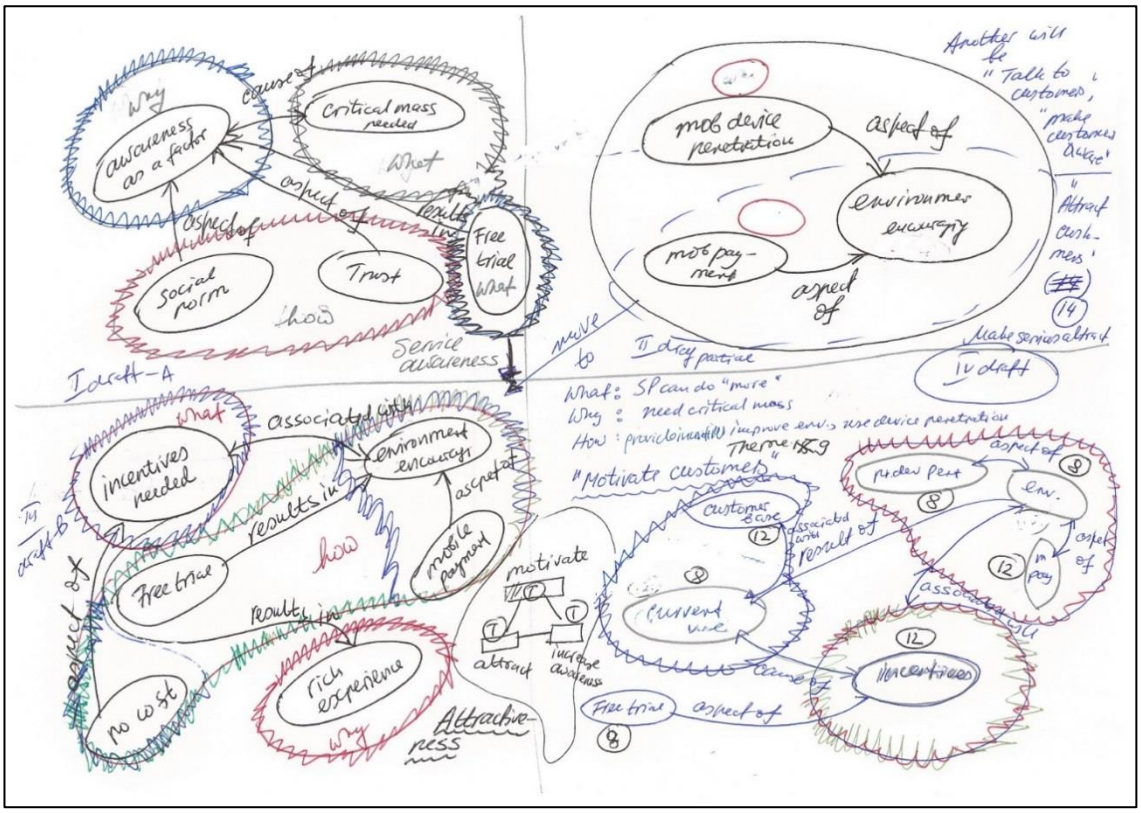


Figure 6-23. Developing theme "Motivating customers"

How was it happening? By creating an environment that offered easy access to services ("*…is a great example of the free wireless zone in Wellington. It is a perfect example of how it can enable some really innovative services to take place..", NZInt7*), this in turn enabled paid service use ("*…There's a lot of software services that allow you to pay, if you wanted to. the market needs to be using them in order for them to work. You've got to have merchants that are already signed… It's starting to become like that", NZInt2),* perhaps based on the initial offering of free services where necessary *("…mobile banking and all these kinds of services, which today they are making it free to people to popularize it, that's the service providers. So bank says, "Go down and download my banking things…", NZInt6)*

Why was it happening? To establish a viable service, it was necessary to achieve a critical mass of customers using it ("*...the amount you pay is really, really sensitive. …WhatsApp for example, have a pay model, but the amount you pay is very tiny, so that's fine, but then you've got to have a massive user base in order to make it worthwhile", NZInt12; "… in terms of business models there's a critical mass as well that is important. So to increase your credentials you need to have a good amount of customers", NZInt5);* ways to motivate customers included the provision of highly convenient services such as mPayment ("*…from a benefit perspective… the new feature that it's going to really, really dramatically change, is me being able to pay mobile*

payment on the spot…", NZINt6), and free service offers "*Free is the way you bring people in the door to help them to understand what the value of the service is.", NZInt1*).

The theme concept was summarized as "**Motivating customers to use a service to ensure its viability**", illustrated by: *"…value increases exponentially with number of users… "(NZInt11).*

Note 12. The theme is closely linked to themes that may explore service awareness, rich experience and cheap application development.

6.5.9 Emerging theme "Simple to use"

From the rest of data, a series of three relatively small-scale but clearly evident themes emerged, focused on service use, service need/choice, and service awareness. A draft of the first theme, about perceptions of customers' views on how easily services should be accessed and used, is shown in the top left quadrant of Figure 6-24.

Figure 6-24. Developing themes "Simple to use", "Services", and "Awareness"

The theme was derived from three descriptive codes in three categories and was supported by 29 NVivo data references extracted from nine sources (Table 6-19). All relevant data were aggregated in Nodes/STAGE 2/Emerging Themes/Simple to use. A

summary report was stored as Sources/Internals/STAGE 2 DOCUMENTATION/ Emerging themes/Simple to use-data (Appendix U2).

Table 6-19. Theme "Simple to use"

Label	Description	S	R
Customer decision making S2 Final		2	3
Ease of use as a factor	Customers adopt services that are easy to use	2	3
Customer requirements S2 Final		5	12
Easy to use services	Customers require services that are easy to use	5	12
Service value adder S2 Final		5	14
Simplicity	Most attractive to customers are services that are simple to use and perform their functions seamlessly	5	14
	Total number of sources and NVivo data references	**9**	**29**

What was happening? According to participants, services had to be "…*simple and intuitive "(NZInt1), "… first and foremost … simple to use" (NZInt3)* and had to function seamlessly ("*so it's a service or it's something that you use but you don't really realize that you use it", NZInt5).* Services that were not simple or easy to use may not attract a large customer base: " … .*very likely that only a small part of the audience is ever going to take advantage" … of services characterized by* '*over design, over development and 'featuritis'" (NZInt1).*

How was it happening? According to participants most mobile services were already "…*actually easier to use than the desktop versions. They're probably less secure as a result, but they're easier to use. So when you log into the mobile apps, you're already halfway there.." (NZInt12).* Highlighting the expectations of simplicity one participant *(NZInt5)* provided an example of a mobile service that was cumbersome and difficult to use and thus less attractive (a video recording service where the customer had to engage in complex interactions using two different sets of credentials).

Why was it happening? Customers were looking for ease of use as a service feature (*"…you could argue is ease of use… basically the people who do use it, basically say, 'It's good, but it's not easy', NZInt9).* According to customer feedback, ease of use was rated highly as a desired characteristic ("…*important to the ratings that we're getting back on the site as well, and that ease of use", NZInt13*), and customers were more likely to ask for services to be made easier to use rather than for new features to be

added *("…when we go and test with consumers, 'What do you want?' Existing users, they don't ask for new features, they ask for … easier…', NZInt9).*

The theme concept was summarized as "**Mobile services need to be simple/easy to use**" illustrated by *"…ease of use is one of the key things" (NZInt3); "…you can't have a mobile app that's difficult to use, because there's so many and there's so much competition" (NZInt12).*

Note 13. The theme may have links to the theme about choice below.

6.5.10 Emerging theme "Services"

The second theme in this series had a focus on the need for convenient services that extended the space of options for customers. It was derived from six descriptive codes in four categories and was supported by 37 NVivo data references extracted from 12 sources (Table 6-20); the codes that composed the theme contained meanings supporting two related but distinctively different theme facets. Figure 6-24 shows two drafts of the theme development (top right bottom left quadrants).

All relevant data were aggregated in Nodes/STAGE 2/Emerging Themes/Services. A summary NVivo report was stored as Sources/Internals/STAGE 2 DOCUMENTATION/ Emerging themes/Services-data (Appendix U2).

Table 6-20. Theme "Services"

Label	Description	S	R
Customer decision making S2 Final		4	5
Choice as a factor	Customers have options when making a decision to use a service.	3	3
Perceived need for service as a factor	Customers adopt services that meet a need they have become aware of.	1	2
Customer expectations S2 Final		2	2
Service choice	Customers prefer to have choice of service channel and of service provider	2	2
Customer requirements S2 Final		9	26
Convenient services	Customer requires services that are convenient to use and make life easier	7	12
Needed services	Customers require services that meet their needs (helpful, rather than just useful)	7	14
Service demand inhibitor S2 Final		2	4
Not right	To be tried and later adopted services need to be seen at least as useful, or better – meeting an identified need, with a cost trade-off	2	4
Total number of sources and NVivo data references		**12**	**37**

What was happening? (i) First, according to participants, customers wanted to determine for themselves if a particular service was *" … something I want to or the perception of something I should do …" (NZInt10).*

(ii) Second, it was *"important"* for customers to be able to *"…to choose the services you want, from who you want and pay [to]…" (NZInt6).*

How was it happening? (i) Participants identified the need for convenient services (*"... things that are convenient… improve our lives even if it's only in a trivial way…", NZInt12)*; convenient services translated "*directly into time saving" (NZInt9),* being "*…accessible in different points in time and different locations" (NZInt7)* using a mobile device that *("… just happens to be in my pocket and so it feels easier and more accessible", NZInt9).* They provided examples of convenient services already offered, including "*… mobile-ified versions of web apps" (NZInt11*) such as navigation services ("*…we can look anything up anywhere at any time when all this stuff gets linked into Google Maps we can always find where we are and how we want to get to any place we want to go to", NZInt1),* financial services (*"…the real time transactions of mobile applications. … I can do it on my terms, done and dusted… I can basically accomplish that task whenever…I want to do it or when I need to do it… at my convenience", NZInt10*), and information services ("*…The Maxx application to know where your bus is … really. valuable", NZInt8*).

(ii) However, they also noted that the market did not always provide equitable service options due to a lack of genuine innovation ("*I've seen a lot of people developing system that exist already, duplicate them from a geek aspect and I've seen people designing very weak things…they don't work on the market, or they don't last very long, so it's a waste of time and energy", NZInt5)* or due to a lack of understanding of customer needs *("One of the things I've sort of picked up on is that if your app's not being used on a regular basis, it's going to get deleted off the phone, therefore, all the work you've put into innovation and putting that app into the market and getting it out there, becomes null and void", NZInt8).*

Why was it happening? (i) Customers were making decisions about adoption and use based on their perceived service needs: "*So, 'Do I have a need that this service meets?' that influences them towards adoption" (NZInt10)* and so even innovative services may fail if they are not meeting a genuine need (*"… lot of people come up with a lot of clever ideas but there's just no need for them…", NZInt4).*

(ii) Customers were also "*…becoming more demanding" (NZInt13);* they could "*just download [the] apps that they want on the phone", (NZInt2)* as there was "*a number of*

service providers providing similar services" (*NZInt13).* Customers were able to "…to *pick and choose…the applications they wanted" (NZInt6)* to suit their needs.

The theme concept was summarized as "**Customers expect services (i) that meet identified needs; and (ii) that they can choose from**", illustrated by: *"… things where sometimes it's convenient to do it on a mobile…" (NZInt12); "… I want to get my content from who I choose to" (NZInt9).*

Note 14. The theme may have links to the theme about services difficult.

6.5.11 Emerging theme "Awareness"

This theme was identified as a potential theme when developing the theme "Motivating customers" (Figure 6-23 above, top left); Figure 6-24 above shows a later draft of this emerging theme (bottom right). The theme evolved around the notion of customer awareness and its significance. It was derived from four descriptive codes in two categories and was supported by 40 NVivo data references extracted from ten sources (Table 6-21).

Table 6-21. Theme "Awareness"

Label	Description	S	R
Customer decision making S2 Final		10	35
Awareness as a factor	Customers adopt services they have some knowledge or understanding about, the challenge is to have them try a service for the first time.	6	16
Social norm as a factor	Customers adopt services recommended and/or used by friends and/or by members of their extended social circles	7	14
Trust as a factor	Customers adopt services perceived as trustworthy (recommended by a trustworthy recommender; provided by a trustworthy provider)	3	5
Service demand inhibitor S2 Final		3	5
Security fears	A primary factor stopping customers from adopting a service – fear about how safe is the service to use (i.e., using it will not cause harm to the customer)	3	5
	Total number of sources and NVivo data references	**10**	**40**

All relevant data were aggregated in Nodes/STAGE 2/Emerging Themes/Awareness. A summary NVivo report was stored as Sources/Internals/STAGE 2 DOCUMENTATION/ Emerging themes/Awareness-data (Appendix U3).

What was happening? Providers were trying to overcome the "*biggest obstacle to success"* which was to have *"…consumers discover your application" (NZInt8).* In particular, they were seeking to determine *"how they drive the penetration to get people to use them the first time…[to] actually understand what the benefit is…" (NZInt3)*

given that customers often made adoption decisions based on perceptions about provider trustworthiness (*"…a lot of people would choose based on brand…", NZInt4*) and based on peer recommendation (*"… I think word of mouth plays a really important role in that. 'Have you downloaded this particular application? It does this and this and this'. It's that initial push", NZInt3*).

How was it happening? Although "*smart phone adoption and then usage*" played an important facilitating role, as "*… before you know it they downloaded an application, and then they downloaded another and another, and then they just become active users when they never intended to" (MZInt9),* innovative marketing was essential to help customers learn: "…*You can give free phones to the early adopters so that they can go out to the streets and show people how things work… so when you are introducing a new business service you can actually have that service demonstrated" (NZInt1).* Service providers could also take advantage of social media channels as when *"…people saying they like an application or something on Facebook can make users to download it…" (NZInt3).*

Why was it happening? Customers may find it difficult to discover the app or service they needed (*"…with so many apps… so many app stores… the means of discovery is difficult", NZInt8*), and to evaluate the options available to them (*"…from a customer point of view …if I need an app about… I don't know, for instance, the weather, if I go on the iTunes store, Apple store I will find ten of them for free, I will find twenty-five of them for that I have to pay, already and I don't really know what to do and I'm not sure which one would be the most reliable one in term of technology or in term of constant update", NZInt5*). In addition, it was "very important" for customers to get the *"…reassurance that it's safe and that their money isn't being able to be accessed …by other people…" (NZInt13).*

The theme concept was summarized as "**Service developers and providers need to raise customer awareness of new services**", illustrated by *"…make it possible for people to envisage themselves doing this rather than having to discover on their own because a lot of people are not going to take that initiative and they not want to download an application just on the chance it would be helpful. Someone's going to have to tell them how useful it is. They are going to have to see it being useful for somebody else before they would even consider the possibility" (NZInt1).*

Note 15. The theme may have links to the theme about motivating customers.

6.5.12 Emerging theme "Mobile lifestyle"

The theme centred around mobility and lifestyle was derived from four descriptive codes in three categories and supported by 56 NVivo data references extracted from 11 sources (Table 6-22). Figure 6-25 (upper half) shows a visualization of the theme's development.

Table 6-22. Theme "Mobile lifestyle"

Label	Description	S	R
Customer expectations S2 Final		4	7
Merge business and life		4	7
Customer requirements S2 Final		9	28
Lifestyle supporting services	Customers require services that meet their personal goals and suit their lifestyle	6	20
Mobility supporting services	Customers require services that support mobility	5	8
Service value adder S2 Final		9	21
Supporting lifestyle	Lifestyle supporting services save time and money, enable communication and staying connected (a new need?), enhance experience, "embed' easily in everyday life; Support also business/work and personal lifestyle as the boundaries between time spent working and not-working start blurring	9	21
	Total number of sources and NVivo data references	**11**	**56**

All relevant data were aggregated in Nodes/STAGE 2/Emerging Themes/Mobile lifestyle. A summary NVivo report was stored as Sources/Internals/STAGE 2 DOCUMENTATION/ Emerging themes/Mobile lifestyle-data (Appendix U3).

What was happening? According to participants, customers had "*….requirements and expectations that apps will do things for us, entertain us, give us a little bit of improved personal productivity", NZInt8.* Thus, customers expected services to enhance their everyday life by enabling efficient use of their time *("…[the] most valuable feature is simply being mobile. That may sound trivial, but is in fact massively important. Mobile enables people to use the in-between times while waiting for others, travelling, and so on", NZInt11),* enabling "*emotional*" connections with others (*NZInt8*), and in general making life *"pleasurable*"; "*…we're past the point where we need stuff, so it's all about life being more pleasurable…it's more pleasurable to be able to do tedious things like banking very, very quickly and conveniently. It's more pleasurable to be able to find a friend quickly" (NZInt10).* In addition, the boundaries between business and professional life had started to blur, and customers wanted to (or perhaps felt obliged to?) "…*utilize their device both for professional and non-professional areas" (NZInt6).*

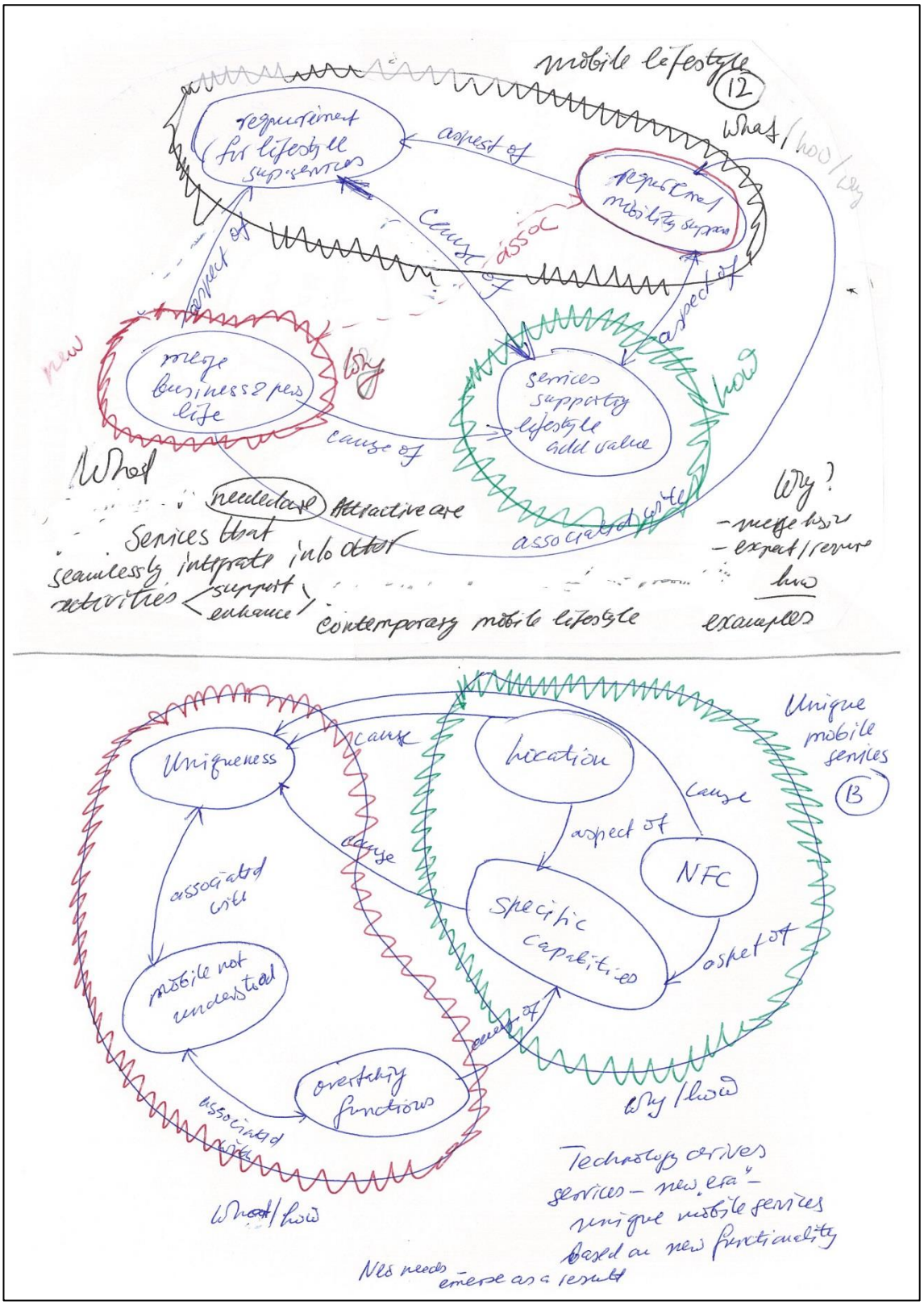


Figure 6-25. Developing themes "Mobile lifestyle" (upper half) and "Unique mobile services" (lower half)

How was it happening? Smartphones were already *"…embedded in our lives pretty much" (NZInt8)*, and allowed "*…customers to have their entertainment, allow them to do their work, allow them to find information" (NZInt4)*. Mobile software had become (nearly) indispensable: *"We could live without mobile software but actually we've got used to it now, so for example, we don't get lost as much as we used to. …We don't wait*

around trying to meet someone who doesn't turn up like we used to. Yes, we could live without that, but actually we'd rather not, because we might not need it but actually it does make our lives better in many ways" (NZInt12). Customers were getting "*real tangible benefits*" from "*… being connected to lots of people, to other organizations that you feel an affinity with",* often using social media applications "*…sitting on a train or a bus reading a book or reading a newspaper" (NZInt3),* and from mobile apps supporting a "moving" customer: "… [the Air New Zealand app] …is *useful is that you are literally moving…when it's telling you about traffic, ….about checking online, …to go to the gate, it's actually all about movement and I think that's a good example" (NZInt12).* However, the blurring of the lines between business and personal life may have a negative effect as *"…some companies prefer the employee to have a mobile phone or smartphone because they've got an expectation for people to work 24/7 days" (NZInt5).*

Why was it happening? According to participants "*…applications [that] are really going to take off is it's giving time back to people. That's really, really important" (NZInt3)* as they *"…helped to self-actualize, [not to] waste time on ridiculous things that we used to waste time on like getting lost or failing to meet someone… we don't waste time waiting for the bank to open or running out of cash at the weekend like we used to…" (NZInt12).* An example was mobile email: *"It does everything that desktop email does, but because it is mobile the benefits grow to anytime, anywhere, low start-up time, not just software and system stat-up but cognitively, a lot less overhead to pick up your phone from your pocket and glance at your inbox rather than the desktop example…" (NZInt11*).

The theme concept was summarized as "**Customers are attracted by services that enhance their lifestyle quality, including services designed to be used while moving**", illustrated by *"…why they're attractive is because … it's enhancing the quality of life, whether it be actual day-to-day life needs, …[or] the social quality of life" (NZInt10),* and *"…most attractive are ones that really leverage mobility in some way, as opposed to just be occasionally convenient" (NZInt12).*

Note 16. The theme may have links to the theme about choice/need.

6.5.13 Emerging theme "Unique mobile services"

This theme emerged as an intersection between technology and service development. It was derived from six descriptive codes in three categories and was supported by 36

NVivo data references extracted from ten sources (Table 6-23). Figure 6-25 (lower half) shows a visualization of the theme development process. All relevant data were aggregated in Nodes/STAGE 2/Emerging Themes/Unique mobile services. A summary NVivo report was stored as Sources/Internals/STAGE 2 DOCUMENTATION/ Emerging themes/Unique mobile services (Appendix U3).

Table 6-23. Theme "Unique mobile services"

Label	Description	S	R
Service value adder S2 Final		2	2
Uniqueness	Services that cannot be performed using a non-mobile device such as authentication through GPS/data network	2	2
Service not viable S2 Final		2	4
Mobile not understood	The potential of and the opportunities offered by the mobile channel are not yet fully understood	2	4
Technology opportunities S2 Final		10	30
Location detection and tracking	Geo-positioning as a built in capability supports various LBS	6	9
NFC	NFS already used for payment	1	2
Overtaking functions	of other devices and media	3	3
Specific capabilities	Current and future mobile devices – with inbuilt capabilities to support new services	8	16
	Total number of sources and NVivo data references	**10**	**36**

What was happening? According to participants, service development was just beginning (*"... I think that we are only just beginning to scratch the surface in terms of what mobile are going to do", NZInt1*) as *"...industry … haven't understood fully the potential of mobile media yet" (NZInt7).* Mobile devices are fast becoming prevalent *("…mobile device is ultimately going to replace people's computers…"),* supporting services that could not be offered on stationary computers (*"…it didn't make sense to have a navigation application running on your desktop or laptop… but it makes sense to put it on something… mobile, it fits in your pocket, its use becomes a lot more…", NZInt4)* and offering specifically "mobile value": as *"…a lot of the new benefits are based on the various capabilities of the phone…" (NZInt2), "…a lot of these services …are never going to really hit online or other channels, they're just going to go straight to mobile…" (NZInt9).*

How was it happening? Numerous examples showed how new and advanced mobile technology capabilities could be used or were used in services. These varied from innovative interface mechanisms unique to the mobile device ("… *can just rotate the phone and do the editing [a video]*", *"shake…or blow [in the microphone]", NZInt5)* (instead of pressing menu buttons), to using the mobile phone as one's *"identifier" (NZInt13)* for authentication purposes (*"…so we've got a customer who's using GPS coordinates…so basically we know exactly where that photo was taken. If it was taken*

in your house, then it's lower risk than if it was taken in Nigeria, NZInt9), to developing augmented reality services *"…using a combination of different elements…Internet data…camera to identify different elements in our environment as well as the GPS data "(NZInt7).* New and existing unique functionalities were adopted by service developers including NFC ("… *a lot of work being done around near field communications now, so mobile payments by near field…all of the carriers have announced pilots or projects…", NZInt8),* and numerous examples of innovative LBS: exploring the environment *("…our application development is being through GPS – location detection. Carrying a computer around that can tell where you are and add information about that through a message or use it to inform you about what is nearby" (NZInt1); "…finding a restaurant, finding where the nearest post office is, locating directions, everything built into a single device", NZInt4),* or organizing meetings *("…. Now you're having services where someone can locate their friends exactly where they are", NZInt2; "…LinkedIn for instance…, if I go in a Cafe I can see that some of the people that are part of my network are in the Cafe or in a two kilometres area, so my phone is telling me that, oh Researcher is having a coffee six hundred metres further", NZInt5)* (although such services carried important implications for privacy, which, according to one participant, had not been fully understood and had not yet led to a *"rejection of technology*" *(NZInt2*).

Why was it happening? According to participants, *"…what drives mobile services is not necessarily the business use case so much as what's now possible in terms of the devices and the connectivity" (NZInt12),* as "s*pecific capabilities that are in the device like GPS, like NFC, like capture or camera*" make it possible to do *"…stuff that you couldn't do before but you can now", (NZInt9).* The use of the technology for authentication purposes (*NZInt9*) is possible as *"…the mobile phone …is something which is personal (NZInt13)*; in addition, other new features, e.g., touch screen "*…makes it very different user experience from the typical mouse and keyboard kind of interaction" (NZInt11).*

The theme concept was summarized as "**New and unique mobile device features drive the development of new and unique mobile services**", illustrated by: *"Things like the camera on the phone and the fact that you can use it to measure the acceleration of the phone and all kinds of bit of equipment in the phone that allow you to collectively develop applications that can find new uses that we didn't have before in all kinds of realms" (NZInt2).*

Note 17. The theme may have links to the themes about experience, value and need.

6.5.14 Emerging theme "Rich experience"

This relatively small theme was derived from three descriptive codes in three categories and was supported by 20 NVivo data references extracted from eight sources (Table 6-24). Figure 6-26 (top left) shows a visualization of the development process for this theme. All relevant data were aggregated in Nodes/STAGE 2/Emerging Themes/Rich experience. A summary NVivo report was stored as Sources/Internals/STAGE 2 DOCUMENTATION/ Emerging themes/Rich experience-data (Appendix U3).

Table 6-24. Theme "Rich experience"

Label	Description	S	R
Customer expectations S2 Final		4	7
Unique experience	Customers expect something unique	4	7
Customer requirements S2 Final		4	5
Service experience	Customers require not just service but a service that provides a [pleasurable] way to use it	4	5
Service value adder S2 Final		4	8
Improved experience	Enriching service experience attracts customers	4	8
	Total number of sources and NVivo data references	**8**	**20**

What was happening? According to participants, customer expectations about service experience needed to be considered first (*"…you have to put these intangibles at the front of thinking about application development and innovation, and park everything else, because I think everything else comes as an outcome of the right thinking up front…", NZInt8)* and service developers were looking at "…*more interesting enrichment services*…n*ew use cases not available offline before that enable a richer life experience for the consumer, for example, they can do something enjoyable that they have not done before…" (NZInt11*).

How was it happening? Developers were looking into exploring new interface features (*"The touch screen interface makes the tactile experience very different… And for some people having that immediacy 'it's at my finger-tips, I can just tap' …makes it extraordinarily engaging", NZInt1*), and enhanced device capabilities ("…[virtual] reality …*has definitely lots of potential for thinking about new experiences that can be created for users" (NZInt7)* in order to develop applications that were *"…more intuitive to use or more pleasurable to use…" (NZInt10),* for example, *"gamifying"* them *(NZInt11, NZInt8).*

Why was it happening? The market had already developed an "…*expectation around the user experience" (NZInt9)* which had become *"…very, very important to the ratings that we're getting back" (NZInt13).*

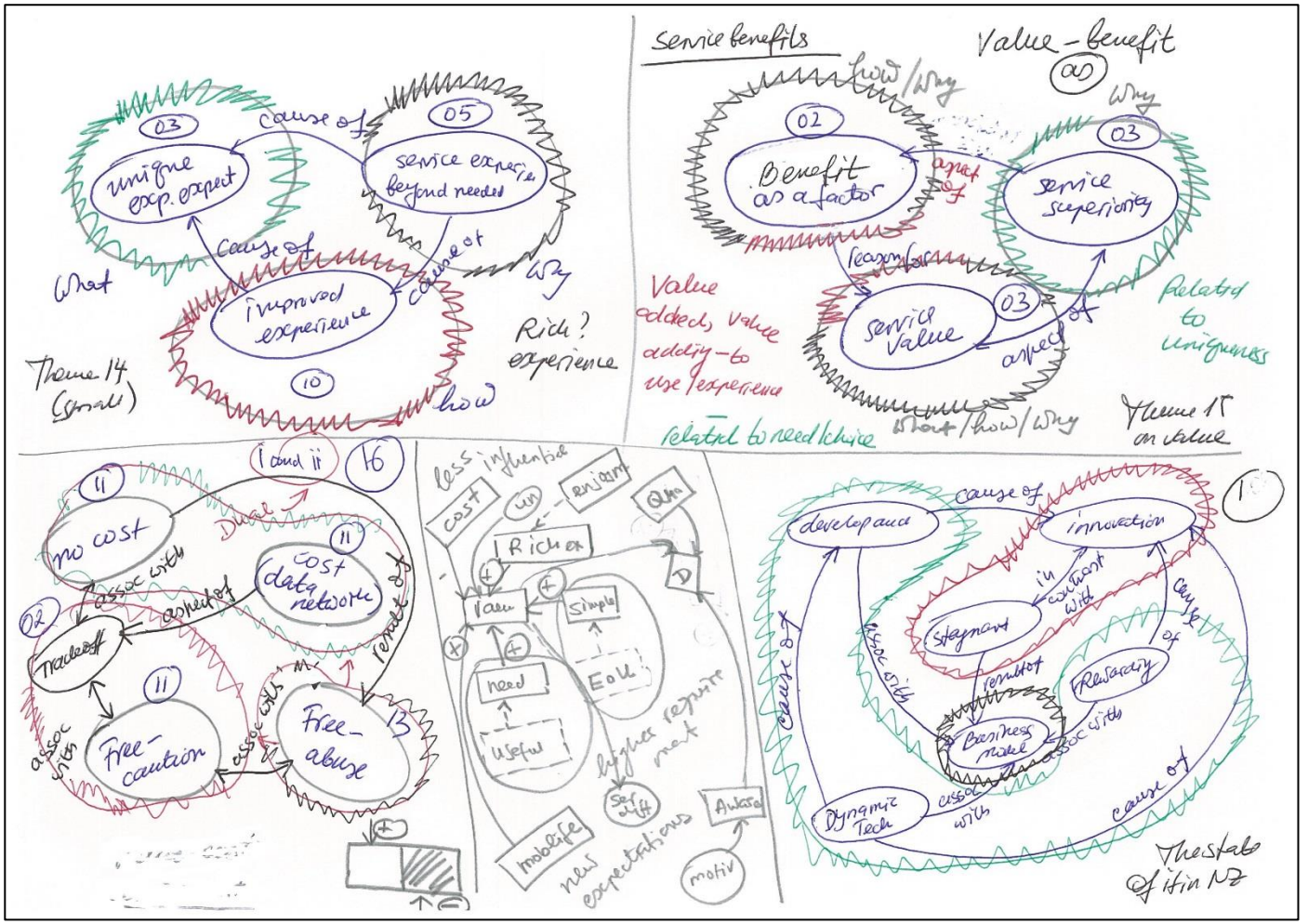


Figure 6-26. Developing themes “Rich experience” (top left), “Service benefits” (top right), “Free vs paid” (bottom left and centre), “Innovativeness” (bottom right)

The need for services to provide *"richness of experience" (NZInt11)* was due in part to exhausting the space of easy-to-conceive services offering to *"…do on your mobile what you did on your desktop…" (NZInt11)* but also due to attitudinal changes – customers were *"… past the point where we need stuff, …it's all about life being more pleasurable" (NZInt12).*

The theme concept was summarized as "**New mobile services needed to provide pleasurable and engaging experience in order to attract customers**", illustrated by: *"The other thing that's probably happened in the mobile space recently, …it's not just the content that's provided, it's the way that the content is provided. … having that polished …pleasurable experience… is a differentiator between someone choosing their service over something which might be functionally quite similar but not as well polished" (NZInt13).*

Note 18. The theme may have links to the themes about lifestyle, uniqueness, choice.

6.5.15 Emerging theme "Service benefits"

This theme emerged from three descriptive codes in two categories and was supported by 33 NVivo data references extracted from nine sources (Table 6-25). Figure 6-26 above (top right) shows a visualization of the theme's development. All relevant data were aggregated in Nodes/STAGE 2/Emerging Themes/Service benefits. A summary NVivo report was stored as Sources/Internals/STAGE 2 DOCUMENTATION/Emerging themes/Service benefits-data (Appendix U3).

Table 6-25. Theme "Service benefits"

Label	Description	S	R
Customer decision making S2 Final		3	9
Benefit as a factor	Customers adopt services perceived as providing a benefit	3	9
Customer expectations S2 Final		9	24
Service superiority	Customers expect services to surpass existing non-mobile alternatives	4	13
Service value	Customers expect services to bring real and measurable value not just features (to conceptualize innovation in an efficient service)	6	11
	Total number of sources and NVivo data references	**9**	**33**

What was happening? According to participants, service benefits and utility rather than service features were important, as a service had *"… to actually provide an end benefit for the end customer" (NZInt3),* and *"… features are never the value, it's the benefit of the feature that's more valuable … does that value add…?" (NZInt6).* The service development process therefore, necessarily involved iteration (*"… learn as you go in terms of what's right and what's wrong… in terms of utility. You've got to think of*

utility as part of your… conceptualization of the innovation", NZInt8) in order to continually create recognizable value (*"…things that are better than doing it on the desktop are things where you definitely are going to be moving, NZInt12*), and a clear value proposition (*"… if you're offering a business service that kind of replaces an alternative, you do have to convince people that it's better…in what way …", NZInt12).*

How was it happening? Participants provided multiple examples of services that added value in different ways: by making a mobile service easier compared to its alternatives (*"…they've tried to make it very easy to do mobile banking so that it is easier than doing it on the desktop", NZInt12),* by adding the element of enjoyment to make learning more efficient (*"...rather than to read the long description, just take a picture with your flash card…. all of a sudden you get a sense of game and you learn something without realizing …a playful way of learning a piece of art…so it's adding some value", NZInt5),* or by enhancing service interactivity and responsiveness (*"…like Kiwibank's got that chat to my personal banker type feature", NZInt10).*

Why was it happening? As was succinctly formulated by one participant, "…*people eventually tire of the gimmick aspect of it and, unless it's producing true value underneath, then people start dropping off those services", NZInt2).* "*Adoption following trial is probably driven by did it do what I expected or did it do better than the alternative I might have used" (NZInt11).* Furthermore, customers were becoming more discerning (*"...why people don't use mobile banking… they don't see value [and] …the value proposition, so a lot of people kind of say, '… I do online banking', or 'I'm happy with a call centre, why do I need mobile banking'?", NZIn6),* had higher expectations about mobile services *("… consumers don't have very high expectations when they call a call centre of a bank, but when they download the app of a bank they have very high expectations, NZInt9),* and wanted "*...things that you couldn't do before" (NZInt9).*

The theme concept was summarized as "**Mobile services needed to provide very clear benefits in order to be perceived as valuable**", illustrated by: *"…people's willingness to make use of that mobile service…it's not automatically a build it and they will come. We've got to provide something that influences people to pull them in towards us" (NZInt10*) and *"It has to either provide capab[ility] benefit or tangible benefits to the end user" (NZInt3).*

Note 19. The theme may have links to the themes about lifestyle, uniqueness, choice.

6.5.16 Emerging theme "Free vs paid "

This theme emerged initially as a theme centred on customer attitude to free services; however, it then evolved into two intertwined themes representing two complementary points of view about service viability. The theme was derived from five descriptive codes in four categories and was supported by 36 NVivo data references extracted from ten sources (Table 6-26). Figure 6-26 above (bottom left and centre) shows a visualization of the theme's development process.

Table 6-26. Theme "Free vs paid"

Label	Description	S	R
Customer decision making S2 Final		4	5
Trade-off as a factor	Customers pay for services perceived as providing a good trade-off	4	5
Service value adder S2 Final		8	18
No cost	Free services meet customer expectations to be provided some services for free – at least for services that are part of a larger, not-for-free service system such as mobile banking	8	18
Service value detractor S2 Final		6	10
Cost	Cost of access to the data network high	3	4
Free – caution	Free services regarded with caution because of perceptions about hidden cost, inadequate quality, lack of value	3	6
Service not viable S2 Final		2	3
Free services get abused	Free services exhaust resources and inhibit investment, which affects quality negatively	2	3
	Total number of sources and NVivo data references	**10**	**36**

All relevant data were aggregated in Nodes/STAGE 2/Emerging Themes/Free vs paid. A summary NVivo report was stored as Sources/Internals/STAGE 2 DOCUMENTATION/Emerging themes/Free vs paid-data (Appendix U4).

What was happening? Participants identified two different trends in customer attitude towards free vs paid services: (i) Customers preferred free services *("… that's why actually some of the services are very attractive because it's free…", NZInt5),* making it difficult for some providers to develop and offer services requiring payment: *"… it's … a cost, it's not a benefit, but of course if they don't do it they're in that competition problem where everybody else does it. So yeah, they have to give it away. It costs them money, but it's a competition issue. I don't think you can sell services, really*", *NZInt12.*

(ii) That said, participants noted that customers were *"…not afraid to pay, what people wouldn't want to have is pay a fat bill for telephone for a mobile company" (NZInt6).* Customers would be prepared to pay if they saw an acceptable trade-off *("… some people would pay. It's going to be a function of how much money they've got and how badly they want to try the new thing really", NZInt2),* for example, for a service that

"…you can't do elsewhere like check deposits and location based offers and other things, …people. might be prepared to pay something" (NZInt9).

How was it happening? (i) Free services were available, for example, as lightweight versions of paid services *("…but for instance the … application that I was talking about there is a [light] version for free and I've got that one because it's good enough for me just to go swimming down the road", NZInt5),* or as an alternative channel *("…, because you could go somewhere, they'll use another channel that is free, so why would you [pay]?", NZInt9).*

(ii) To encourage paid service usage, providers could create an appropriate business model that lowered *"…the [financial] risk in trying but still maintaining some value", NZInt8)*; they could also use free services as a launching strategy *("…they had a 'free' new model so everybody could get set up and start using this service but of course as soon as they used it up to the limit then they realized oh well, I am getting so much value out of this I will happily pay the monthly fee. And so now they have a very well-established clientele", NZInt1).*

Why was it happening? (i). Customers accepted that they had to *"…pay data services and text messaging charges and things like that to the mobile operators…", (NZInt9)* who charged "*for providing the plumbing" (NZInt4)* but were worried about the cost of access to the data network ("*Cost is a factor…if they get pinged through the mobile operator for accessing that service…", NZInt13).*

(ii) Customers were also cautious about free services:*" …[free] removes one of the barriers, but only one of the barriers, because then there's also the, 'Well if it's free, how is it being paid for, so am I paying for it in another way?' So are there, does the free then introduce some adoption restrictors as a result", NZInt10),* and had doubts about their value *("… when you make something free you take all value away from it…people may not perceive value when it's free …" Well it's free that means it, either it doesn't work or it's average", NZInt8).* Customers were happy to pay for "*time efficiency" (NZInt5);* confirming the point, a participant gave an example where an overseas bank charged for mobile transactions, still there was *"…no material difference in terms of levels of adoption and usage between them and other financial institutions" (NZInt9).*

The theme's concept was formulated as "**Customers (i) still preferred services offered free of charge, but (ii) their attitude towards free vs paid services was changing",**…illustrated by *"…which existing mobile business services are most attractive to customers? … stuff that's free" (NZInt4)* and "*People are starting to learn that if they do want quality they do need to pay" (NZInt12).*

Note 20. The theme may have links to the themes about service benefits, need and choice.

6.5.17 Emerging theme "Innovativeness"

This theme was derived from six descriptive codes in four categories and was supported by 33 NVivo data references extracted from nine sources (Table 6-27). Figure 6-26 above (bottom right) shows a visualization of the development process for this theme. All relevant data were aggregated in Nodes/STAGE 2/Emerging themes/Innovativeness. A summary NVivo report was stored as Sources/Internals/STAGE 2 DOCUMENTATION/Innovativeness-data (Appendix U4).

Table 6-27. Theme "Innovativeness"

Label	Description	S	R
Service demand inhibitor S2 Final		2	6
Stagnant	Services that do not change "well" to meet changing customer requirements are not going to be used.	2	6
Service not viable S2 Final		5	11
Business model	Businesses develop their models too slowly while innovative applications and services disrupt the market, or develop unrealistic models	4	7
Dynamic technology development	[add to services difficult] Technology is moving forward at a very fast pace and the future is not easily seen especially by small players	3	4
Technology opportunities S2 Final		5	6
Develop and customize	It is now easier to develop and customize applications	3	4
Rewarding	Mobile application development is relatively cheap and also scalable and therefore, cost effective	2	2
Uncertainty S2 Final		7	10
Innovation	Innovative development is on a "test" it basis, no clear roadmap; not all consider it needed (in other codes – it is not more important than need for services)	7	10
	Total number of sources and NVivo data references	**9**	**33**

What was happening? Mobile technology was ready to support innovative service development. It had become less complex to use (*"… at the moment… you can see also some new applications being developed that allows people to work with mobile technologies in a more easy way…elements for mobile devices which are kind of like custom made data frames", NZInt7*). It also offers means to customize services according to the target user profile (*"… for instance, the CBD has more Asian population so the way you talk to them, or the way your facilities [work] is not the same*

than Herne Bay. … because you've got a GPS system, the mobile can identify which app or which area you've got", NZInt5). This has created a "*rewarding*" *(NZInt13)* market opportunities for local service developers (*"… today you're getting applications from small companies, both upcoming small companies who are no longer programming in the standard client server environment, they are programming on platforms that are completely new platforms…so that they can work in providing services for users one way or the other", NZInt6*) who could take advantage of the in-built scalability of the mobile user community *("… the economics of app development …are scalable – they benefit from re-usability and standards so that mobile app number 100000 will cost less to build than app 10000 and less than 100 and so on", NZInt11).* Successful, innovative ideas could have significant impact (*"… you can come in and just completely disrupt a particular market by using a mobile app… that's going to happen more and more…", NZint12).*

However, innovation in mobile services was also perceived as carrying a degree of uncertainty in terms of outcomes *("…mobile apps, it's a much weirder environment where maybe innovation is harder to do because, IBM can innovate by generating a new, say, forward memory, which they've done many times, because they know what it is they're trying to achieve", …NZInt12)* Innovation was not a priority *("… what's probably more important than innovation is usefulness and usability for the customers that you have…", NZInt12),* especially given the small size of the local customer market (*"…there are these small service companies… who have all been acquired by American companies because what they're offering a service for mobile operations is more global than what is local", NZInt6*).

<u>How was it happening?</u> The process of conceptualizing a new idea was not straightforward and *"…it's not until we actually work through the technology side of it …it takes you a little while to then say, 'Yes this is the idea I was trying to articulate.", (NZInt10).* "*Device variety*" also needed to be considered when making implementation decisions (*"…there are so many mobile devices out there. to implement your service, can you make it device agnostic or can you develop a device specific version…", NZInt10*). To mitigate risk, developers were operating on a trial and error basis: *"…they launch the app on the market …without testing really and it's crashing and a month later we've got a version one point zero and it's sort of a trial/error rather than saying, well let's test it, NZInt5)* and were trying to gauge customer response (*"…So we would try a new service and we'll see how that responds and then grow that and modify that or*

just change it up based on what we think they [customers] are", NZInt2). As a result, apps (and services based on them) could *"… fall into the trap of getting stuck when they have some traction, but are unable to change and refine elegantly, their architecture is complex and stagnant, their user base expectations … not managed to enable and support change", NZInt11).*

Why was it happening? Innovative ideas were not always technologically feasible (*"…I think that tends to be the case that we've got plenty of ideas about business use case, but we have to kind of wait for the practicality of them to catch up", NZInt12*). Concerning MNO support for new technology there was a slow response *("…and I know the other two telcos are the same … the actual implementation of the technology has got barriers, whether they be business barriers or technical barriers", NZInt10).* Furthermore, there was a need to introduce innovation in the use context *("…innovation is applied not only in the technology but also [in] the use of the technology…the environment where the technology is inserted into needs to change a bit…some conceptual patterns …have to be changed over time", NZInt7),* and to consider the socio-economic background of the targeted customer segment (*"The question is how practical and affordable are those things in practice… business use cases have often run ahead of the technology and affordability", NZInt12).* The perhaps unnecessarily fast pace of technology development (*"Yeah it's changing too fast, …I think it's going too fast it's just a silly game as well", NZInt5*) contributed to the challenge, as it exposed new services to the risk of becoming obsolete too early (*"The dynamics of this market can wipe you out of business before you know it…The frequency which they come out with these releases has been really quite breathtaking and for a developer actively participating in that community trying to come up with new ideas that use those very latest features, you are always operating right at the cutting edge of – what if I do something now that uses all this new technology but then that breakthrough doesn't work on all the other devices that are out there on the market", NZInt1).*

The theme's concept was formulated as "Innovative services were needed in order to keep up with technology innovation, though there was uncertainty about the outcomes", illustrated by *"…the whole space is so new and there's no knowing way of doing it or standard way of doing it. The whole process is innovative" (NZInt2)* and *"When you're trying to come up with some new mobile app it's a lot fuzzier, isn't it, in terms of success" (NZInt12).*

Note 21. The theme may have links to the themes about services difficult and unique mobile services.

6.5.18 Emerging theme "Performance quality"

The last theme was derived from six descriptive codes in four categories and was supported by 45 NVivo data references extracted from 11 sources (Table 6-28). Figure 6-27 depicts a visualization of the theme's development. All relevant data were aggregated in Nodes/STAGE 2/Emerging Themes/Performance quality. A summary NVivo report was stored as Sources/Internals/STAGE 2 DOCUMENTATION/Performance quality-data (Appendix U4).

Table 6-28. Theme "Performance quality"

Label	Description	S	R
Customer decision making S2 Final		5	11
Quality as a factor	Services adopt and pay for services perceived as performing at a high service quality level (available, reliable, fast, fully functional)	5	11
Customer expectations S2 Final		7	16
Service quality	Customers expect high service performance in terms of speed, reliability, and always/anywhere availability. Even more so as services become more part of everyday life.	7	16
Service value detractor S2 Final		2	2
Speed	Speed of the data network not adequate	2	2
Technology limitations S2 Final		5	16
Backhaul	Date network infrastructure may not be adequate, expanding but may be slow	1	3
Device drives back	Mobile devices still have inherent limitations (screen size, OS)	4	7
Web protocol	The fast transition to the mobile Internet meant using the existing Web but HTTP is inherently slow for mobile devices	1	6
	Total number of sources and NVivo data references	**11**	**45**

What is happening? According to participants, customers were generally content with mobile device reliability as devices *". in most part…they work in extraordinary way…" (NZInt1),* even though there were a few "technology glitches" such as the provision of waterproof devices (*"…a few things that we don't know how to handle… [in a survey] …everybody said, I want my mobile phone to be waterproof ", NZInt5).* However, the quality of mobile networks in terms of coverage/speed was not at the expected level. New Zealand seemed to be *"…a bit behind in totals of bandwidth speeds that you would accept in some other different countries, NZInt7)* and customers using mobile services were dissatisfied (*"For the ones that do use [mobile services], the biggest factor or source of dissatisfaction is around speed …", NZInt9).* Customer use of services was also affected by the performance quality of the device interface *("… with the smaller screen. …there's a danger because people download an application and then it doesn't work very well and then they pretty much abandon it", NZInt13).*

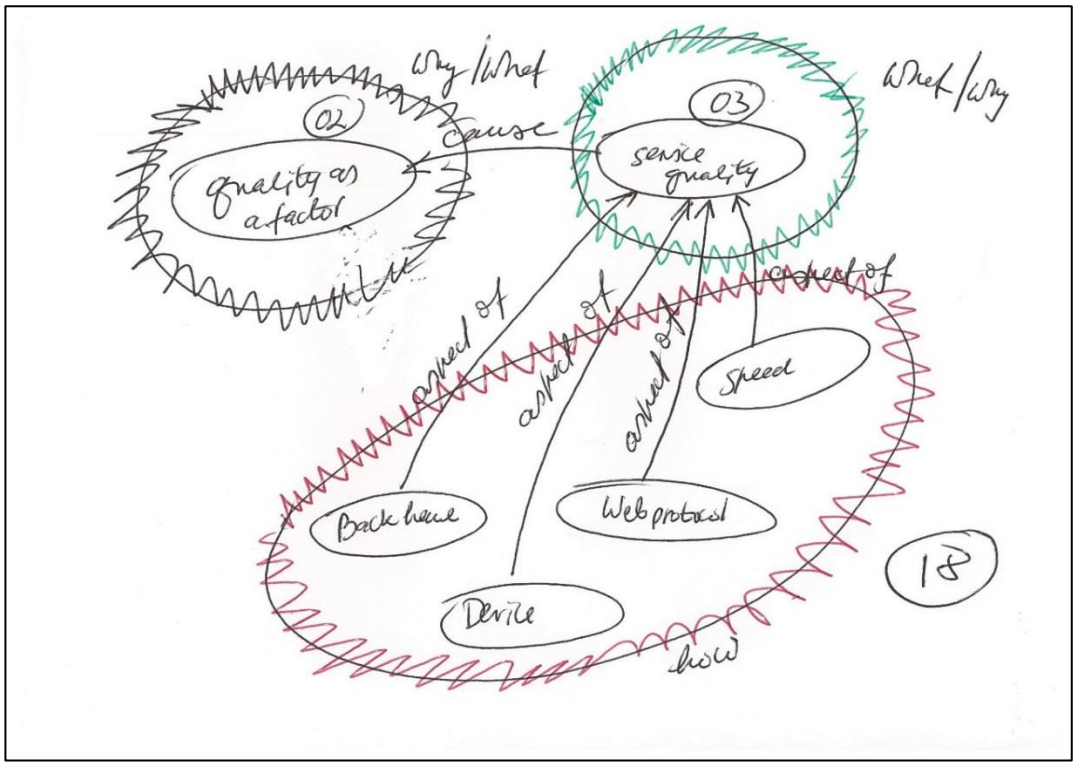


Figure 6-27. Developing theme "Performance quality"

How was it happening? Customers were likely to judge a mobile service depending on "*data service quality" (NZInt5)*; "*…It's good, but it's not fast enough" (NZInt9).* In summary, customers were expecting a "*faste*r" *(NZInt9*), "*reliable" (NZInt4)* and "*accessible" (NZInt10)* service in order to fulfil the "available anywhere" promise of mobile technology ("*...the mobile device allows … to have that location independence" …NZInt10*). Service "*timeliness*" was *"really, really important" (NZInt12)* – for example, for services that required high speed access in order to achieve the required geo-positioning precision (*"…application made for blind people actually …need to be very precise to know where they are, what's going on, or elderly when they take their pills … need to click on that simple button, but that needs to be connected to the server very quickly as well", NZInt5).* A participant provided an example about improving the screen interface by improving the service design: "… *LinkedIn … now we have I think version six of the app … it's very robust … apparently they invested some money in development, but not only the technology development and the reliability, but also in the interface design and now both are working very well together", NZInt5)* .

Why was it happening? Customers "… *basically… view mobile as a twenty-four by seven channel and they don't really tolerate very well when things are broken in some way" (NZInt9).* However, infrastructure providers could not always offer the required speed due in part to the need to upgrade their backhaul channels to accommodate

growing data demand, and to maintain the RNC infrastructure and performance (NZInt6). Similarly, device interface performance quality was important customers (*"…an application which is running on your mobile, or you're wanting it to run on your iPad, we're finding customers are more and more looking for ….it needs to be sharp, it needs to be pixel perfect…", NZInt13)* given the inherent technology limitations *("Well one of the things that a mobile device like this is limited by is the amount of real estate on the screen that you have", NZInt4).* A participant also pointed out application layer limitations, contributing to both perceived connection speed and image quality, that were difficult to overcome: "*That web protocol which is now 25 years old or whatever, is really old and restricted and that has become a fundamentally limiting factor in mobile phones" (NZInt2).*

The theme's concept was formulated as "**Overall service quality is judged by device and network performance quality**", illustrated by: *"…the other thing that changes consumer perception once they are actually adopted, is around a requirement for availability, reliability, and robustness" (NZInt9).*

Note 22. The theme may have links to the themes about services difficult, service benefit, free vs paid.

6.5.19 Emerging themes summary

Identification of the emerging themes involved rereading the data and modifying code labels, descriptions and content if there was need to refine the coding. Minor changes included reassigning data excerpts or parts of them, and relabelling codes. The data excerpts in the NVivo node "To code later" were also regularly re-examined and some were assigned to codes. In addition, the structure of the coded data set was slightly expanded as three of the descriptive codes (Value as a factor, Rich experience and Data network) were re-examined and the data were reorganized into seven new descriptive codes (Benefit as a factor, Trade-off as a factor, Unique experience, Service experience, Improved experience, Cost, and Speed). At the end of Stage 2 the data hierarchy comprised 98 descriptive codes, with seven of those descriptive codes containing a total of 27 nested codes (Appendix V).

The updated version of the coded data set was preserved in the NVivo project in folder Nodes/STAGE 2/Data Codes. An end-of-stage report containing the updated code hierarchy was generated and stored in the Stage 2 documentation folder as DD–Codes Stage 2; an end-of stage report containing the updated version of the coded data set was

also generated; however, due to its length, it could not be uploaded as an internal document to the NVivo project documentation folder (though it can be generated and exported as a standalone file upon a request). A report containing the data that remained as potentially useful but not used is available in Appendix W.

In all, 18 emerging themes were identified and described. These emerging themes were based on meanings extracted from a total of 799 NVivo data references; the "smallest" theme "Rich experience" was supported by 20 data references (refer Subsection 1.5.14) while the "largest" themes ("Customer segmentation", "Customer roles" and "MNOs under pressure") were supported by 81, 74 and 64 data references respectively (refer Subsections 1.5.2, 1.5.1, and 15.5. respectively). Table 6-29 summarizes each theme name and concept, as well as the related word, source and NVivo data reference counts. A diagrammatic representation of the links between emerging themes and data sources (i.e., interviews) can be seen in Figure 6-28.

Just as occurred in Study 1, the number of codes used to develop a theme varied, from three (e.g., in theme "Innovation") to ten (in "Enabling competition"). All themes were supported by codes from two or more categories (Table 6-30). However, compared to Study 1, where only two categories (Technology and Regulatory environment) contributed each to a single theme, five of the categories in Study 2 (Technology limitations, Regulatory environment, Customer attitude, Customer input and Customer segmentation) contributed to a single theme each. This was in line with the "flatter" structure of the code hierarchy used in Study 2: rather than using categories and sub categories as in Study 1, in Study 2 only categories were used (but a higher number of them – 19, compared to 5 in Study 1).

New in Study 2 was the emergence of the four "double-faceted" themes that were characterized by two related but distinctly different facets. This can be explained in part by the descriptive coding approach applied in Cycle B in which codes that represented topics were developed (rather than codes representing meanings, as in Study 1); a topic could be less or more specific depending on the relative richness of the data. During the coding data were interpreted in order to determine the topic they belonged to, without looking for relationships between the codes. Thus the existence of the facets was detected only later when seeking to identify patterns and themes. To preserve the facets each was described using the "what-how-why" framework and illustrated by data excerpts from within the theme data.

Table 6-29. Emerging theme names and descriptions

Theme name	Theme description	S	R	W
Customer role (users; contributors)	**(i) Customers perceived as drivers of service development as service users** **(ii) Customers perceived as drivers of service development as service contributors**	13	74	3201
Customer segmentation	Customer segmentation by specificity of requirements guides service development	13	81	3445
Enabling competition	Even though current legislation benefits some of the stakeholders, much more work is needed to ensure a balanced regulatory environment able to support completion at the same time ensuring mobile network infrastructure growth and providing adequate transaction safety and privacy protection to New Zealand customers	12	55	2545
Active vendors	Device vendors/platform providers compete to establish their product (device and platform) as a market leader	9	41	2237
MNOs under pressure (sector competition; market dynamics)	**(i) MNOs under pressure to maintain viability due to increased sector competition** **(ii) MNOs under pressure to maintain viability due to changes in market dynamics**	11	69	3509
Services difficult	Difficult to develop and offer new services	11	40	2150
Future MNOs	MNOs will have a core function – to provide a reliable and fast network but will have to operate in partnerships with other players	10	39	1842
Motivating customers	Motivating customers to use a service to ensure its viability	11	32	1954
Simple to use	Mobile services need to be simple/easy to use	9	29	1100
Services (need; choice)	**(i) Customers expect services that meet identified needs** **(ii) Customers expect services that they can choose from**	12	37	1613
Awareness	Service developers and providers need to raise customer awareness of new services	10	40	1899
Mobile lifestyle	Customers are attracted by services that enhance their lifestyle quality including service designed to be used while moving	11	56	2314
Unique mobile services	New and unique mobile device features drive the development of new and unique mobile services	10	36	2138
Rich experience	New mobile services needed to provide pleasurable and engaging experience in order to attract customers	8	20	634
Service benefits	Mobile services needed to provide clear benefits in order to be perceived as valuable	9	33	1244
Free vs paid (free; paid)	**(i) Customers still preferred services offered free of charge** **(ii) Customers attitude towards free vs paid services was changing**	10	36	1357
Innovativeness	Innovative services were needed in order to keep up with technology innovation however, there was uncertainty about the outcomes"	9	33	1984
Performance quality	Overall service quality is judged by device and network performance quality	11	45	2176

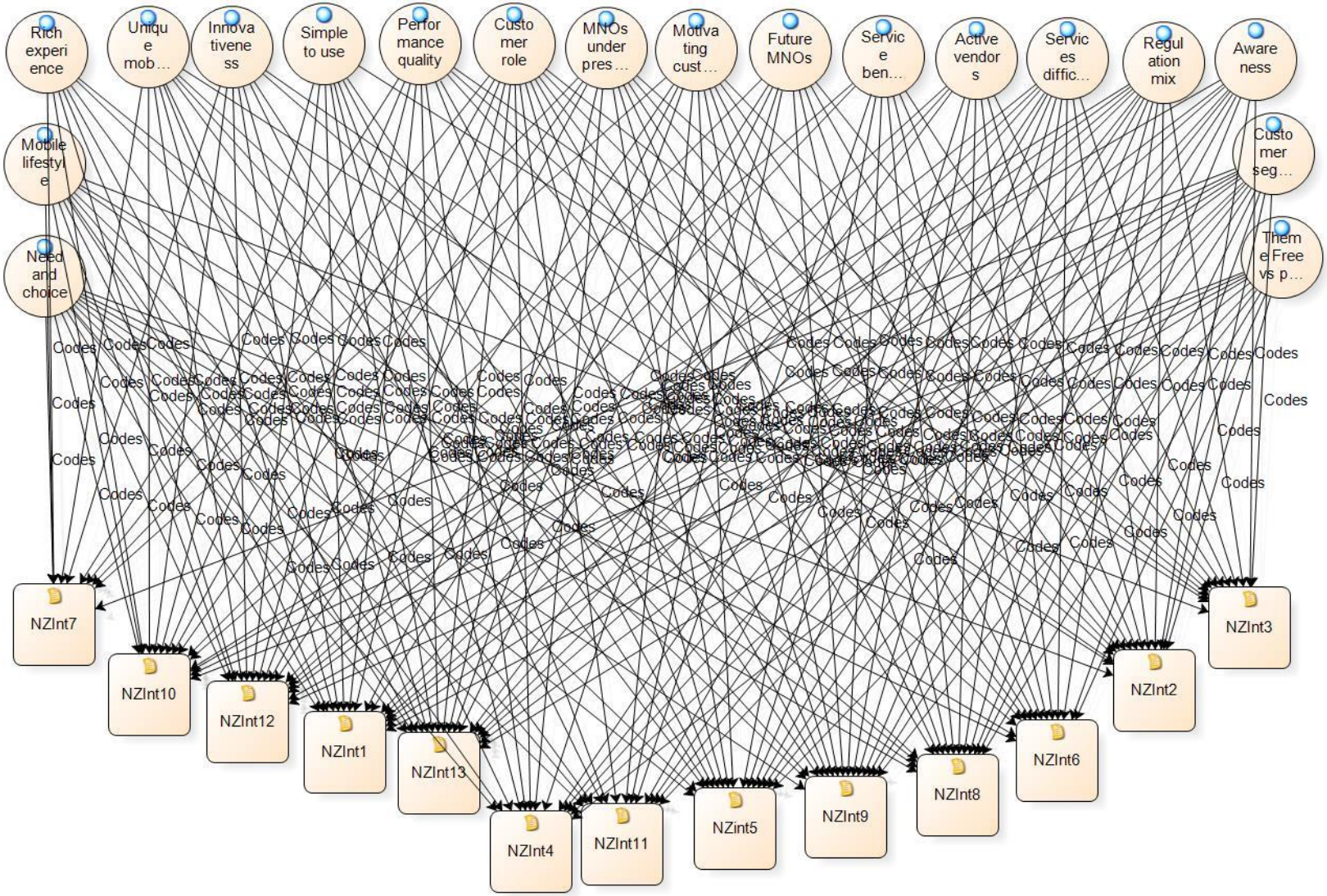


Figure 6-28. Emerging themes across sources

Table 6-30. Emerging themes vs categories

Themes (numbers in brackets show number of categories contributing to each theme)	Categories (numbers in brackets show number of themes each category was associated with)																					
	Customer attitudes (1)	Customer decision making (8)	Customer expectations (5)	Customer input (1)	Customer requirements (4)	Customer segmentation (1)	Regulatory environment (1)	Service demand generator (2)	Service demand inhibitor (4)	Service value adder (5)	Service value detractor (2)	Service viable (2)	Service not viable (2)	Technology limitations (1)	Technology opportunities (2)	Uncertainty (3)	Service development and provision (4)	Competition (3)	Controlling influences (3)
Customer role (4)	X			X				X								X			
Customer segmentation (3)		X				X						X							
Enabling competition(3)		X					X									X			
Active vendors (3)																	X	X	X
MNOs under pressure (3)																	X	X	X
Services difficult (2)																	X	X	
Future MNOs (2)																	X		X
Motivating customers (2)								X				X							
Simple to use (3)		X			X					X									
Need and choice (4)		X	X		X				X										
Awareness (2)		X							X										
Mobile lifestyle (3)			X		X					X									
Unique mobile services (3)										X			X		X				
Rich experience (3)			X		X					X									
Service benefits (2)		X	X																
Free vs paid (4)		X								X	X		X						
Innovativeness (4)									X				X		X	X			
Quality (4)		X	X								X			X					

6.6 Study 2: Building Thematic Networks (Stage 3)

Following the same approach as used and described in Study 1, the emerging themes were utilized to define a foundational set of "basic" themes representing the data, then grouped into "organizing" themes based on similarities between them. At the next level of abstraction, the data in the organizing themes were read and interpreted again, and overarching "global "themes were derived, with each global theme encapsulating the meanings underlying its network of organizing themes. The organizing themes were summarized and the summaries were incorporated into the corresponding global theme description. The analysis was completed with a discussion of the findings in relation to the specific research questions guiding the investigation.

6.6.1 Basic, organizing and global themes

The process employed in developing the theme network was highly iterative, as the researcher considered different possible groupings and links (Figure 6-29, Figure 6-30). A total of 22 basic themes were initially defined: each of the 14 single-faceted emerging themes was converted into one basic theme, each of the four double-faceted emerging themes was converted into two basic themes.

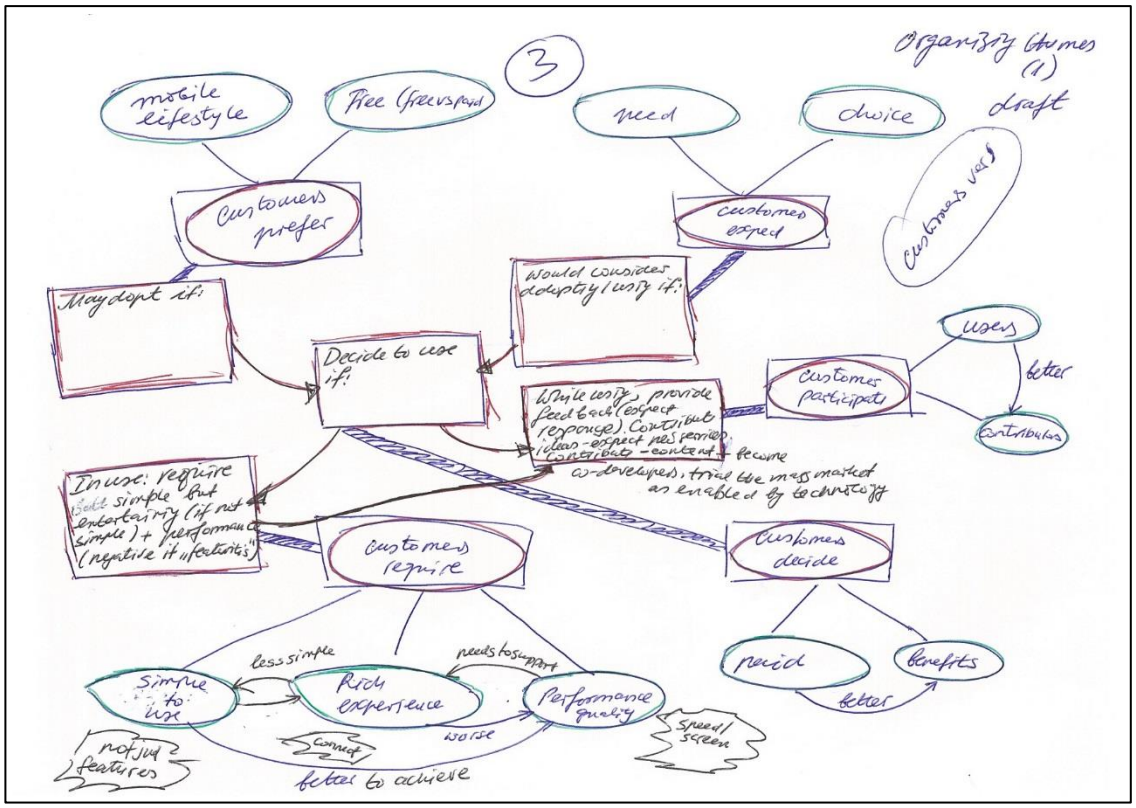


Figure 6-29. Developing organizing themes (draft 1)

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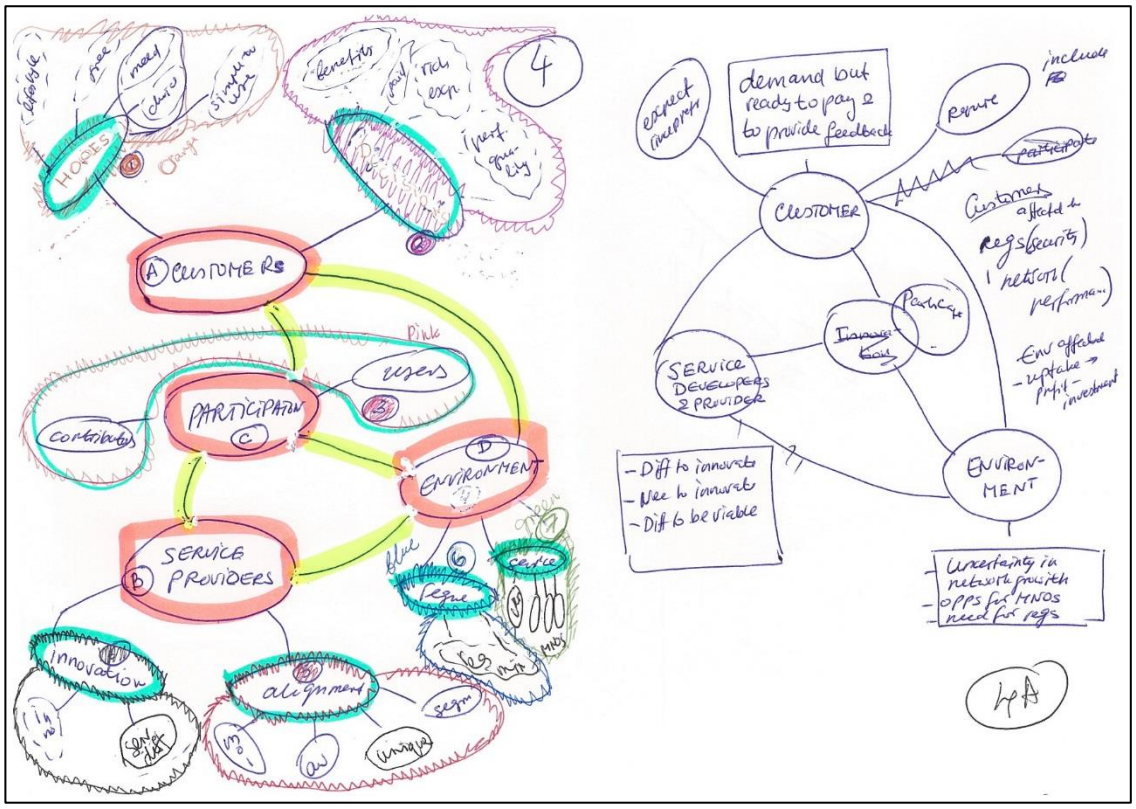

Figure 6-30. Developing global themes (draft 2)

The basic themes were searched in order to identify links between them that could lead to organizing and global themes. After a number of trials seven similarity clusters emerged; the resulting organizing themes were subsequently grouped to form three global themes synthesizing the main points of the data. The global themes were comparable in terms of word count/number of NVivo data references, and each was supported by data from each of the 13 interviews. Though neither of these outcomes was necessarily expected or required, the fact that the themes reflected such broad coverage lends credibility to their "global" nature.

The coded data, code and theme definitions, and descriptions were then re-examined and used to create expanded descriptions of the content of each organizing theme (stored as memos in the NVivo project). The final version of the theme network was preserved in the NVivo project file as folder Nodes/STAGE 3/ Global and organizing themes. No further changes to the data coding were made. The thematic networks and the thematic map that can be seen as a graphical representation of the Study 2 data set is shown in Figure 6-31. The full hierarchy of codes/categories and themes can be seen in Appendix X. A descriptive summary is presented in Table 6-31.

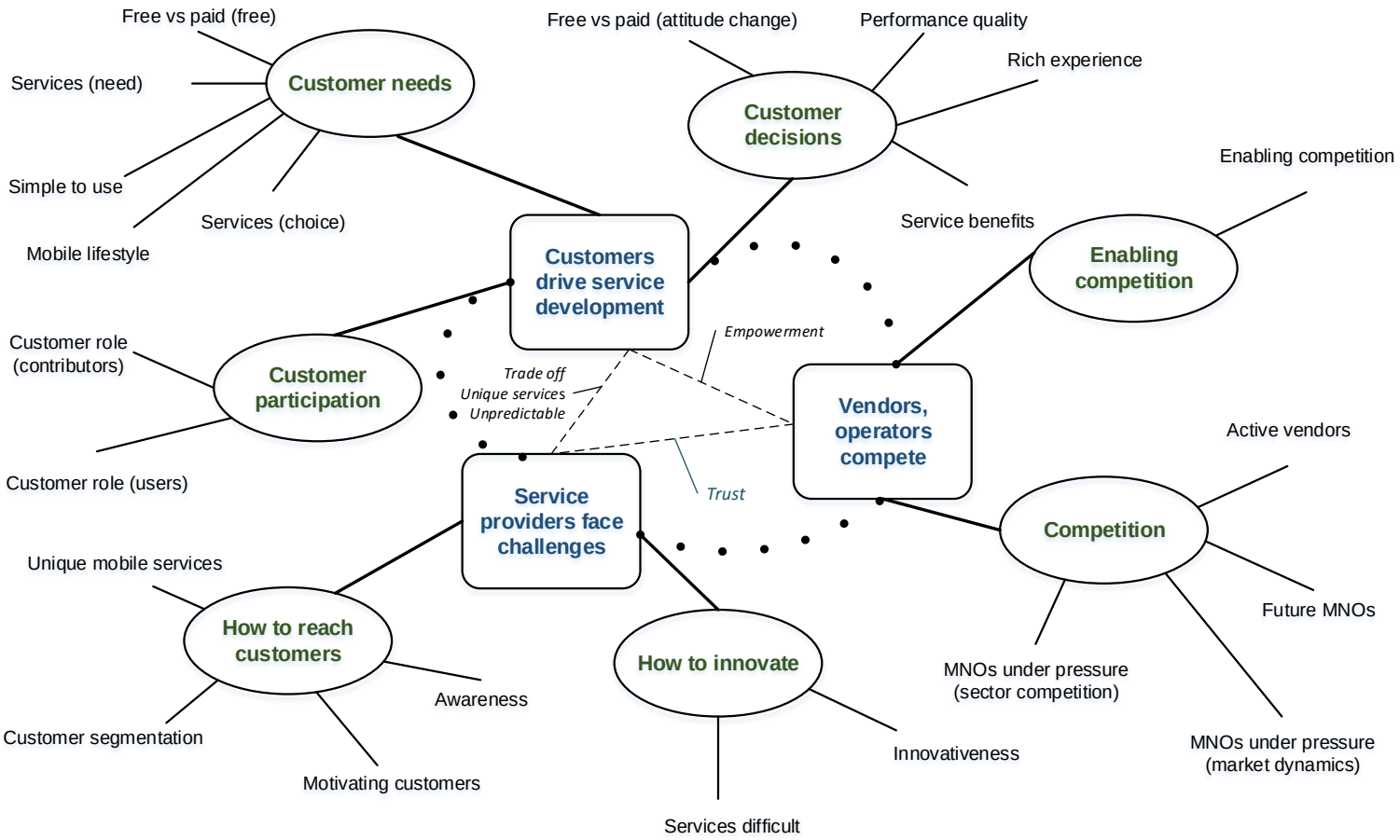

Figure 6-31. Global theme thematic networks

Table 6-31. Basic, organizing and global themes

Basic themes grouped under organizing themes[96]	Global themes	S	R	W
Organizing theme ENABLING COMPETITION	**VENDORS, OPERATORS COMPETE**	**13**	**204**	**10,133**
Enabling competition				
Organizing theme COMPETITION				
Active vendors				
Future MNOs				
MNOs under pressure (market dynamics)				
MNOs under pressure (sector competition)				
Organizing theme HOW TO INNOVATE	**SERVICE PROVIDERS FACE CHALLENGES**	**13**	**263**	**13,603**
Innovativeness				
Services difficult				
Organizing theme HOW TO REACH CUSTOMERS				
Awareness				
Customer segmentation				
Motivating customers				
Unique mobile services				
Organizing theme CUSTOMER PARTICIPATION	**CUSTOMERS DRIVE SERVICE DEVELOPMENT**	**13**	**330**	**13,639**
Customer role (contributors)				
Customer role (users)				
Organizing theme CUSTOMER NEEDS				
Free vs paid (free)				
Mobile lifestyle				
Need and choice (choice)				
Need and choice (need)				
Simple to use				
Organizing theme CUSTOMER DECISONS				
Free vs paid (attitude change)				
Performance quality				
Rich experience				
Service benefits				

6.6.2 Global theme "Vendors, operators compete"

Global theme "Vendors, operators compete" encompassed two organizing themes: COMPETITION and ENABLING COMPETION. The theme captured the perceived characteristics of the service development environment created by the interactions of the stakeholders involved. Its key insights reflected the uncertainty around the future of the players in the mobile services market exacerbated by the emergence of a global device/platform provider duopoly.

[96] The supporting data can be seen in Appendix Y. The reports were also stored in the NVivo project under Sources/STAGE 3 DOCUMENTATION/Global themes/

According to organizing theme COMPETITION, competing device vendors promoted different development platforms; the resulting platform fragmentation was an impediment to service provision. As the mobile services market was driven by smart phone penetration, device vendors were able to impose development restrictions, for example, by limiting the ability of other parties to control how devices functioned. Furthermore, the global operating environment was becoming a virtual duopoly with the two big device vendors/platform providers competing to establish their product (device and platform) as the market leader for popular services, and thus "lock in" service developers, providers and customers; to achieve their goals the two dominant vendors had placed a strong emphasis on customer orientation and provided incentives for developing apps/services for their platforms – thus promoting the benefits of their new devices/platforms.

In time these vendors may threaten the viability of MNOs in data network provision (by providing an affordable Wi-Fi network, for example) thus adding to the pressure MNOs were already under: MNOs had to compete to stay relevant in the market and to ensure profit to shareholders, even though their ROI had been eroded due in part to the introduction of competition-encouraging legislation. MNOs could benefit from mobile service use (as smart devices were becoming more affordable) if they invested in developing their data networks in order to support data-intensive mobile services with a reliable and fast network, and develop synergies with other players: due in part to the aggressive promotion strategies of device vendors, customers were now choosing device rather than network providers, and MNOs had to consider all choices customers made.

In spite of its "cutthroat" nature the competition was "naturally" limited as the small country size could simply not support too many operators; therefore, MNOs continued to control mobile data prices (for example, using plan bundling) and were not particularly interested in supporting application and service development by third party developers. Rather than service developers and providers, MNOs were seen as potential mobile service *enablers* (e.g., providing location data, authenticating customers, providing mPayment services).

According to organizing theme ENABLING COMPETITION, the New Zealand regulatory environment was not restrictive to content development, with existing regulations around security and privacy already protecting customers and customer

rights. However, while the context was conducive to mobile service development (as customers tended to adopt services they perceived as safe to use), small local service developers may find it hard to compete because of increased compliance costs. Moreover, as it was likely that in the future New Zealand customers would use imported services, future regulatory provisions would need to facilitate service import while providing adequate privacy and security protection to New Zealand customers, and attract global service providers to "set up camp" rather than encourage competition. Similarly, while existing bandwidth management regulations provided the "best deal" for customers, they had a negative impact on infrastructure owners' ROI and income. In response, MNOs limited their investment in infrastructure ownership and development; future legislation would need to make adequate provisions for sustained infrastructure growth.

6.6.3 Global theme "Service providers face challenges"

Global theme "Service providers face challenges" encompassed two organizing themes: HOW TO INNOVATE, and HOW TO REACH CUSTOMERS. In this theme participants set out their views on new service development, and its drivers and challenges. Key insights indicated that new services were developed by trial and error rather than by following a clear roadmap, as the opportunities offered by the mobile channel and its potential were yet to be fully understood.

In organizing theme HOW TO INNOVATE participants felt that, although it had become easier to develop and customize applications, it was still difficult to identify, develop and offer new services: there were different perspectives on how services needed to be provided, and innovative development was running on a "test it" basis, without a clear roadmap. A conflict was identified: on one side, technology innovation provided new opportunities that could be used to develop and deploy innovative services, and in this way technology served as a driver for new and innovative service development; on the other, technology was developing at such a fast pace that often there was not enough time to test the market with a new business model – often unrealistic business models were promoted, as service developers were not well attuned to customer expectations and needs. This introduced uncertainty about the outcomes of innovative services adoption and use by customers, exposing service developers and providers to a financial risk. As a result, service developers and providers tended to follow competitors' leads and so develop and provide "the same" service that had been proved to be valuable and less risky, such as mobile banking (more like a secondary

service channel rather than a truly innovative service). A barrier to innovation was also the need to continue to develop existing services in order to meet changing customer requirements, when not all service providers were used to such a fast pace (e.g., businesses with established business models such as banks). Some service developers were looking for new opportunities, such as exporting services to developing economies where the market was perceived as easier to penetrate and innovate.

According to organizing theme HOW TO REACH CUSTOMERS the success of a service depended on the pricing model and the trade-off offered to customers; free services were seen as a way to attract more customers and create the critical mass needed before collecting any revenue. Participants described how to develop, promote and maintain a successful service.

Service development was perceived as being driven by the interplay of several factors. First, mobile device ownership has reached extremely high levels and may itself become a service development driver as people want to make full use of their devices. Second, service development was driven by technology progress: the new and unique features of mobile devices provided an opportunity to invent and develop new and unique mobile services that could not be employed using a non-mobile device. Examples included authentication through GPS/data network, other LBS that require geo-positioning as a built-in capability, services developed around the use of NFC (already used for payment services). A third factor was related to the existence of multiple customer market segments, each with its own specific customer needs and requirements. Any new service needed to be aligned with at least one precisely identified target market; for example, customer segments that were formed along demographic characteristics (younger vs older customers), socio- economic status (may affect service affordability), occupation, prior experience.

As far as service adoption was concerned, one of the challenges faced by providers was to have customers try a service for the first time. Customer awareness of new services needed to be raised as customers tended to adopt services they had some knowledge and understanding about. Services recommended and/or used by friends/members of extended social circles were more likely to be trialled depending on perceptions about the trustworthiness of the recommender or the provider, as customers were highly concerned with how safe to use a service was. Second, it was becoming necessary to provide additional incentives to motivate continuous use, by creating a supportive

overall environment (e.g., affordable use of phones overseas, free wireless zones in rural communities, merchants set up to accept mPayment).

6.6.4 Global theme "Customers drive service development"

Global theme "Customers drive service development" encompassed three organizing themes: CUSTOMER NEEDS, CUSTOMER DECISIONS, AND CUSTOMER PARTICIPATION. In this theme participants contributed their thoughts regarding perceived customer expectations and requirements, and the role of customers as drivers of service development. The key insight was that customers were typically well-informed and therefore, their requirements and expectations needed to be considered; customers had a significant input through feedback and co-participation.

According to organizing theme CUSTOMER NEEDS, customers were attracted by services that enhanced their lifestyle quality by making life easier, were simple to use and functioned seamlessly. Customers' requirements included convenient and helpful (not just useful) services, and services that supported mobility (especially important as business/work and personal life had started merging location- and time-wise.). To this end, customers would adopt services that met a need of which they were aware. Of the services they adopted customers had high expectations: services were expected to meet the individual's personal goals and needs, to be easy to use, to support interaction and staying connected (where staying connected was highlighted by participants as an important expectation related to the mobile device's core capability of being always connected to a network). As customers were used to having options and making informed decisions when choosing a service, they expected the same in regard to mobile services. Finally, it was felt that customers still expected to be offered at least some free services (especially as the cost of access to the data network was still perceived as high) – for example, services that were part of a larger, not-for-free service system such as mobile banking. However, free services were also regarded with caution because of perceptions about hidden costs and/or inadequate quality (and that free services may be abused and inhibit investment, leading to lack of value).

According to organizing theme CUSTOMER DECISIONS, the customer attitude towards free vs paid services was changing: customers were perceived as being more prepared to adopt and even pay for "value" as the decision to adopt a service depended on how clear the value proposition was (clear benefits). Customers wanted real and measurable value, not just features, and saw benefits in services that proposed to surpass

existing non-mobile alternatives, or were unique, and promised a pleasurable, engaging and enriching experience. Once in use, overall service value was judged by the quality of the performance of the device *and* the network performance quality, and by the quality of the service experience. Customers expected high service performance in terms of speed, reliability, and always/anywhere availability – even more so as mobile services became more part of everyday life. However, the speed of the data network was not always seen as adequate (possibly due to a slowing infrastructure growth rate); the user experience was thus not always pleasurable, either due to the use of the inherently slow Web protocol (HTTP) or to limitations pertinent to mobile devices (small screen, operating system limitations).

According to organizing theme CUSTOMER PARTICIPATION, customers were perceived as somewhat conservative in the way they used new technology, and somewhat distrustful of innovation. However, customers were interested in new services if they suited their needs (e.g., mobile banking, or services that offered connectivity with others, or entertainment services). Participants noted that customer preferences were changing and so customer behaviours were difficult to predict; however, technology also enabled customers to provide feedback and it seemed they were happy to do so. Service providers valued and relied on customer feedback as it made it possible to gauge customer demand and develop and offer services meeting inferred customer requirements, expectations and preferences. The customer role as feedback provider was thus perceived to be very important – it created value for service providers by enabling them to fine-tune the value proposition, and it created value for customers when a much-needed service was offered. In addition, customers had become active participants in the value creation process as the technology empowered them to also develop and deliver content, and become service co-creators.

6.6.5 Member check

The member check is a method used for establishing research validity, one of the possible steps that can be taken when seeking to ensure qualitative research credibility. It is a process wherein the findings of the research are taken back to (some of) the research participants and their feedback on the accuracy of the reporting is sought, with the purpose of validating it (Seale, 1999). As such it has been noted as being “the most crucial technique for establishing credibility” (Lincoln & Guba, 1985, p. 314) (as cited in J. Cho & Trent, 2006, p. 322). Although Cho and Trent distinguish between two types of validity (“transactional validity” and “transformational validity”, described

next) they support the use of member check provided that a method appropriate for the purpose of the validation has been selected, as also noted later by Koelsch (2013). In addition, given the fact that the gathering of the Study 2 data spanned a period of almost two years, and the analysis and write-up took two further years, the researcher considered it important to check both the study's transactional validity (whether the interpretation of the data accurately represented the views of the participants) and its transformational validity (in terms of how relevant the findings were in the light of the latest developments in the mobile service industry sector).

Based on the ideas in the work cited above the researcher decided to deploy the member check process, and approached the first and last participant to be interviewed in Study 2 (NZInt10 and NZInt11) with an invitation to provide feedback on the write-up of the global themes that had emerged from the data analysis (Appendix Z). The two participants were still working in management positions in the industry sector under investigation, but came from two different organizations (the same ones as at the time of the interviews), had different stakeholder profiles, and did not know each other.

The researcher contacted each participant individually. Most of the researcher's interpretation of the data as represented in the global themes was found acceptable, and still current, by both member check participants: one of the participants characterized the global theme descriptions as "*plausible*" and aligned with their knowledge and understanding of the dynamics of the MDS industry ("*yes a lot of this is what is going on right now"*). The other participant specifically empathized with "*the innovation and customer reach themes that work largely on an exploration / testing the market basis and social adoption*", and with *"informed customers who are wanting to make their lives easier"*). On the other hand, the second participant's view did not resonate with the inferences about competition between MNOs and device vendors ("*I have seen more of a collaboration if anything"*) and about the limitations on infrastructure development (*"I know [my company] and hear the other MNOs are investing heavily in network capacity, especially data"*).

The difference in opinions about vendor-MNO competition and investment in infrastructure may be explained in part by the differences in the participants' organizational backgrounds (a large established MNO facing decreased ROI and increased competition vs a smaller and more flexible MNO, a recent entrant actively seeking collaboration and partnership to support growth). The data themselves suggest

that while all MNOs had an interest in developing further their data networks (as data was becoming increasingly their main source of revenue) the two large infrastructure owners were facing low ROI (due in part to the increased competition in the sector). Similarly, participants pointed out that while MNOs currently benefitted from increased smart phone use, in the future they may be challenged by device vendors who were starting to engage in providing both MDS and data access. The comments of the member check participants highlighted the need to reflect on these juxtapositions further in the analysis.

6.7 Study 2: Exploring the Thematic Map

The thematic map and the underlying data were explored further in order to relate the emerging relationship patterns back to the specific research questions guiding the empirical investigation, and to its theoretical background. A preliminary set of relationships linking the specific research questions to the thematic map was identified (Table 6-32); using it as a guide the data in the thematic networks were reread and, in conjunction with the annotated global theme descriptions, answers to the specific research questions were derived.

Table 6-32. Global theme networks vs specific research questions

Research questions guiding the investigation	**Global themes emerging from the data**		
	"Customers drive service development"	"Service providers face challenges"	"Vendors, operators compete"
RQ1: What are mobile industry stakeholder views about customer expectations, requirements, and attitude drivers?	X	X	
RQ2: What are mobile industry stakeholder views about the value of customer mobility support features of MDS?	X	X	
RQ3: What are mobile industry stakeholder views about the mobile service supply chain, and the regulatory environment?		X	X

The iterative process followed is shown in Figure 6-32. Starting with the first global theme its description was copied into a new NVivo working space, and was enhanced by annotating the text to include mentions of basic themes as applicable. Each annotated description was then scanned and checked against each of the three specific research questions. For example, RQ1 asked "What are mobile industry stakeholder views about customer expectations, requirements, and attitude drivers?". Therefore, the annotated descriptions were scanned to identify text that spoke to what (according to participants) customers thought, required, wanted, needed, felt, did.

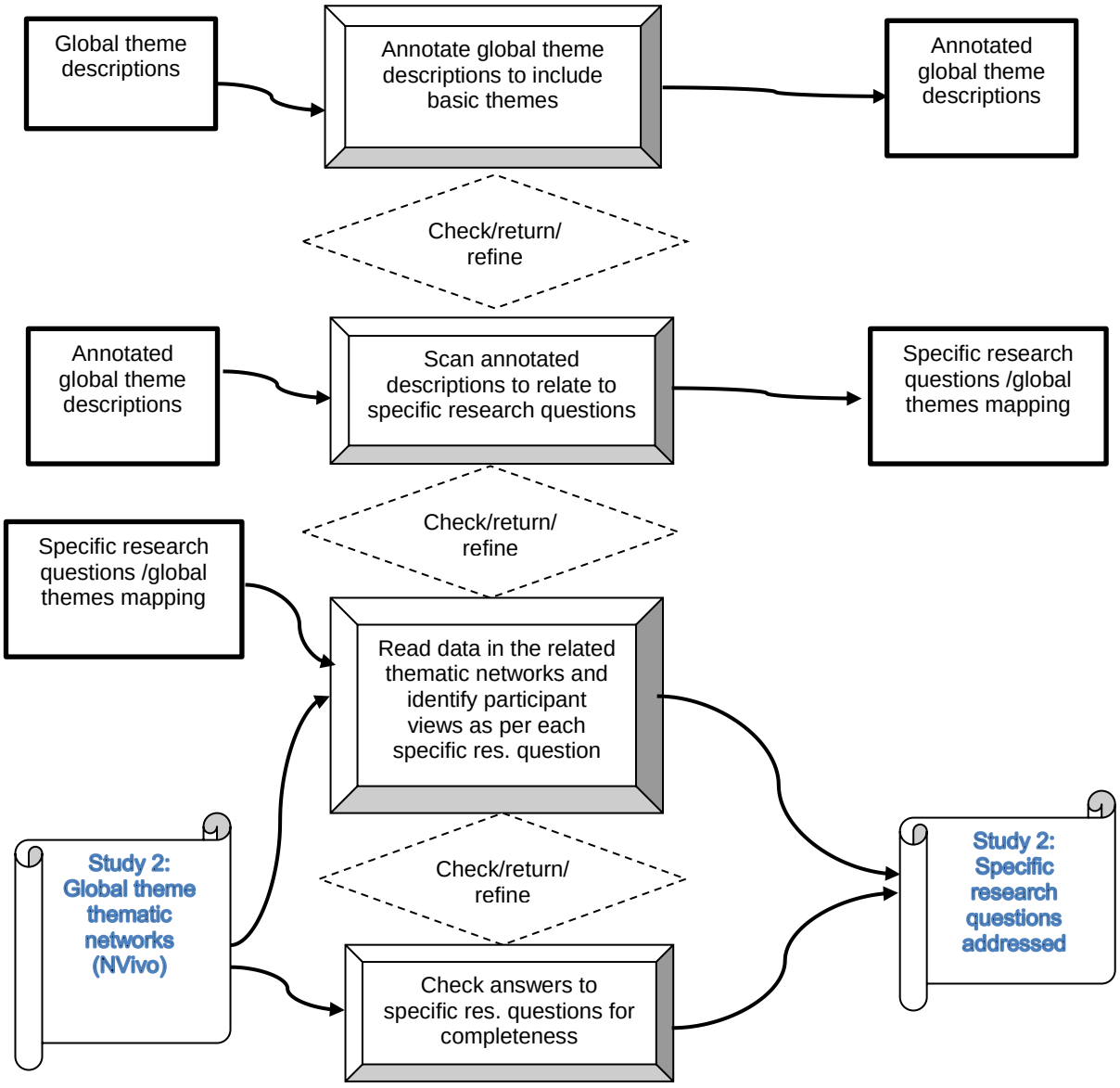

Figure 6-32. Addressing the specific research questions

Finally, a check across the whole coded data set was made in order to identify references not used in addressing any of the specific research questions. This systematic, top-down approach ensured that the answers to the specific research questions were grounded in the data, that the supporting data excerpts were not taken out of context, and that all coded data were revisited and considered in the analysis.

Figure 6-33 and Figure 6-34 show graphically the outcomes of the last step of the analysis. The subsections that follow present Study 2 findings (including supporting data).

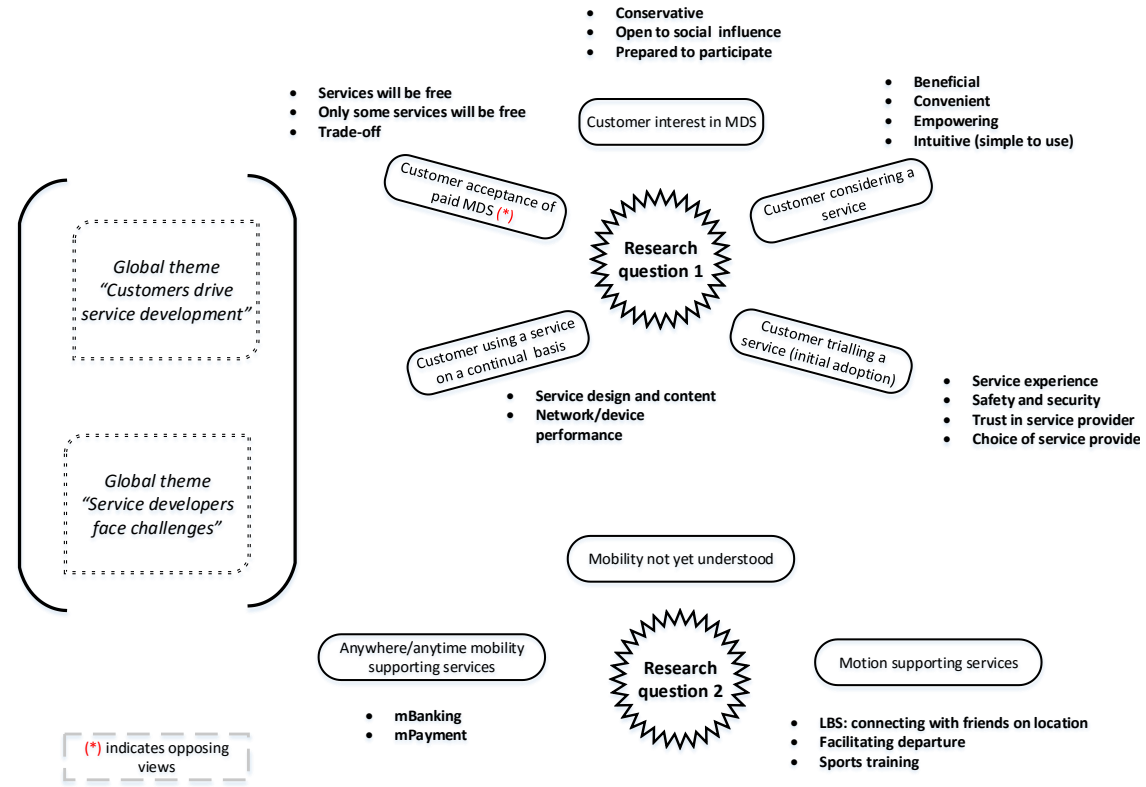

Figure 6-33. Participant views about customers and about mobility support

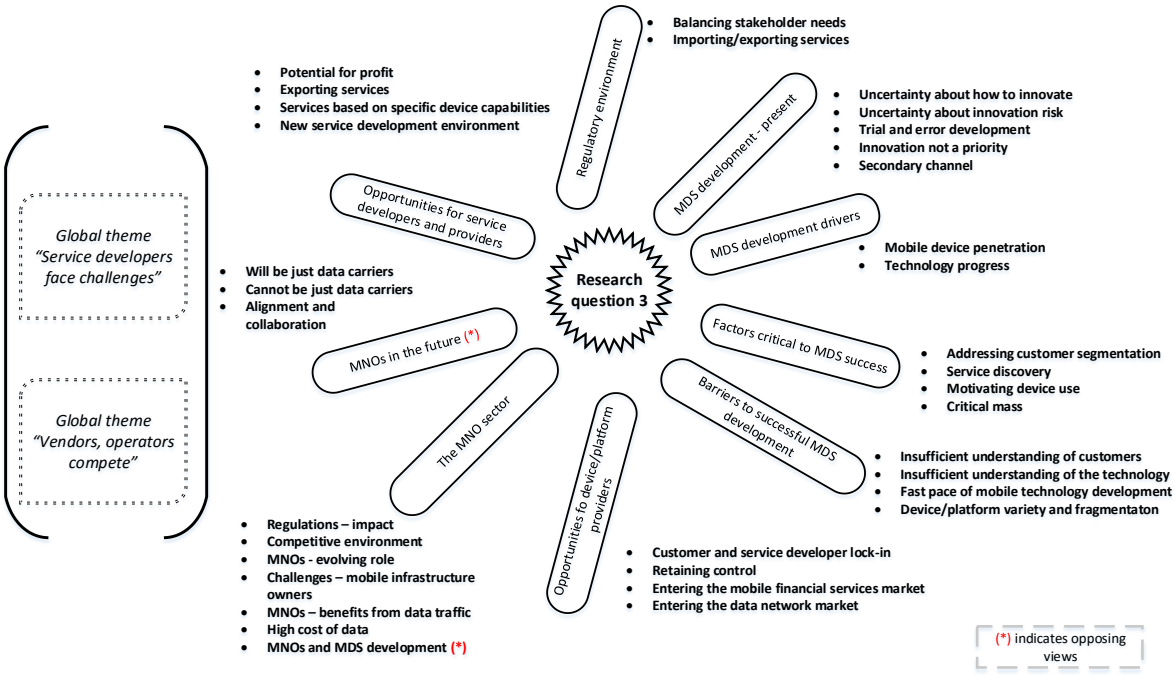

Figure 6-34. Participant views about the environment

6.8 Views about customers (RQ1)

The thematic networks of the global themes "Customers drive service development" and "Service providers face challenges" provided substantive insights relating to the first of the three specific research questions guiding the study ("**What are mobile industry stakeholder views about customer expectations, requirements, and attitude drivers?"**).

Collectively, participants expressed both generally held views regarding customer attitudes (e.g., customer interest in services and customer acceptance of paid services), as well as specific views about how customers made decisions to consider, trial, and continue to use a service. In summary, according to participants, customers were cautious but increasingly interested in new services. They would carefully consider a service offer and evaluate its potential value and safety in order to decide whether or not to trial it; continuing to use a service would depend on performance quality related to both the service design and content, and to network and device performance.

Two opposing views were expressed about the willingness of customers to pay for MDS – according to some, customers would continue to prefer free services, while others thought that customer attitudes were changing toward accepting the need to pay (for better quality). Data from the thematic networks of the two themes were used to support the interpretations (summarized in Figure 6-33, upper half).

6.8.1 C**ustomer interest in MDS**

Customer attitude to services was seen as changing. While some customers were still conservative when using mobile devices for purposes other than voice communication (mainly due to a lack of skill in advanced technology use), the influence of social media and customers' peer environment were driving a change in attitude. Customers were becoming active participants in the process of creating service value.

6.8.1.1 Conservative

Overall customers were seen as still conservative towards using mobile services:

> *"… for a lot of people they're still thinking of it just in terms of a phone and so you don't check your email on a phone you make phone calls on a phone…so there are these the less technological segment of the population who are still reluctant to take advantage of the fact that their Smart phone can actually run applications", (NZInt1).*

6.8.1.2 Open to social influence

Service use by others promulgated through social contacts (including social media) and word of mouth played a significant role in increasing customer interest in specific services for reasons related both to the usefulness of the service or application and to using it for enhancing one's social standing:

> *"…when you're talking about broad base appeal what people are going to decide on – Are my friends using it?" …, (NZInt1); "… there's also a certain amount of social influence…' Everyone else I know is using this and says it's fantastic', or 'Everyone else I know is using this and I should get on board too', …(NZInt10); "… word of mouth has a lot to do with how an application is propagated, I suppose, amongst consumers. I mean if I go and tell my friend, 'Oh this is a great app.' They may look to download it…", (NZInt8); "I think word of mouth plays a really important role in that. 'Have you downloaded this particular application? It does this and this and this'. It's that initial push …So people saying they like an application or something on Facebook can make users to download it…", (NZInt3); "… Someone might load something new on their phone so they can show their friends and then it becomes a bit of a fashion item almost. There's that whole social buzz to be cool that carries a lot of the new part…", (NZInt2); "… We used to back in time say, I like that song, or I like that painting or whatever, but now it's I've got that service from that mobile provider. Apps are almost like collectors, we used to keep our images and stick them in our iPhones…but now when you collect apps it's creating a sort of social buzz so probably it's one of those benefits as well to be able to engage whenever with others…", (NZInt5); "…the consumers end up winning …because they say…'Okay, here is the service that I'm going to use because it goes back to meeting my needs, or because everyone is using it, therefore, I should jump on … the same bandwagon…", (NZInt10).*

6.8.1.3 Prepared to participate

Customers were prepared to voice their opinions about services they received in order to help service providers engage with customers and gauge their expectations:

> *"…customers' expectations are changing… One of the things that is specific to mobile application delivery, is instant customer feedback. And so I think that's, it's very important and a very useful tool in content or application providers being able to get response and feedback to the services…It's something that customers are willing to give freely based on their unique experiences of your, of what you provided…" (NZInt13).*

6.8.2 Customers considering a service

Customer were cautious and would evaluate a service prior to using it whenever possible. The customer decision to consider a service was determined primarily by customer perceptions about perceived service value – bringing use benefits by meeting a perceived need, and enhancing customer lifestyle by being convenient, empowering and intuitive (simple to use).

6.8.2.1 Beneficial

A valuable new service would need to provide benefits related to meeting a perceived need (not just using new device capabilities):

"…Do I have a need that this service meets?' that influences them towards adoption…I think fundamentally you've got to have the need, how does this fit into your need, otherwise I think you just fall into the don't adopt", (NZInt10); "…features are never the value, it's the benefit of the feature that's more valuable…. what is the point of having a feature if it is not going to benefit you, anything that you have? So does that value add to you something?" … (NZInt6). "…what drives innovation is the need, someone sees a need and then comes up with an idea to resolve an issue, … a lot of people come up with a lot of clever ideas but there's just no need for them", (NZInt4).

6.8.2.2 Convenient

A convenient service would save time:

"…boil it down to one word and that would be 'convenience'…", (NZInt1); "…convenience, which …very much translates directly into time saving…", (NZInt9).

6.8.2.3 Empowering

A service, aimed at improving quality of life by being unique, or performing better than alternatives:

"… And the second thing is allowing things that you couldn't do before…", (NZInt9); "…things that are convenient and helpful and efficient do improve our lives even if it's only in a trivial way…" (NZInt12).

6.8.2.4 Intuitive (simple to use)

Services that did not require a special process of learning how to use them:

"…the ones that really work today and are attractive to customers are things that first and foremost need to be simple to use…" (NZInt3); "…I would call that seamless, so you don't really see the service and you but it's something natural, more natural that goes between you and the service provided. So that's why it's so attractive, it's not complicated, it's very intuitive, you push here and there and all of a sudden you've got it…", (NZInt5).

6.8.3 Customers trialling a service (initial adoption)

The decision to trial a service would also be influenced by expectations about the experiences encountered while using the service; also important were perceptions about the service safety, the trustworthiness of the service provider, and the availability of options to choose from.

6.8.3.1 Service experience

Customers would expect services to provide a pleasurable, engaging and enriching experience including interaction and connecting with others:

"…that user experience is becoming very, very important to the ratings that we're getting back…", (NZInt13); "…the other thing that's unique about mobile compared to other channels today, is the expectation around the user experience…", (NZint9); "Yes, particularly the next generation richness of experience category of services now that the low-hanging fruits of do on your mobile what you did on your desktop are done…" …New

use cases not available offline before that enable a richer life experience for the consumer, for example, they can do something enjoyable that they have not done before…", (NZInt11).

6.8.3.2 Safety

The security/safety levels of the service were important for some customer segments, e.g., mature customers:

"… I did some interviews when I was in the UK last year and we had almost everybody sort of under sixty had, was doing Facebook on their mobile phones. And I kind of go, 'Well you already know how to log in, you already know how to take photos, you already know how to type things in, you already know how to search for friends, all this stuff on your phone, what would stop you doing mobile banking?' And the answer was always safety…", (NZInt9).

6.8.3.3 Trust in service provider

The customer decision would be also based on an evaluation of the perceived trustworthiness of the service provider:

"…If I could put that one in one word, I would say 'trust'. I think so much of this technology is new that people want to get involved in something they know has some kind of reputation in the marketplace…Trust and security …may be come out even ahead of considerations like price…", (NZInt1);" … when you're dealing with funds you need to build confidence that your funds are going to be well looked after and they're going to be secure, because it's something which is valuable, it's important to you…", (NZInt13).

6.8.3.4 Choice of service provider

Customers would expect to be able to choose between similar services offered by different providers;

"…. depending on whether the mobile network operator is offering these services, or is an application provider offering the services, or is the system's company offering the services, you might have to pick and choose what applications you want and based on the complexity of what you want you may have to pay for those services…. to choose the services you want, from who you want and pay [to] who[m] …is important, that is how the market is going to drive…", (NZInt6).

6.8.4 Customers using a service on a continual basis

When deciding to continue (or not) using a service, customers would evaluate its overall performance quality along two dimensions, service design and content, and network and device performance.

6.8.4.1 Service design and content

This dimension reflected perceptions about the quality of the service in terms of the value it provided (efficient, meeting expectations, surpassing non-mobile alternatives):

"…Adoption following trial is probably driven by did it do what I expected or did it do better than the alternative I might have used…", (NZInt11); "… things that are better than doing it on the desktop are things where you definitely are going to be moving…", (NZInt12); "…people eventually tire of the gimmick aspect of it and, unless it's producing true value underneath, then people start dropping off those services…", (NZInt2).

6.8.4.2 Network/device performance

This dimension reflected perceptions about the quality of the service in terms of the quality of the technology supporting the service: network performance (network speed, reliability, and anytime/anywhere availability), and device performance (display):

"…the other thing that changes consumer perception once they are actually adopted, is around a requirement for availability, reliability, and robustness. So I've talked about speed, but basically they view mobile as a twenty-four by seven channel and they don't really tolerate very well when things are broken in some way..", (NZInt9);

"… we're finding customers are more and more looking for it to be, it needs to be sharp, it needs to be pixel perfect…", (NZInt13).

6.8.5 Customer acceptance of paid MDS

There were differing views on customer attitude towards paid services and related future trends: customers wanted free services vs customers were prepared to pay for service quality if there was a reasonable trade-off:

6.8.5.1 Services will be free

At present free services were the most preferred ones, and customers would continue to demand free services:

"…free of charge, so that's why actually some of the services are very attractive because it's free, so people they don't have to pay, that's a bonus", (NZInt5);

"… people don't want to have to go through the payment headache to get that tiny piece of information…", (NZInt2); "… nobody wants to pay for anything anymore… everybody assumes everything is free. You cannot sell a new service…I don't think it's possible now to sell a service…", (NZInt12).

6.8.5.2 Only some services will be free

"Auxiliary" services (enhancing access to an existing service by adding a mobile channel, such as mBanking, or mobile ticketing) would be expected to be free:

"… applications that provide you access to services will be freely available, so if I want to buy a bus ticket, for example, or an airline ticket, the mobile applications that run on my phone will be freely, I can download those free because it's in the interest of the organization to make those available to me", (NZInt4).

6.8.5.3 Trade-off

Customers regarded free services as intrinsically less valuable and were prepared to pay a reasonable price for a service based on its perceived value (a trade-off, as network access cost was still a consideration):

> *"… when you make something free you take all value away from it and therefore, people will either say, 'Well it's free that means it, either it doesn't work or it's average...'", (NZInt8); "…I need a reliable device, I need a reliable service, so I'm prepared to pay for that…", (NZInt4); "People are not afraid to pay, what people wouldn't want to have is pay a fat bill for telephone for a mobile company", (NZInt6);*

> *"…There's always going to be a trade-off… if it's priced fairly, people will continue to pay… It depends what you value your time at and the convenience…it depends what the cost is…", (NZInt3);*

> *"…Cost is factor… With other types of mobile services [different from mobile banking], they would have much higher demands for data. so the cost of getting their data to the phone is … going to be one of those things which drives whether those services take off or not…", (NZInt13).*

6.9 Views about mobility support (RQ2)

The data in the thematic networks of global themes "Customers drive service development" and "Service providers face challenges" produced insights that enabled the researcher to address the second specific research question (**"What are mobile industry stakeholder views about the value of customer mobility support features of MDS?").**

According to participants, mobile technology opportunities were not yet fully understood, nor fully utilized. Participants supplied numerous examples that illustrated the two types of customer mobility support provided by existing MDS: "anywhere/anytime" support, and "motion" support. Data from the thematic networks of the global themes mentioned above were used to support the interpretations (summarized in Figure 6-33, lower half).

6.9.1 Mobility not yet understood

Although attractive to customers, mobile services that focused specifically on deploying mobility-related functionality were still in their infancy. A suggested use was to gather customer location data in order to analyze customer behaviour for marketing purposes:

> *"… mobility's got some particular meaning… most attractive are ones that really leverage mobility in some way, as opposed to just be occasionally convenient. … 90% of mobile apps are occasionally convenient. Maybe 10% of mobile apps are really about moving….", (NZInt12);" …we are only just beginning to scratch the surface in terms of what mobile are going to do…", (NZInt1); "…. the industry are saying with very short term goals [,] doesn't understand the full potential of mobile…", (NZInt7);*

"…the most interesting thing with mobile service is the implementation of GPS data at the moment. And I think that is really like where new business models are developed and where you can see new opportunities for users…. people using location data as a way for marketing, as a way for analyzing consumers behaviour…", (NZInt7).

6.9.2 Anywhere/anytime mobility supporting services

"Anywhere/anytime" support concerned mobile services designed to be used by customers who changed their physical location regularly as part of their daily lifestyle; the important factor was that the mobile device connected to a mobile network created a persistent mobile service channel (the mobile device was always on, and always available to the customer as it was a personal possession):

"…Mobile. Yeah it's available anywhere, it's available anywhere, anytime provided you've got access to the network…", (NZInt4); "…For the time-saving and money-saving mobile business services, their most valuable feature is simply being mobile. That may sound trivial, but is in fact massively important. Mobile enables people to use the in-between times while waiting for others, travelling, and so on…", (NZInt11).

Typical examples included convenient services (refer preceding subsection) such as mBanking and mPayment. mBanking saved time as it enabled access to the customer's bank independent of the customer's location; mPayment could save time at the point of sale, and eliminate the need to carry a physical wallet:

"…Mobile banking apps save time and money because access to info is more timely…", (NZInt11); "… one of the challenges, I guess, with mobile banking now is that we're living in a global economy and people move around and travel a lot, and they expect the same, they expect to do the same things abroad as in a mobile channel as they would as if they were at home…", (NZInt13).

"…mobile payment… it's got massive potential and the way I've seen it working overseas is fantastic. We're still not there yet…… I just think adoption wise we've got a wee way to go and New Zealanders aren't used to it yet…", NZInt3).

6.9.3 Motion supporting services

"Motion" supporting services were designed to be used when the customer was literally moving. In this category, the important factor was that the service or application was *specifically designed* to be used while the customer was moving; normally the service would utilize a specific device capability. Examples included navigational and sports supporting services.

Being made aware of the presence of your friends/contacts at a point nearby while walking in the city was an example of a location-aware service provided in order to connect the device owner with friends in real-time/real-space mode:

"…Services on location, an aspect of mobility…", (NZInt13); "…if I go in a Cafe I can see that some of the people that are part of my network are in the Cafe or in a two

> *kilometres area, so my phone is telling me that, oh Researcher is having a coffee six hundred metres further…", (NZInt5).*

The application in this example below was designed to assist a departing customer on their way to the airport and in the airport itself by providing precise and timely information related to their flight:

> *"… one example I think that's very good in terms of why it works as a mobile application is Air New Zealand's mobile app. And the reason it's useful is that you are literally moving, I mean you are going to be mobile. …So when it's telling you about traffic, when it's telling you about checking online, when it's telling you to go to the gate, it's actually all about movement and I think that's a good example…", (NZInt12).*

The last example demonstrated how a mobile device equipped with appropriate sensors could support the gathering of real-time data related to a specific sports activity; once the data were analyzed the results could be used to improve the sportsperson's technique:

> *"…someone … did something about tennis elbow, measuring tennis elbow with a feature of an iPhone and developed a special app to understand the speed and all these sort of things and the impact…", (NZInt5).*

6.10 Views about the environment (RQ3)

Finally, the networks of the global themes "Service providers face challenges" and "Vendors, operators compete" were searched for patterns and insights related to the third research question (**"What are mobile industry stakeholder views about the mobile service supply chain, and the regulatory environment?")**.

This particular research question "pulled" out a large number of participant views on various aspects of their operational environment. Participants expressed relevant views regarding MDS development (current state, drivers, success factors and barriers to development), and regarding the opportunities for service developers and providers, device/platform vendors, and operators, including the impact of current regulations and the need for further regulation. Data from the two global theme networks were used to support the following interpretation (summarized in Figure 6-34).

6.10.1 MDS development – present

Views regarding the current state of MDS development revealed a conflict: while new technology opportunities in turn offered new service development opportunities for potentially profitable MDS, MDS development was considered fraught with uncertainty and therefore, risky. Rather than innovate, many companies preferred to follow innovators. In addition, the operating environment presented a number of barriers to

new MDS development: a naturally limited, but highly segmented customer market, and the high cost of development due to development platform fragmentation and the fast rate of device /platform change. This interplay of factors slowed down MDS development.

6.10.1.1 Uncertainty about how to innovate

There was a perceived lack of direction on how to approach innovative service development:

> *"… in general …the time-saving/money-saving categories of mobile apps that replace pre-existing offline or desktop use cases are running out…", (NZInt11); "…the whole space is so new and there's no knowing way of doing it or standard way of doing it. The whole process is innovative…", (NZInt2);*

> *"…many people in the mobile application development space look at the problems from different perspective. Some of them think it's all about the technology. Some of them know that it has to be the user experience and others are just marketers…", (NZInt1); "… because everyone's got different ideas and so you develop eighteen versions of the one product, …or people only have a very conceptual idea and it's not until we actually work through the technology side of it, they go, 'Oh okay, actually this is what I mean.' …so it takes you a little while to then say, 'Yes this is the idea I was trying to articulate'…. ", (NZInt10).*

6.10.1.2 Uncertainty about innovation risk

Although technology innovation provided new opportunities that could be used to develop innovative services, innovation in service development was perceived as difficult, with uncertain outcomes, and therefore, risky:

> *"…when we're talking specifically about…mobile apps, it's a much weirder environment where maybe innovation is harder to do because, IBM can innovate by generating a new, say, forward memory, which they've done many times, because they know what it is they're trying to achieve. …When you're trying to come up with some new mobile app it's a lot fuzzier, isn't it, in terms of success…", (NZInt12); "…To develop at what level of innovation, how much innovation risk do you want to take becomes part of the decision making process for somebody who is in the business commercially of producing applications…", (NZInt1).*

6.10.1.3 Trial and error development

New services were developed with caution**,** waiting for customer reaction before moving forward:

> *"…we would try a new service and we'll see how that responds and then grow that and modify that or just change it up based on what we think they are…", (NZInt2); "…So they launch the app on the market…without testing really and it's crashing and a month later we've got a version one point zero and it's sort of a trial/error rather than saying, well let's test it…" (NZInt5); "…For it to jump to being truly useful and stick around, it's got to be functional and integrated. There are not that many services that will stand the test of time like that…", (NZInt2).*

6.10.1.4 Innovation not a priority

Many companies did not consider innovation as a priority as they were concerned with staying relevant to current customers. However, some of them would often follow in the steps of service innovators in order to stay competitive:

> *"… what's probably more important than innovation is usefulness and usability for the customers that you have…", Because a lot of it's not about attracting new customers, it's about retaining the ones that you've got…. that doesn't mean that innovation isn't important in certain places, because clearly we never move forward if someone doesn't innovate…", (NZInt12).*

> *"…So they're not being innovative at all…they're saying, 'Okay, Bank A has a mobile solution that does X, we're Bank B so we better have a mobile solution that does X.'…", (NZInt12); "…payment services. That's eventually going to be performed by a whole host of companies that are jumping into that space now…", (NZInt2).*

6.10.1.5 Secondary channel

In regard to services such as the popular mBanking, mobile technology was used as a means to open a new communication and transaction channel with customers rather than develop a unique service. While the mobile channel was convenient and safe to use, the service did not take advantage of unique or specific features of the technology (i.e., such MDS offered only limited new value):

> *"…mobile banking…it's really just a channel…a way of accessing an account…. (NZInt13); "…most companies will just see it [mobile banking] as another channel to get to their customers … they would treat mobile business services as just another medium to communicate with their customers…", (NZInt2);*

> *"…It's not a web page any more, it's an app that gives you more security and a more seamless approach…", (NZInt2); "…the value still isn't on the phone necessarily, it's still held elsewhere…. there are some new challenges…but…there's a lot of overlap between mobile banking and Internet banking…", (NZInt13).*

6.10.2 MDS development drivers

Participants identified two major MDS development drivers: the existence of a critical mass of smart device owners as a consequence of fast-growing smart phone penetration, and the "push" from device and platform vendors who rapidly released more and more technologically advanced models.

6.10.2.1 Mobile device penetration

As mobile devices became more affordable, their adoption grew. There was a critical mass of smart phone owners who were familiar with the technology and were potentially interested in using their devices for more than just voice communication:

> *"… the price of those Smartphones are coming down is obviously going to help…", (NZInt3); "… there are also those benefits to having smartphones where you can actually*

have access to real time information…as time goes by that price point will become less and less…", (NZInt8); "…it will come to a point in time where… it'll become really next to nothing cost, it'll say, "You buy my phone, you buy my device, pay fifty dollars a month flat, use as much data, as much voice, everything flat…", (NZInt6);

"…We've had mobile feature phones for quite some time but now it's starting to hit critical mass and now developers are jumping into it and so that's a piece that's happening fast – in those last few years you can see them in job ads. They're actually advertising for people…", (NZInt2); "…. Yeah, the smartphone adoption and then usage… people who have got their smartphones just because it came free with their plan, and then before you know it they downloaded an application, and then they downloaded another and another, and then they just become active users when they never intended to… Consumers are already doing stuff on their phones… there's already a population of users, particular smartphone users… everyone's familiar with how to use it [the technology]. So when they think about mobile banking, they think of it as quite an easy, obvious thing…", (NZInt9); "… if you look at the Asia market, Vietnam and all those, Cambodia, nobody is using computers any more they're all using a mobile phone. They check the emails, they talk on mobile phone, they do their banking transaction on mobile…", (NZInt5).

6.10.2.2 Technology progress

There was a push from device vendors (who also provided service development platforms) for developing services promoting new features and functionalities to targeted customer segments; mobile devices were seen as ultimately replacing personal computers:

"And really what's sort of driving smartphones today is really the applications, ….[it] is the applications that are really driving the benefits of smartphones, which I suppose is why you've seen the demise of Blackberry as you have and the rise of Apple and Samsung…", (NZInt8); "…what drives mobile services is not necessarily the business use case so much as what's now possible in terms of the devices and the connectivity…", (NZInt12); "… different requirements and expectations on the demand side, also fuelled by the capability to cater to those differences at lower and lower cost on the supply side…", (NZInt11);

"…because mobile usage, mobile services, mobile needs are the fastest growing needs in the world..", (NZInt6); "…mobile device is ultimately going to replace people's computers… the capabilities of these devices are amazing and they're just going to get faster, smaller and faster and more powerful…", (NZInt4).

6.10.3 Factors critical to MDS success

Participants elaborated on the role of several major factors that contributed to MDS success: understanding and addressing customer segmentation caused by different and specific requirements, raising customer awareness of services, motivating and incentivizing service use, and creating and retaining a critical mass of service users.

6.10.3.1 Addressing customer segmentation

The customer market was segmented into multiple customer groups with potentially different needs, divided along several dimensions including age, socio-economic status,

and occupation. Therefore, service developers needed to identify their target customers and their needs, and develop, promote and offer services accordingly.

> *"…Digital services, and particularly mobile services, are all about micro-segmentation…" "„ (NZInt11);" …there are definitely different groups that have different requirements…", (NZInt10); "…too many mobile apps either try to solve many small problems at once with a cornucopia of features, or do not make a bold choice about their customer segment. Something for everyone rather than the number one app for user eks…focus on small segments required to succeed … ", (NZInt11);*
>
> *"… it's very important to think about what your different personas might be with mobile apps, because not all the customers are going to be the same…they won't have the same requirements…", (NZInt12); "…You can't develop just one application, it almost needs to be three applications to cater for the different markets…", (NZInt3);*
>
> *"…there's lots of implications that one has to think about for different categories of people that, you know, related to age groups, financial backgrounds… it's very difficult to generalize mobile media because the way that different people use mobile technologies …[is] more specific to their local, or like their personal characteristics…", (NZInt7);*
>
> *"… segmentation is very important. So our view is twofold, one is that the problems for different segments that you're solving are different…we look at it two ways, one is the actual use cases and therefore, the services are different per segment. And the other, which is very related, is how you promote it is very different…what we have seen is that customers who promote services generically, i.e., "Mobile banking is here, mobile banking is awesome," they get very low levels of adoption. Whereas customers who promote services in a segment-centric way, they get very high levels of adoption…. that requires segment-centric approaches… you can't just sort of say, 'Mobile banking's here.' You've got to say, 'This is the specific need for you, Mr Customer, that we are addressing…', (NZInt9).*

One participant provided an example of a flexible service that took into account the customer's location in order to modify some of the specific service content:

> *"… last year we worked on [name of app omitted] which was something for people [target customer description omitted]. So we developed a concept of having a special app that will allow people in a specific neighbourhood of Auckland to communicate about [service content description omitted] so there was a special application for Ponsonby[97], for CBD and their requirement are quite different … because of the location… 80% of the app was pretty much the same, but there's is 20% that is quite flexible according to the needs…", (NZInt5).*

6.10.3.2 Service discovery

Customers may not be aware of the service they needed, due to the proliferation of services, particularly apps, and may not have good grounds to evaluate the value proposition. As service benefits may not be realized with a limited trial, raising customer awareness was a primary (but challenging) task. Social media and peer recommendation was recognized as used by customers when forming an opinion:

> *…. You've got hundreds of thousand apps, how do you know what's good and what's not?…Because with so many apps … the means of discovery is difficult…. how do you*

[97] Ponsonby is a suburb of Auckland; CBD denotes the city centre area of Auckland.

actually make people aware of that new application?...how do those consumers discover your application…probably the biggest obstacle to success…", (NZInt8);

"… from a customer point of view, for instance, if I need an app about…, for instance, the weather, if I go on the iTunes store, Apple store I will find ten of them for free, I will find twenty-five of them for that I have to pay,. and I don't really know what to do and I'm not sure which one would be the most reliable one in term of technology or in term of constant update…", (NZInt5);

"…So you tend to rely somewhat on word of mouth to say, okay, well, people tell you what app is, they think is great. Obviously you take a lead from what the App Store people might be saying from an editorial perspective, but also I think, you read blogs, you know the Gizmodos, the Engagets, or whatever… you choose to read, it may give you hints of what may be a great app or not…", (NZInt8; "…make it possible for people to envisage themselves doing this rather than having to discover on their own because a lot of people are not going to take that initiative and they not want to download an application just on the chance it would be helpful. Someone's going to have to tell them how useful it is. They are going to have to see it being useful for somebody else before they would even consider the possibility…", (NZInt1).

6.10.3.3 Motivating service use

It was necessary to provide additional incentives to customers in order to establish a trust relationship and motivate them to use a service. The most common approaches used were the offering of free "service sampling" coupled with attractive pricing for the paid service options or level, and service bundling. Access to free Wi-Fi zones would encourage service use; in addition, for enabling services such as mPayment, it was necessary to create a supportive environment of merchants ready to accept it, in order to incentivize customers.

"…Free is the way you bring people in the door to help them to understand what the value of the service is…", (NZint11); "…to increase your credentials you need to have a good amount of customers and probably for that you need to give it away for free…", (NZInt5); "…sometimes free pricing is not enough. You may need to stimulate early adoption not just through give-aways but bundling with another in-use service or other incentives to try it out…", (NZInt11); "…The other thing that people of course use is, this bit's free and you pay for the next bit. Or the alternative is it's free up to a point and then you have to start paying…", (NZInt12);

"… a great example of the free wireless zone in Wellington. It is a perfect example of how it can enable some really innovative services to take place and allow new forms of communication to happen…", (NZInt7);" … the other thing is that the market needs to be using them [services such as mPayment] in order for them to work…. you have to have the merchant signed up and everyone's connected to it…", (NZInt2).

6.10.3.4 Critical mass

Mobile services would normally be priced low in order to initially attract a significant number of customers. In order to retain a critical user mass, providers of services needed to be able to adjust and change in order to continually meet customer expectations. However, not all mobile service providers were able to respond and adapt

quickly; some were traditionally less customer-orientated, while others had not built enough flexibility in the design of their services.

> *"… the amount you pay is really, really sensitive. And I think, WhatsApp for example, have a pay model, but the amount you pay is very tiny, so that's fine, but then you've got to have a massive user base in order to make it worthwhile…", (NZInt12);*

> *"…it's a two-way street, our customers want us to respond much faster so we need to respond much faster…", (NZInt4);*

> *"…when they download the app of a bank they have very high expectations, and that's very, it's very new for financial institutions. They're not accustomed to being publically assessed… it doesn't just apply to banks…that is a new thing for enterprises that all of a sudden they're in public…', (NZint9);*

> *"…almost all fall into the trap of getting stuck when they have some traction, but are unable to change and refine elegantly…their architecture is complex and stagnant…. their user base expectations are not managed to enable and support change…", (NZInt11).*

6.10.4 Barriers to successful MDS development

Several factors playing an impeding role were identified: lack of understanding of the customer market and the technology opportunities and limitations, the fast pace of technology change, the presence of multiple device brands, and strong service development platform fragmentation.

6.10.4.1 Insufficient understanding of customers

Service and application developers had an insufficient understanding of the customer market and found it difficult to reach:

> *"…that's what the smartphone has done, has made developing applications so easy… But to be successful, how do you market it, how do you take it to the consumer, how do you get that cut through above everything else that's being launched out there in the marketplace? And that's your biggest obstacle for the success…", (NZInt8); "…a lot of people who come up with these mobile services are clever technology people… they understand how to solve technical problems. But what they don't understand is how do they solve the business problems, how would they market their products… a successful solution needs both technical and business acumen…", (NZInt4);*

> *"…The need to make customers try a new service or app… I think that's a very tough thing that people who are building these applications need to work out how they drive the penetration to get people to use them the first time …[to] understand what the benefit is…", (NZInt3);*

> *"…there's not enough communication between the front end and the back end between programmers and designers and producers. I think we still that what I would call a creative producer that's someone who is able to understand the technical aspect, the parameters, but also understanding the needs of the customer…sometimes when we develop…services for mobile, we forget about customer, the way they interact with it and sometimes we make it too pretty and it doesn't really work well in the background…", (NZInt5); "…You deliver people what they want, therefore, they listen to you and therefore, you can guide their [consumer expectations], if you don't give people want they want and therefore, you don't listen to them…", (NZInt9).*

6.10.4.2 Inefficient understanding of the technology

Service and application developers had an insufficient understanding of the technological aspects of implementing a service:

> *"…The question is how practical and affordable are those things in practice. And I think that's kind of a slightly slower thing, thinking about, 'Hey wouldn't that be a really good idea.'…business use cases have often run ahead of the technology and affordability …. that tends to be the case that we've got plenty of ideas about business use case, but we have to kind of wait for the practicality of them to catch up…", (NZInt12).*

6.10.4.3 Fast paced mobile technology development

The vendor/platform market was dynamic and service developers did not have enough time to explore how best to convert their ideas into a real life service; additionally, there were impediments to the development in the area of security, and to following best practices such as software testing (due to the imperfect development environment):

> *"…it's changing too fast, …. we don't need to have a new computer on the market every six months. Nokia used to produce twenty-five different mobile phones a year, twenty-five different models, they're not there anymore but we've got the iPhone 4 that was released, as it was released iPhone 5 that will be released in September. I think it's going too fast it's just a silly game as well…", (NZInt5); "…The dynamics of this market can wipe you out of business before you know it. … The frequency which they come out with these releases has been really quite breath-taking and for a developer actively participating in that community trying to come up with new ideas that use those very latest features, you are always operating right at the cutting edge of – what if I do something now that uses all this new technology but then that breakthrough doesn't work on all the other devices that are out there on the market…", (NZINt1);*

> *"… it's quite hard to test this stuff. It's quite hard to, if you come up with a wonderfully innovative mobile app that, for example, uses location, and you want to test it on Android. You can't even test it on the emulator anymore, you have to do it on a device, and then you have to fake your location….", (NZInt12); "…especially the smaller providers they do everything from A to Z, they design the interface, they create the codes, the language and quite often they've got a very limited ability to do usability tests or to test simply the app… we've got less and less time as well to develop those products and I think we should take sometimes more time…", (NZInt5);*

> *"…[The] 2004 Telecommunications Act…says that basically the government needs to be able to get access to all information… how do you do that? If you can make it with a hole that the government can get to it then there's a hole that hacking can get into it…", (NZInt2).*

6.10.4.4 Device and platform variety and fragmentation

Related to the previous point the number of mobile device brands and the associated service development platforms were perceived as being quite high, which forced service developers to make decisions about developing services that targeted "all devices" (larger customer market) or developing services for a particular platform, or developing multiple versions:

"…You've got android that is growing very rapidly, iPhone which is a closed shop, Symbian which used to dominate and is moving out more. You've got J2ME which is actually available on 80% of all phones which is a parallel platform, a Java platform, and it just fits in all these phones but it's a complete dog as well. It's generally a complete mess. …There's no coordination between the providers of how these platforms are going to operate, you're just left with all these individual platforms. As a developer, it makes it quite difficult because there's major fragmentation…", (NZInt2);

"… I think the first particular obstacle is ensuring that the applications can work across different networks and different platforms. [there is] fragmentation between different networks and the way that they operate and interface as well as the different platforms…. We've got windows, android, Apple, there's going to be a winner and a loser and that sort of fragmentation is going to be difficult in bringing stuff to market…. You can't just develop one application, you have to develop three or potentially four applications…", (NZInt3); "… there are so many mobile devices out there. …can you make it [the service] device ambiguous (agnostic) or can you develop a device specific version…", (NZInt10).

6.10.5 Opportunities for device and platform providers

The actors in the device/platform vendor sector were competing for dominance by maintaining a strong customer focus, supporting development of services and applications for their respective platforms, protecting the functionality of the devices, and looking at expanding: first, by providing mobile services that were already popular (for example, mPayment and mBanking), and second, by providing network access independent of the mobile data networks.

6.10.5.1 Customer and service developer lock-in

Device/platform vendors were competing to attract customers and provided incentives to encourage development of applications for their service aiming to achieve a "preferred" device/platform status:

"… you've got these people providing platforms and they're all fighting one another to try and dominate and get more customers…. Applications have to run on a platform and so once you've started developing for a particular platform you have natural lock-in with your customers and your own development team on that platform. …I do think it's happening very fast if you look how fast android is taking over things…", (NZInt2);

"…that's where…the power of the Googles and the Apples and the whatever, they spend their money on things that consumers want, because they are consumer-centric organizations…", (NZInt9);

"…one of the key, I think, it's an area which rewards people for being innovative, and with marketplaces like Google, like Google Play, or even though the iPhone channels are more restrictive, they still provide an incentive for people… an incentive for people to write applications for mobile…", (NZInt13).

6.10.5.2 Retaining control

While opening up their development environment, device/platform vendors were careful to ensure that the devices retained their full functionality and capabilities, even if certain

customers (e.g., corporates providing mobile phones to their employees) may want to limit such use (a participant gave an example with Dropbox):

> *"…It is a breach of …corporate laws on IT governance…[to]… download Dropbox … even though the company provide the device, they don't prevent me from using Dropbox on this device. …. the reason is they don't know how to prevent you. The IT governance is not able to manage mobile devices…. If they start to bring in IT governance into mobile platforms, the mobile developers like the Apples and Androids will lose control, so they will not give mobile operators their basic bottom end how to open and write… IT governance, they won't give it to them…Absolutely a revolution in the making…", (NZInt6).*

6.10.5.3 Entering the mobile financial service market

Device/platform vendors were in a strong position to compete with other financial service providers, including banks, for a share in the growing market for mobile financial services such as mPayment and mBanking:

> *"… it's a fairly large pie …there's a lot of companies that are looking to have a slice of that. … there's going to be lots of different competing technologies which do similar things, and it could take a little while for the best players, or maybe not necessarily the best, but some larger players to grow, to get a level of adoption….", (NZInt13); "… banks will be part of the eco system, but the biggest disruptors will be the likes of Google and Amazon and PayPal, who will, who see banking as …the world's biggest industry. … a lot of the innovations are going to come out of those big competitors. They're not going to be direct competition, but they're going to be tied into it… you fast forward ten years it'll be …many consumers will be comfortable banking with Google or banking with Apple…", (NZInt9);*

> *"…The biggest area where this will impact is whether the regulators will either encourage or discourage people like Google and PayPal and others from playing in the banking space. That's actually the biggest, real big issue…. I mean, so Google will just apply for a banking licence in New Zealand … The question is will the regulators invite that or will they fight it….", (NZInt9).*

6.10.5.4 Entering the data network market

Device / platform providers were seen as potential competitors to MNOs; as they grew stronger they would have the ability to support Internet connectivity by deploying their own wireless (non-mobile) networks with seamless handover across large areas.

> *"…There is the thought that companies like Apple and Google who are starting to corner the smart phone markets will have, at some point, enough of a market share to actually start building their own networks across Wi-Fi and data … I mean we're seeing things like Viber doing, allowing you to make voice and SMS voice calls and send SMS's and bypassing the mobile operators. Who's to say someone like Apple doesn't build a worldwide IP network?", (NZint4); "…All they need to provide is data connectivity. And in fact it might not even be mobile networks…", (NZInt9);*

> *"… the tablet movement is going to create this non-dependence, because people are going to start using Wi-Fi at home…. in Wellington, I've got Wi-Fi at home, the city is all Wi-Fi'ed, free Wi-Fi in Wellington City. So you kind of go, 'Well most of the time I'm already accessible, so why do I need a mobile network'… you'll start thinking, 'Why do I have my phone with a provider?' I mean it is an entirely feasible…", (NZInt9).*

6.10.6 The MNO sector

According to participants the MNOs who owned the infrastructure had been affected negatively by regulations enabling competition among operators and protecting customer rights: operators faced profit erosion exacerbated by the declining revenue from voice services. As the sector in New Zealand was small it could not be too competitive, and operators managed to recover their revenue loss by maintaining high data cost levels (local and roaming). MNOs benefited as well from the continued supply of newer and more advanced mobile devices (driven by the device/platform vendors) as it caused both customer growth (as smart mobile devices became more affordable), and increased mobile data use (as vendors supported and promoted application development and use). MNOs were not actively engaged in new MDS development and were focused on their core role as data carriers; they were gradually losing their position as leaders in the MDS supply chain and in order to remain relevant needed to look for closer partnerships with other players.

6.10.6.1 Regulations – impact

The aim and purpose of the relevant regulations in New Zealand had been to create equal opportunities for competing MNOs, and eventually to ensure as far as possible better price options to customers. The regulations had been met with resistance from one of the established MNOs (the former Telecom) who had made a significant investment in building a mobile data network. As a result, larger MNOs had lost revenue and may have had to limit further investment. Unless the new players – smaller MNOs – would reinvest their profits into building infrastructure, in the long run the regulations would have a negative impact (in terms of a less developed data infrastructure, leading to lower performance quality).

> *"…the government's trying to…ensure the consumer gets the best deal…", (NZInt4); "… as we know, it's very clear that if you don't have competition, you don't get the services, you don't get the prices…", (NZInt12);*

> *"…the New Zealand regulatory environment has reluctantly been opening itself… it's become more supportive,…with great resistance from Telecom, for example…it's gradually become more conducive to competition, innovation and so on, but it's not been an easy process, and it's still an ongoing issue…", (NZInt12); "…. the Commerce Commissioner making sure that all mobile telcos have similar bandwidth spectrum…", (NZInt10);*

> *"…in terms of …data and voice…, the regulation has probably made life more difficult for the carrier… the mobile termination rate rulings …has definitely made our lives a lot harder…that's probably where the impact mostly is…", (NZInt8);*

> *"…what the government's done to stifle the larger Telcos to allow the smaller Telcos to operate, ….like 2 Degrees something, in the long run is probably not good. Because*

you're taking investment out of the large Telcos …they're going to invest less, at the end of the day the Telcos have to show a return to their shareholders. And if you're eating into the way they can operate then they've got to cut costs elsewhere, so that cost comes out of capital investment….in the long run it'll be counterproductive… it puts more money in the back pocket for the smaller provider in the short term, but unless the smaller provider actually uses that to invest to do real capital…they'll eventually get gobbled up anyway and nobody wins in the long run…what the government's trying to do is to ensure the consumer gets the best deal, they might have in the short term but in the long term it might not have helped anybody. Because if shareholders don't see a return they'll just pull their investment out…", (NZInt4).

6.10.6.2 Competitive environment

The MNO sector was characterized by very close, "cutthroat" competition between the three large MNOs, and none of them was seen as a dominant player. As intended by the regulator, there were benefits accruing to customers (in the form of better pricing); indirectly the competitive environment supported the development and deployment of services as a means of staying ahead of rival MNOs. However, the competition was somewhat limited largely due to the small size of the country (which could not support a higher number of MNOs). From a global perspective, New Zealand was a small and therefore, vulnerable market.

"… there's a lot of competition ….it used to be where there was… a sole network operator, they don't have the dominance now that they used to have because there's a lot of competition in the market…", (NZInt13); "…the cutthroat nature, because everyone's trying to outdo each other… we released the new mobile plans recently,. I'm waiting for Spark and Vodafone to follow, because they'll go, '… we can't be out priced by 2degrees.'…", (NZInt10);

"…that supports the development and implementation of services, because they're constantly trying to get better and better and better. No one's resting on their laurels. When we had a monopoly and a duopoly, people rested on their laurels…", (NZInt10);" …specific network technology such as mash up, getting Google and applications to try and reduce some of that international bandwidth costs…But also get some money out of it…. How …We [Spark] don't know. Big players can say 'if you don't do it, Vodafone or 2degrees will do it'…", (NZInt3);

"…the difference between New Zealand and overseas is that there's probably a lot more competition and it's a bigger market, and here, although we have, we have limited competition and it's, and that's what's keeping the price up…", (NZInt13);

"…We're too small a place. Over the top players will kill us…", (NZInt3).

6.10.6.3 MNOs – evolving role

Participants noted that the MNO's role was changing. As MNOs had lost their dominance as device providers customers were no longer choosing their network brand first, rather, their choice of mobile network provider was secondary to the choice of mobile device brand and associated services. MNOs were coming to be treated more as data carriers and less as a participant in mobile service development and provision.

"…It's, I think there is some brand loyalty to networks, but …people are more conscious of what phone they have…it's become a status symbol…it's aspirational… the carrier becomes secondary to the device, which…wasn't the case say three to five years ago…", (NZInt8); "… originally when you bought a phone, you bought it off the … the telecom provider and that was it…Now, you might buy the device from any store you like… the telecom providers aren't necessarily in control over the devices which are using their network, … the customer now has a lot more choice…, "(NZInt13); "…once you have already got the mobile device they don't really … need you to be able to access [their] store…", (NZInt1);

"…a fundamental change is happening in the place that MNOs are no longer as important, it's the service providers of cool services [who are important and] can become bigger than MNOs if they know how to own aps, application services, that fundamentally drives everything for the mobile…", (NZInt6);

"…the companies believe that their service or their network … is important….it's probably maybe not as important as perceived, …. You have all your content, all your music, your videos, your movies in the App Store….this… is entirely Apple, there's no Vodafone on it, other than the connection… the industry constructs are changing…. the hard question, is what will be the relevance of the carrier in years to come?...Obviously the Googles and the Apples of this world …probably start seeing the carrier as a dumb pipe to all their rich content and services…", (NZInt8); "… the operators today, whether they like it or not, these applications are being provided … through… devices which is not even network dependent… the benefits offered to mobile users today is the genuine availability of applications that can be freely bought …and not controlled by… your provider…", (NZInt6).

6.10.6.4 Challenges – mobile infrastructure owners

The open market has challenged the ROI of the telecommunications company which was the first to build a country-wide mobile data network, as the new players did not invest heavily but were given equal access. Another threat was posed by the globally dominant device vendors who may offer their own data network. To remain relevant, infrastructure owners needed to continue to build their networks but were finding it difficult to recover the cost; to attract customers they may need to form partnerships with service developers:

"…the other major players [in addition, to the incumbent, Telecom] which these days would be Vodafone, 2degrees,…, have been trying … to do more in the market. But of course it is a problem, because those other players want to do that on the back of someone else's infrastructure. Someone else has put all the money into building the physical infrastructure. They bung up a few masts and sell a few phones and say, 'Oh we want this full market.' …And of course, you can see why those who've been involved in building up a national government funded infrastructure for decades were not very happy about doing that…(NZInt12);

"…but someone like Apple or Google have a different driving factor, their aim is to sell the devices and if they provide the network that says, I sell you the device, you buy my device you can call anybody else who's got the same device on this network for free and that's a huge incentive….so they're not selling the plumbing they're selling the device, that's where they make their money…", (NZInt4);

"…We're building more and more infrastructure but how do we get a return. We can't charge our end customers more for it…. Everyone's expecting MFI and cellular phone, they're also getting data plan included. The problem is there's a real cost to providing that infrastructure and it is a massive problem and I don't think that the world understands how we decide what … communications to keep building …", (NZInt3); "…

Mobile network operators are trying to recover their cost of investment in their networks that they've built, that's billions of dollars…. Their recovery rates are a low slower now because the usage of this is no more the traditional voice of traditional data… ", (NZInt6);

"… [when recently] RNC both failed…. quickly Telecom had to reinvest… they have to otherwise they are not going to be able to deliver, somebody else will see the gap in the business and another operator will take that advantage… in the meanwhile there's companies like Nokia and Alcatels suddenly bring better advanced technology to say, 'We can do faster networks,' so the backhaul one gig becomes redundant it's too little they need more, so it's a constant game…", (NZInt6);

"… So it beholds then the Telcos to figure out how they are going to play in this brave new world…. how …to keep their business going because… people like the Apples and the Googles are going to eat into their, eat their lunch…. I believe that network operators will be doing that and third parties will develop business services….and then the network operator who can provide the most services wins…", (NZInt4).

6.10.6.5 MNOs – benefits from data traffic

The increased affordability of smart mobile devices had led to increased use of data networks and therefore, MNOs (as core data carriers) had benefitted from the dynamics of the device market. To sustain revenue growth (needed as voice traffic revenue had been declining), MNOs stimulated data use by providing access to "data-hungry" mobile services:

"…really there's probably not many people who can't afford to get a smartphone now… we're working with device vendors and everyone else, I think you've made smartphones a reality for pretty much everybody…", (NZInt8);

"… if you look at our core services of voice, text, and data, the most attractive is data now. And that's really driven by smartphone adoption in our market… Obviously there's net benefits for the carriers to do that, because you're really looking at this additional revenue that comes say from use of data for example, which wasn't there when they had voice and text only…. Voice revenue's sort of tapered off and texts is basically free … stagnant growth of voice and text…you have to look for that next lift in revenue, so it's data, and then where do you go beyond that? …Growth is in, the driver is growth in data…. look at how Telecom has positioned themselves as the smartphone network, you think about how plans these days include data, and everything is smartphone… as a whole, the industry is driving the market to smartphone…", (NZInt8);

"…network operators have got a vested interest in people using mobile services, because of the pricing structure we've got…you pay for data…. you look at Spark introducing Lightbox[98], which is very bandwidth hungry…. But I now suddenly need to upgrade from my thirty gig broadband plan to a hundred gig broadband plan, because I'm using another seventy gig worth of content…", (NZInt10).

6.10.6.6 High cost for data

As a result of the limited competition among infrastructure owners and the need to ensure a revenue stream (as seen above – low ROI, voice traffic decrease), mobile data prices in New Zealand were higher than in other developed countries; charges for data

[98] A service offering TV show streaming on demand, https://www.lightbox.co.nz/; relatively inexpensive as a service but customers pay for data access.

roaming were "prohibitive" to using overseas MDS that were provided locally (e.g., mBanking):

> *"…the reality is applications use data, but you can't say zero rate data for applications…you don't want to give away all your revenue…from …a mobile operator's perspective … [the] cost of infrastructure is too great to give stuff away…", (NZInt8);*
>
> *"…we have limited competition and it's… keeping the price up…", (NZInt13); "… data charges are still a bit higher in comparison to international…probably because there's less people the price needs to be higher …", (NZInt7); … we pay far too much here… Vodafone, for instance, is a big example of ripping off the people for communication… look at broadband in Japan, there are I think twenty gigabytes per seconds transfer and it costs how much? I think ten New Zealand dollars a month or something like that for unlimited data…", (NZInt5);*
>
> *"… telecom providers have a lot to answer for … making that [using mobile banking abroad] prohibitive for people because of the expensive roaming charges…", (NZInt13).*

6.10.6.7 MNOs and MDS development

It appeared that while MNOs provided adequate data infrastructure and were interested in service use (in order to retain customers, and profit from increased data traffic), they were not particularly engaged as new mobile service developers and providers. However, two different views emerged: according to participants from the MNO sector, their respective organizations and the sector as a whole were supportive of service use; others (service developers/providers) found MNOs disinterested and possibly not willing to take the risk:

> *"…you've got to provide the infrastructure… and provide a really solid network platform…If we do that, that's great. Fast network performance which I think Telecom does a good job at, despite all its problems…", (NZInt3); "…we have extremely high mobile penetration, good coverage, and high speeds. We have adequate interconnection between NZ networks and to the global internet…", (NZInt11);*
>
> *"… effectively they're providing that service and that channel and, but what's at the end of the channel is something which is more, it's more customer driven…", (NZInt13); …I don't think they really get involved much. They provide just the services for tip over…", (NZInt2);*
>
> *"…Yeah. I don't think there's anything that is not supportive of development of applications as such that I can see… we as a business encourage it and even support it in terms of sometimes co-funding it…", (NZInt8); "...all the network players in New Zealand are incredibly supportive of development and implementation …they have to… if you don't your customers aren't going to stay with you. You need to be seen to be innovative, you need to be seen to be supporting all these applications…. For example, if one of the network providers decided, 'No you can't buy anything from Apple iTunes," …everybody on that network will leave'…", (NZInt4); [MNO sector participants]*
>
> *"…Like Vodafone don't say 'here we go, here are all the first apps' and it comes preloaded with these apps. They don't have any big channel linking you into their main part. You think they might…I don't think the network operators would provide [services]… I don't think that they do really communicate much with application developers….", (NZInt2); "…I think they don't support enough… mobile network industry in New Zealand, I think are not very supportive yet and I would say that they probably should look more at the very long term rather than the short term investment…",*

(NZInt5; "That…New Zealand's mobile network infrastructure are more supportive to the development[?]… Not really… the network operators here are not doing anything…It is not in their interest to drop things to make it more innovative for them because then they will lose out…", (NZInt6); [non-MNO sector participants]

6.10.7 MNOs in the future

Two opposing views about the future emerged, MNOs accepting a position at the bottom of the value chain as "pure" data carriers vs MNOs involved in providing service content in addition to their data carrier role in order to remain competitive. In the latter scenario survival strategies included developing synergies with other players, and providing specialized auxiliary services such as customer authentication.

6.10.7.1 Will be just data carriers

MNOs are already considered by some participants in the MDS supply chain as data carriers only rather than as data carriers and MDS providers. Even though New Zealand MNOs were trying to enter the market of value-added services they may lose that role in the future (as it was already happening overseas), for two main reasons: first, services would be provided by a growing number of dedicated service developers, and second, because MNOs had a history of unsuccessful attempts to act as service providers (due in part to their clumsy and slow to respond internal process):

"… I think Apple probably more so than anyone probably sees a carrier as the pipe …", (NZInt8);

"… these existing data network owners are…plumbers, right they sell plumbing, they make their money by how much data you send across their pipes, (NZInt4); "… I don't think mobile network operators have a big role to play in mobile service development. The network operators role should stop at the pipe…", (NZInt11); [in] most other countries it's going to be large system applications guys or multiple small guys who are service providers of all kinds of services who are going to …do better than the operator. The operator will just become a pipe carrier…", (NZInt6);

"…I don't think network operators have anything to do with content development… they are just a pipe, and a dumb pipe, and every time they try and be something else, they don't do a good job of it. … both Telecom and Vodafone tried to be up the value chain and no one wants them up the value chain. They're much better off being the lowest cost infrastructure provider… So I think that the future for telcos, at least in the consumer space, is going to be just being infrastructure providers… And I think that the telcos, I mean telcos in the US already realize this. So they've pretty clearly become infrastructure providers and they don't bother with anything else...", (NZInt9);

"… what I know from insider knowledge, the difficulty of releazing new products based on our internal systems, and I know the other two telcos are the same, because it's the actual implementation of the technology has got barriers, whether they be business barriers or technical barriers…I don't think there's technology limitations…it is business limitations… you've got to jump through eighteen thousand hoops in order to get some money to pay a developer who can then write the code…", (NZInt10).

6.10.7.2 Cannot be just data carriers

MNOS who did not boost their offering of core data services were under threat of losing their market position, and therefore, they could not afford to focus solely on providing infrastructure:

> *"… just selling, just having a network without and depending on everybody else to provide services ain't going to work in the new world…", (NZInt4);*

> *Global operators like AT&T possibly will be part of the growth, people like Telecom and Telstra of these parts of the world will lose out…Vodafone is a global operator…will survive because they know their survival is not network, it's the business services that they're going to offer…That's why they acquire service companies, developers, development, offer cool services on top to keep stickiness of the client…. Who all controls the consumer and their business is going to be the king. Operators are not going to be the king unless they also change dramatically…… there's a battle going on between big global systems integrators who are developing mobile applications, mobile platform applications while the MNOs are also trying to rapidly do the same thing before the systems integrators can do so that then the MNOs have still that difference of point on offer…", (NZInt6).*

6.10.7.3 Alignment and collaboration

In order to remain competitive and relevant, MNOs would need to align their data services with device functionality and the potential services using them, and to form alliances with other participants in the MDS supply chain. They would need to leverage their specific business and technological capabilities (such as the ability to provide network support for specialized MDS, and the ability to provide access to a large customer base and individual customers' identity, account and location data) in order to gain advantage:

> *"…data requirements from a mobile perspective… high speed data requirements …because [of] data intensive phones or smartphones… there's email functionality, GPS functionality…All of these functionalities to be utilized … need services to be added by MNOs. So applications, provide them, develop services that MNOs can deliver…", (NZInt6);*

> *"…network operators will actually…add value …to provide the glue…for the third parties…the network operators will have …a customer base, the third parties will need access to the customer base and the network operators will provide that glue to allow these services to be sold through that customer base while taking a cut in the fee or whatever…", (NZInt4);*

> *"… network operators will definitely be part of evolving the services, but then there will be simply the companies that have a good idea. So do they go out to market themselves with their idea or do they partner with someone to do that? It will be very interesting in ten years to see what it's like… Vodafone tried it with the Sky partnership years ago. (NZInt10); "…not to say the operators aren't potentially great partners. These Vodafones and telcos are potentially banks really if you look at it like that…", (NZInt2);*

> *"…value-added services provided alongside it [data] such as user authentication, location, payments…We could do more to open APIs and interconnection for authentication, location and payments between carriers, between banks and carriers, between apps and carriers…", (NZInt11); "…the mobile phone…is something which is*

personal…it will be used as your identifier, so that someone can charge something against your account… there's an awful lot of interest in this…", (NZInt13).

6.10.8 Opportunities for service developers

Some service developers were looking for new opportunities such as exporting services to developing economies where the market was perceived as easier to penetrate and innovate in compared to the much more limited local New Zealand market; it was likely that that in the future New Zealand customers would use imported services.

6.10.8.1 Potential for profit

Application development was becoming easier and could be profitable, if successful with customers:

"… the technology that used to be behind this mobile device used to be very complex, but at the moment...new applications [are] being developed that allows people to work with mobile technologies in a more easy way…", (NZInt7);

"…the economics of app development unlike media are scalable – they benefit from re-usability and standards so that mobile app number 100000 will cost less to build than app 10000 and less than 100 and so on…", (NZInt11); "… in the mobile space, if you publish the right application and you get a lot of hits and a lot of downloads, it can be quite rewarding… and it's very, quite simple, it's quite simple to do these days…", (NZInt13).

6.10.8.2 Exporting services

Given the limited size of the local customer market it was seen as competitive and costly to service developers. Therefore, a more profitable prospect would be to develop services for the global market, and/or for underdeveloped markets such as emerging economies:

"… you're probably not going to get a huge amount of NZ specific applications working because we're just too small…", (NZInt3); "…about the mobile app ecosystem over and above the role of the carriers…New Zealand's small size means that while we have good local software companies we are likely to be a net importer of mobile services… (NZInt11);

"…it's just a cost, it's not a benefit, but of course if they [service providers] don't do it they're in that competition problem where everybody else does it. So… they have to give it away. It costs them money, but it's a competition issue…", (NZInt12);

"… there are lots of innovative software companies seeing potential for growth so they offer it…The moment it gets to be a good piece of the puzzle, global companies are watching out, they buy them out… there are these small service companies,…who have all been acquired by American companies because what they're offering a service for mobile operations[that]is more global than what is local…", (NZInt6);

"… we made the choice of not going into first world, like iPhone android type markets, we wanted to deliberately learn about this new and emerging market….What we're trying to do is hit these new emerging economies. People who have never had a computer because they've only had $2 a day to live on and they buy their first computer which is a mobile phone and they've never been connected to the internet before… We already know

the segment that we're appealing to…. young males that are very poor in India so we can actually … target things that they would like….I call it an enabler because that's what it is…. something which provides them with an interface…", (NZInt2).

6.10.8.3 Services based on specific device capabilities

Innovative services that used new and specific smart device capabilities ("new uses of the phone") to meet identified customer needs would be successful in the market. Participants provided examples that included the use of motion sensing, the phone camera, the accelerometer, LBS, and NFC technology. It was also noted that some of the innovative services would require partnerships as they needed a supporting infrastructure to be created:

"…specific capabilities that are in the device like GPS, like NFC, like capture or camera…", (NZINt9); "…real physical property capability of the phone…for instance. you can just rotate the phone and do the editing…, (NZInt5); "…. a lot of the new benefits are based on the various capabilities of the phone …Things like the camera…the fact that you can use it to measure the acceleration of the phone and all kinds of bit of equipment in the phone that allow you to collectively develop applications that can find new uses that we didn't have before in all kinds of realms…", (NZInt2);

"…We attempted to make most often in our application development is being through GPS – location detection. Carrying a computer around that can tell where you are and add information about that through a message or use it to inform you about what is nearby -- is definitely a new capability…", (NZInt1); "… An example of that would be say absolute positioning. Now you're having services where someone can locate their friends exactly where they are…", (NZInt2);" … finding a restaurant, finding where the nearest post office is, locating directions, everything built into a single device. I think a device that supports that kind of functionality is probably where the world's heading to at the moment…", (NZInt4); "…One other thing is…. LinkedIn for instance… if I go in a Cafe I can see that some of the people that are part of my network are in the Cafe or in a two kilometres area, so my phone is telling me that … things that can be done, innovation to make those things a little bit more fluid…", (NZInt5); "… the most interesting thing with mobile service is the implementation of GPS data at the moment. …new business models are developed… you can see new opportunities for users that's what it is on the commercial side for, you know, people using location data as a way for marketing, as a way for analyzing consumers behaviour…. there is lots of potential also to using if you think about new services… augmented reality which is using a combination of different elements…Internet data …[and]…the camera to identify different elements in our environment as well as …. GPS data…", (NZInt7);

"…the most obvious example in the United States is…remote deposit capture… basically you're taking a photo of a check to enable deposits… it's something you couldn't do in the physical world, but obviously mobile technologies, whether it be the camera or GPS… allows you to do new things…. some banks do offer it on the PC, where you can use your scanner. But……authentication is… a lot easier… then you can add additional layers, so we've got a customer who's using GPS coordinates on top of that capture, so basically we know exactly where that photo was taken. If it was taken in your house, then it's lower risk than if it was taken in Nigeria…", (NZInt9);

"… the environment where the technology is inserted into needs to change a bit to that. So I think they've got some conceptual patterns that have to be changed over time…", (NZInt7); "From a carrier perspective… I think near field communications is the next frontier. Obviously a lot of work being done around near field communications now, so mobile payments by near field. …all of the carriers have announced pilots or projects or the likes…Like for example, 2degrees has just partnered up with Snapper, who provide the bus cards and done it, but I mean obviously the adoption and the rest of it's subject to devices and everything else being near field capable…", (NZInt8).

6.10.8.4 New service development environment

The mobile service development environment offered opportunities for small and emerging companies (including service users) to get involved in service development:

> *"…today you're getting applications from small companies, … upcoming small companies who are no longer programming in the standard client server environment, they are programming on [mobile] platforms that are completely new… providing services…", (NZInt6);*

> *"…Being open source I think is the key. If network operators or the over the top players try and do it themselves, I think it's going to be difficult. They have to give it to the masses and that's when you're going to get real innovation… if you give it to the masses, that's when you're going to get real innovation and you take the next giant step…", (NZInt3);*

> *"… some people call them 'pro the users'…because users is normally passive but … the most important thing with mobile devices is that it's not only a media consumption device but also media production device…. if this technology becomes more accessible … you can also have some kind of services being developed from a more, I wouldn't want to call it grassroots level, but more from a ground level…", (NZInt7).*

6.10.9 The regulatory environment

While the New Zealand regulatory environment was seen as favourable to MDS development and deployment (supporting competition, not restrictive but protecting customer privacy rights and ensuring transaction security), participants identified several areas where regulatory intervention may be needed. These included balancing the need to ensure competition (leading to lower data costs for customers) with the need to support the development of the national mobile data infrastructure, balancing the need to protect customer privacy and safeguard transactions with the need to lower compliance costs for service developers and the need to align with global modalities in areas such as taxation, to support safe and secure use of non-local ("imported") services, to encourage the development of MDS of global significance ("exporting" MDS) while at the same time creating incentives to attract in global service providers.

6.10.9.1 Balancing stakeholder needs

Overall regulations were needed in order to ensure customer safety and privacy protection while supporting and encouraging MDS development. The regulator needed to balance the interests of all stakeholders (including customers) in order to ensure a competitive environment, with affordable mobile data access (including roaming). However, the regulations should not impede investment in infrastructure (as discussed earlier, the current competition-enabling regulations may have had a negative impact on infrastructure owners' ROI):

"…New Zealand's regulatory environment is quite restrictive for many industries, think electricity, health, etc. but currently it is not too restrictive for apps…", (NZInt11);

"…Commerce Commission …. need to make sure that the network operators don't charge as much as they're charging today with the marketplace. To increase usage of the people, increase value, you need to drop prices and these network termination charges…all these things are still not fully addressed not yet…", (NZInt6); in the European markets now is that there's an EU cap on roaming charges now… to provide the platform so that people can use their mobile abroad, with a premium but it's not cost prohibitive to use. … there probably has been some focus on that in New Zealand, from New Zealand telecommunication providers …[but]…there's probably a long way to go … in terms of making that [happen]…", (NZInt13);" …the regulatory bodies can be most supportive… is enabling all of that [e.g., like Netflix] to be accessible, and then the consumers then decide what they want to use, which then effectively picks the winners and losers…", (NZInt10);

"…New Zealand needs to stay aligned to global developments in the area of identification and authentication, and tax and payments … [not to] … stifle(d) innovation for their constituents by not enabling them to participate in global modalities…", (NZInt11);

You will adjust…just that adjustment time is quite difficult. … infringing on privacy or security in terms of personal information or bank information… that's probably the only space where regulation is probably required…", (NZInt8);

"…Because every bank, every country in the world wants to eliminate cheques and get them out of circulation, so all of a sudden they say, 'Hey, well here's a good way of sort of stimulating that.' So there's an example of where mobile is actually enforcing, not enforcing, encouraging regulatory change. …they have to be regulated, you have to have the same safeguards that you have for a normal bank…", (NZInt9); "…We do need to be very careful in balancing the need for consumers right to privacy with the ability for small developers to innovate without unduly high compliance cost…", (NZInt11).

6.10.9.2 Importing /exporting services

New Zealand customers would be likely adopters of services offered by overseas providers. Regulations were needed to facilitate their safe use (especially important in the case of mobile services provided and consumed under different regulatory regimes), and/or to attract global service developers to establish a presence in the country at the same time enabling New Zealand software developers to develop services targeting the global market:

"… New Zealand's small size means that while we have good local software companies we are likely to be a net importer of mobile services. Hence the need to ensure our consumer market and local regulations facilitate easy import of services from overseas… while safeguarding the rights of New Zealand consumers and also helping local developers to export overseas…", (NZInt11); "… apps get created all around the world and available anywhere in the world, so it's probably one that's quite hard to legislate or regulate. … from an application space…it's pretty hard to do anything…", (NZInt8);

"…The thing that will fix that obviously is having …[the]… international over the top players basically providing applications. I don't think a lot of those applications will be specific New Zealand applications…the biggest thing from an industry perspective is how to encourage these people to set up camp in NZ…. Are there any tax incentives for bringing IT/innovation? Could New Zealand potentially be a hub for this sort of innovation?...", (NZInt3).

6.11 Summary of Chapter 6

This chapter presents the outcomes of Study 2. It contains a comprehensive step-by-step description of the three stages of the data analysis process enacted, including graphical illustrations and extensive data quotes that were used to support the researcher's interpretations. At the last stage of the thematic analysis the coded data set was examined with the purpose of identifying and describing the themes emerging from the data, building on the relationships between the codes. The 22 basic themes (which represented the key points made by the participants) were subsequently organized into seven thematic clusters (organizing themes). The thematic analysis concluded with the creation of a thematic map that comprised three overarching global themes and their respective thematic networks of associated organizing and basic themes.

The Study 2 thematic map was explored further in order to relate the findings back to the main research question, by addressing each one of the three specific research questions guiding the investigation. Based on the global theme descriptions and thematic networks participant views related to each of the specific research questions were formulated, and illustrated extensively with direct data quotes in order to support the interpretation. The chapter that follows considers the outcomes of the empirical investigations presented in this and in the preceding chapter (Chapter 5), and discusses their implications further.

CHAPTER 7. FURTHER ANALYSIS AND DISCUSSION

As stated in Chapter 1, this study aims to contribute to a better understanding of MDS adoption and use through the exploration of mobile industry stakeholder (mobile service supplier) perceptions about customer demand for MDS in the context of the MDS market environment. This chapter contributes to the research aim by summarizing and reflecting on the empirical findings, developing a theoretical framework of propositions that address the main research question, and discussing the characteristics of perceived customer demand with the view of adding an MDS supply perspective to MDS adoption models. The chapter's position in the overall research process is shown in Figure 7-1.

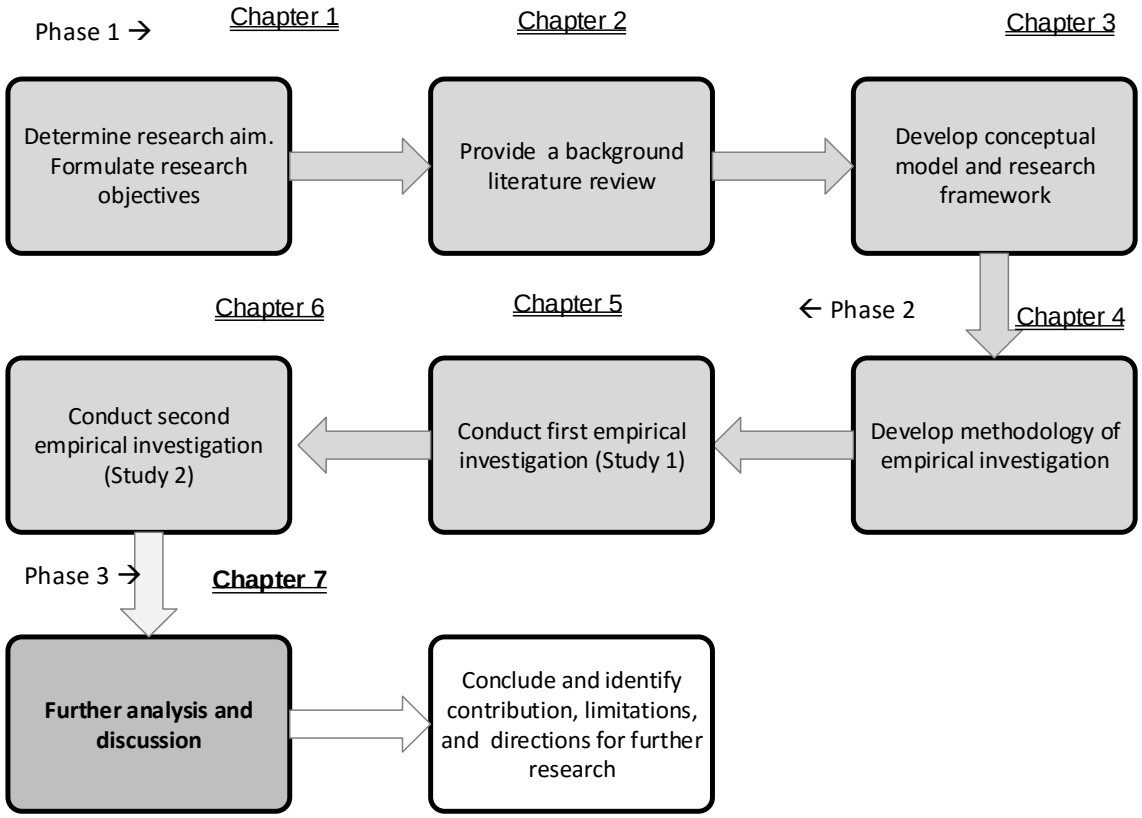

Figure 7-1. Research process path (Chapter 7)

The chapter is organized as follows. Section 7.1 offers a reflective comparative summary of the approach taken to interpreting the data and the research process (including data gathering, data coding and analysis, and theme development) in order to determine the extent to which the study's findings might be relevant to both sites. Section 7.2 provides arguments in support of the overall research trustworthiness of the two empirical investigations. Section 7.3 develops a theoretical framework that incorporates propositions derived from the analysis of the two thematic networks. Drawing on these findings and on the extant literature, Section 7.4 develops and

proposes a series of models and frameworks, namely: (i) a conceptual model linking MDS supply and MDS adoption; (ii) a service value dimension framework; (iii) a customer typology; and (iv) a service value based MDS customer adoption framework. It also elaborates on MDS supply and regulatory environments factors that may affect the process of MDS value creation, and MDS adoption rate. Section 7.5 provides a brief chapter summary.

7.1 Interpreting the Data

As described in detail in Chapters 5 and 6, the data gathered in the empirical investigation (Study 1 and Study 2) were interpreted and analyzed by applying the method of thematic analysis. In each study, the respective outputs of the analysis included: i) a coded data set, i.e. the study data represented as an organized collection of coded data units; ii) a study code hierarchy, i.e. a hierarchically organized classification of the codes used to code the respective study data; iii) a thematic map representing the inferences made by the researcher in the form of themes, abstracted from and supported by data quotes retrieved form the respective coded data set; and iv) a synthesis of the findings addressing the specific research questions.

The rather lengthy multi-staged iterative process that was followed (it took about a year to complete each of the two studies) started with the researcher decomposing the data set into appropriate data units and coding them, developing at the same time a hierarchy of codes. The process continued with a methodical examination of the codes, identifying potential code groupings and relationship patterns, and checking the relevant data to ensure consistency; the data codes were used much like strings that allowed the researcher to pull out the data excerpts supporting a particular concept. The coded data were revisited and the codes were adjusted as needed. The coherent themes emerging from the data were gradually abstracted, defined and categorized. Therefore, the comprehensive thematic map created as result of the analysis represented the *key characteristics* of the original data and provided a basis for further exploration – for example, searching for answers to the main research question of the study. To this end, in Chapters 5 and 6 each of the two thematic maps were further dissected and re-examined in order to address the specific research questions formulated in Chapter 3.

7.1.1 Research context

As noted previously, the data for the empirical investigations presented in Chapters 5 and 6 were gathered at two different locations and at different times; Study 1 was

conducted in Bulgaria during the period 2010- 2011while Study 2 was conducted in New Zealand in 2012-2013. The studies' settings were found comparable in terms of mobile telecommunications infrastructure and MDS landscape. First, in each country at the time of the respective study, two MNOs dominated the mobile telecommunications sector, although the corresponding regulatory environment provided opportunities for new entrants. Second, while in both countries the level of mobile device penetration and ownership was high, only a few mobile services were offered. In both countries there were expectations about a higher demand for mobile financial services. mBanking and mPayment were actively promoted as a new service channel by banks and by the consortia formed specifically with the aim to introduce and support mPayment.

7.1.2 Data gathering

Both studies followed the research design described in Chapter 4. The main steps of its actual implementation can be seen in Figure 7-2, although a number of specific operational adjustments were made in Study 2, taking into account the researcher's experiences with Study 1. The methodological differences between the two studies that occurred during the coding and analysis were documented in detail in Chapter 6; the next three subsections discuss their significance and implications.

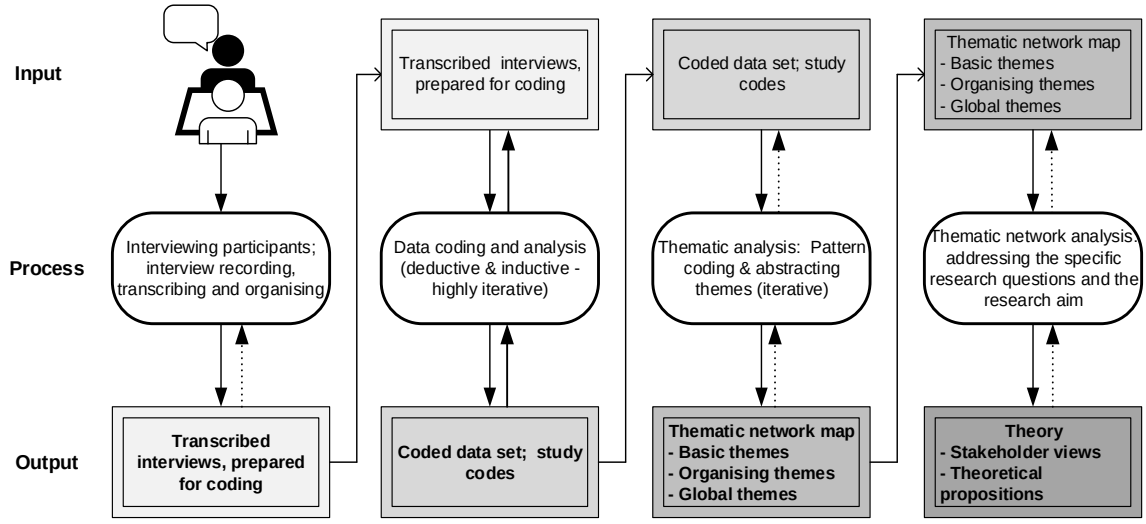

Figure 7-2. From interviews to findings: Inputs, outputs and processes

In both studies a purposive sampling approach was used, close to the stratified purposive sampling method described in Patton (2002, p. 240). In both studies potential participants were experts in the area of MDS design, development, and provision, and were also involved in decision making. The samples were further stratified according to the stakeholder types defined in Chapter 1. A comparable number of participants were recruited in each study (12 in Study 1, 13 in Study 2). However, in Study 2 the data

gathering approach was adjusted in two ways. First, invitations were sent only to individuals who occupied middle to top level positions in their respective organization in order to improve the response rate. (In comparison, Study 1 participants were also experts and were involved in decision making but some were not occupying middle –to top managerial positions; at times such individuals were reluctant to participate without obtaining first the agreement of a higher ranking manager). Second, the interview guide was modified to make it more straightforward and to remove the one question Study 1 participants were rather reluctant to reply to (the question asked about additional background- current involvement with an MDS project; although the answers to this question could add to the participant profile they were not expected to contribute significantly towards the interview topics). Finally, interviews were recorded manually by taking notes in Study 1, and recorded electronically in Study 2. As hoped, all adjustments helped improve the efficiency of the field work, and likely contributed to the increased richness of the data in Study 2.

7.1.3 Data coding and analysis

As also seen in Figure 7-2 in both studies the data coding strategy involved two major coding rounds - a deductive coding round followed by an inductive coding one. In Study 1 all coding was done manually. As the data volume was relatively low it was possible to use MS office tools for keeping track of the data coding and analysis process. However, the initial data set in Study 2 was significantly larger; this necessitated the use of a CAQDAS tool (NVivo10).

7.1.3.1 Data coding unit

In Study 1 (Chapter 5) it was deemed appropriate, given the nature of the data set, to use a single linguistically determined unit, namely, the sentence as created when building the original transcript (from notes). The approach worked well for short sentences and phrase-like sentences from which single meanings were extracted. With long sentences, however, managing the coding process was more effort- and time-consuming due to the need to code and track manually multiple meanings originating from the same coding unit. In order to take advantage of the use of a CADQAS tool and also given the larger size of the data set, a more flexible approach was adopted in Study 2. Consistent with recommendations to avoid imposing structural constraints but maintain a focus on the objectives of the analysis (Attride-Stirling, 2001; McLellan et al., 2003) in Study 2 data were interpreted at varying levels of granularity (e.g., sentence, paragraph), *depending*

on the context. Despite the difference, the number of data codes used in each of the two studies were comparable.

7.1.3.2 Deductive coding

The set of deductive codes applied in Study 1 were derived from the research framework. Given the similarity of the research contexts of the two studies and the common research objectives, in Study 2 the sub-categories developed in Study 1 were used to code deductively the Study 2 data at the initial coding round. At the second (inductive) coding round the Study 2 data codes were developed iteratively by coding the data under each deductive code, taking into account the specifics of the Study 2 data. The approach allowed the researcher to reduce the complexity of the coding process while retaining its comprehensiveness.

7.1.3.3 Inductive coding

The specific inductive coding method applied in Study 1 was that of in vivo coding (Saldaña, 2012, p. 91), in which the code definition is kept very close to the data meaning. While this coding method helps avoid data misrepresentation, it is very time consuming and thus only feasible for relatively smaller data sets (such as the Study 1 data set). In addition, in vivo coding often does not necessarily lead to data reduction as the number of codes may be as high as the number of data coding units. To achieve a more significant data reduction, similar in vivo the codes were aggregated as super codes. However, this increased the complexity of the code hierarchy as another level was added to it. Subsequent pattern searching and theme development was based on super codes rather than on the in vivo codes.

Another method was chosen in Study 2, namely, descriptive coding (Saldaña, 2012, p. 87). Descriptive codes were assigned to data excerpts whose meanings were associated with the same topic. NVivo10 functionality was used to alleviate the risk of misinterpreting NVivo10 – each topic was described comprehensively, and the coded text was kept within the context of the interview transcript. As the code hierarchy was simplified (it contained only one level of data codes), updating the coding was easier. The descriptive codes were used in the subsequent pattern searching and theme development.

7.1.3.4 Code hierarchies

In both studies the data codes were aggregated in next-level groupings (17 sub-categories in Study 1, 19 categories in Study 2) in order to maintain an up-to-date meaningful overview of the coded data. In each study the resulting code hierarchy contained around hundred data codes (Table 7-1).

Table 7-1. Coded data set and thematic map numerical characteristics

	Coded data set			Thematic Map		
	Codes	**Categories**	**Sub-categories**	**Basic themes**	**Organizing themes**	**Global themes**
Study 1	99	5	17	13	6	2
Study 2	98	19	N/a	22	7	3

As mentioned, the coding schema developed in Study 1 was transferred to Study 2 and used as the start of the data analysis. This decision was theoretically justified in Chapter 6, and was validated by both the practice, and the outcomes. As shown, most of the next-level code groupings (sub-categories in Study 1, categories in Study 2) were shared across the two studies (Table 7-2).

Table 7-2. Data hierarchy: Next-level inductive code grouping in Study 1 and in Study 2

Next-level inductive code groupings stared across the two studies	
1. CUSTOMER ATTITUDES	**2.** SERVICE DEMAND INHIBITOR
3. CUSTOMER DECISIONS	**4.** SERVICE VALUE ADDER
5. CUSTOMER EXPECTATIONS	**6.** SERVICE VALUE DETRACTOR
7. CUSTOMER REQUIREMENTS	**8.** SERVICE VIABLE
9. CUSTOMER SEGMENTATION	**10.** SERVICE NOT VIABLE
11. REGULATORY ENVIRONMENT	**12.** TECHNOLOGY LIMITATIONS
13. SERVICE DEMAND GENERATOR	**14.** TECHNOLOGY OPPORTUNITIES
Similar next-level inductive code groupings	
Study 1	**Study 2**
15. UNCERTAINTY ABOUT CUSTOMERS	**15.** UNCERTAINTY
16. UNCERTAINTY ABOUT MNOS	
17. SERVICE MARKET	**16.** SERVICE DEVELOPMENT AND PROVISION
	17. COMPETITION
	18. CONTROLLING INFLUENCES
Different next-level inductive code groupings	
	Study 2
	19. CUSTOMER INPUT

Using the sub-categories from Study 1 made the coding process in Study 2 more efficient. This was extremely important given the large data set generated by the audio recordings.

Some differences were also observed. For example, the Study 1 sub-category SERVICE MARKET was “expanded” in Study 2 into three new categories (SERVICE DEVELOPMENT AND PROVISION, COMPETITION, and CONTROLLING INFLUENCES) as the data showed support for such a differentiation. However, in Study 2 there were less data related to perceptions about uncertainty. Finally, an entirely new category emerged in Study 2 - CUSTOMER INPUT. It comprised codes that related to expectations about customers providing meaningful feedback, requesting specific features, and otherwise contributing to developing new MDS. Participant opinions about the more active role customers played, and were expected to play, were influenced by the way the already existing app stores worked, and by experiences related to mBanking which was beginning to establish itself as a service.

7.1.4 Themes emerging from the data

In each study the emerging themes were identified by implementing a pattern coding approach. The following relationships were used to search for patterns: “Associate with”, “Aspect of”, “Cause of/Result of”, “Contrast with”, “Attribute of” (Gibson & Brown, 2009, pp. 86-93; Miles et al., 2014). In Study 1 the pattern codes were based on semantic relationships between super codes (codes that aggregated the in vivo codes), while in Study 2 patterns were sought amongst descriptive codes.

A total of 13 and 19 themes emerged in Studies 1 and 2, respectively. In Study 2, four of the emerging themes were double-faceted, i.e., their data supported two related but different aspects of the same theme. This can be attributed in part to the descriptive coding approach taken in Study 2 in which data are coded as related to a topic. In comparison, the data in Study 1 were coded using in vivo coding which searches for a the semantically narrower category meaning. While it would have been possible to convert each double-faceted theme into a regular one by recoding the relevant data and splitting them into two groups (one for each facet) it did not seem imperative to do so at this stage of the analysis as the theme descriptions and definitions showed clearly each facet. In the subsequent thematic network development each theme facet was considered as a single basic theme.

7.1.4.1 Theme hierarchies

In both studies the emerging themes were searched for similarities or shared ideas that could be used to interconnect them. The resulting similarity clusters were used to define six higher level “organizing” themes, which were subsequently aggregated into a higher

hierarchy level - the overarching "global" themes that epitomized the main points, or meanings of the data in each study (Table 7-3).

The higher number of basic themes in Study 2 can be attributed in part to the participant sample characteristics: as invitations were sent to individuals who occupied middle- and higher level managerial positions, the participants were apparently more knowledgeable about the MDS ecosystem as a whole (compared to the Study 1 participants). In addition, the global device vendor duopoly that had just started to develop in 2010 (when the bulk of Study 1 data were gathered) became more pronounced with the passage of time, and by 2013 (i.e., at the time of Study 2 data gathering) was fully recognized[99].

7.1.4.2 Thematic network analysis

The two studies were both similar and different in the way the two data sets were represented thematically. Ultimately the Study 1 data were represented by five organizing themes grouped into two global themes; the Study 2 data were represented by six organizing themes grouped into three global themes.

The respective thematic maps are discussed in detail in Chapters 5 and 6. In both studies key points made by participants refer to perceptions about customers of mobile services captured by a global theme in each study – global theme "Customers demand" (S1GT1) in Study 1 and "Customers drive service development" (S2GT1) in Study 2, and to the challenges faced by service providers - global theme "Service providers face [challenges]" (S1GT2) in Study 1 and global theme "Service providers face challenges" (S2GT2) in Study 2. In Study 2 only, a number of participants elaborated on the relationships and interactions concerning device vendors (global theme S2GT3 "Vendors, operators compete").

[99] http://www.forbes.com/sites/haydnshaughnessy/2013/04/09/decoding-apple-and-googles-duopoly-in-the-lucrative-apps-market/#3c1375305cfa

Table 7-3. Theme hierarchy in Study 1 and in Study 2

THEMES – STUDY 1		THEMES- STUDY 2	
Basic (emerging) themes	**Organizing Themes**	**Basic (emerging) themes**	**Organizing Themes**
Global theme "Customers demand" (S1GT1)		**Global theme "Customers drive service development" (S2GT1)**	
• Difficult customers • Customer segmentation	*Customers differ*		
• Attractive services • User friendly services	*Customers require*	• Customer role (contributors) • Customer role (users)	*Customer participation*
• Need for service • Service value	*Customers expect*	• Free vs paid (free) • Mobile lifestyle • Need and choice (choice) • Need and choice (need) • Simple to use	*Customer needs*
• Personal goals • Free services	*Customers prefer*	• Free vs paid (attitude change) • Performance quality • Rich experience • Service benefits	*Customer decisions*
Global theme "Service providers face [challenges]" (S1GT2)		**Global theme "Service providers face challenges" (S2GT2)**	
• Optimistic providers • Service innovation • Reg. environment opportunistic	*Opportunities and challenges*	• Awareness • Customer segmentation • Motivating customers • Unique mobile services	*How to reach customers*
• Operators as a barrier • Operators threatened	*Barriers*	• Innovativeness • Services difficult	*How to innovate*
		Global theme "Vendors, operators compete" (S2GT3)	
		• Enabling competition	*Enabling competition*
		• Active vendors • Future MNOs • MNOs under pressure (market dynamics) • MNOs under pressure (sector competition)	*Competition*

The more significant high-level key insights gained from the analysis of the two studies' thematic maps are summarized in Table 7-4 (detailed descriptions can be found in Chapters 5 and 6). In order to compare, the key insights are grouped in clusters based on their thematic closeness and similarity within each study, and across the two studies.

Table 7-4. More significant key insights from the thematic analysis

PERCEIVED CUSTOMER ATTITUDES TOWARDS MDS	
1. Customers are difficult to satisfy, not enthusiastic (S1GT1).	**3.** Customers are well informed (S2GT1).
2. The customer market is multi-segmented (S1GT1).	**4.** Customer behaviour is unpredictable (S2GT2).
PERCEIVED CUSTOMER PREFERENCES ABOUT MDS	
5. Customers expect services to meet a specific need and offer a clear value (S1GT1).	**8.** Customer needs have to be considered (S2GT1).
6. Appealing design, friendly way to interact, and innovative features attract customers (S1GT1).	**9.** Customers want services that bring value (S2GT1)
7. Customers prefer convenient (time/money saving) service (S1GT1)	**10.** Customers are attracted by "unique" services" (S2GT2)
PERCEIVED CUSTOMER ATTITUDES TOWARDS PAYING FOR MDS	
11. Customers would be prepared to accept the service cost if the service met their expectations and requirements (S1GT1) ***vs***	**13.** Customers prefer free /low cost services. (S2GT1).***vs***
12. Customers would always prefer services at low cost, or free services (S1GT1)	**14.** Customers are willing to pay for services that bring value (S2GT1).
PERCEIVED CUSTOMER ROLES	
	15. Customers have a significant input through feedback and co-participation (S2GT1).
	16. Customers are empowered by the technology to drive MDS development (S2GT1.
MDS DEVELOPER AND PROVIDER ATTITUDES TOWARDS MDS	
17. Service providers believe in the future of mobile services (S1GT2).	**20.** The opportunities offered by the mobile channel and its potential are yet to be fully understood (S2GT2).
18. Mobile technology offers potential to be captured through innovative approaches (S1GT2).	**21.** New services are developed by trial and error rather than by following a clear roadmap (S2GT2).
19. There are no significant regulatory barriers to MDS development (S1GT2).	
MNOS	
22. MNOs network operators are losing their leadership position (S1GT2).	**25.** There is an uncertainty around the future of the players in the mobile services market (S2GT3).
23. MNOs act as a barrier to MDS development (S1GT2).	**26.** The mobile industry sector is highly competitive (S2GT3).
24. Investment in mobile infrastructure may be insufficient to meet MDS requirements (S1GT2).	**27.** MNOs will play a role in MDS development ***vs***
	28. MNOs will focus solely on mobile data (S2GT3).
	29. MNOs are not supportive of MDS (S2GT2) ***vs***
	30. MNOs are supportive of MDS (S2GT2)
	31. Mobile infrastructure development by MNOs may be hampered due to low ROI (S2GT2).
MDS DEVELOPER AND PROVIDER ATTITUDES TOWARDS GLOBAL VENDOR/PLATFORM PROVIDER DUOPOLY	
	32. The device/platform provider duopoly has introduced further uncertainty (S2GT3).
	33. The duopoly is anticompetitive (S2GT3).

It can be seen in Table 7-4 that within Study 1 and Study 2, the key insights are clustered in five and seven thematic clusters, respectively. Across the studies, all

clusters in Study 1 (Perceived Customer Attitudes towards MDS, Perceived Customer Preferences about MDS, Perceived Customer Attitudes towards Paying for MDS, MDS Developer and Provider Attitudes towards MDS Development, and MNOs) are paralleled by corresponding clusters in Study 2. Conversely, there are two clusters in Study 2 that appear only in this study - Perceived Customer Roles, and MDS Developer and Provider Attitudes Towards the Global Vendor/Platform Provider Duopoly. A possible explanation may be that at the time of Study 1 data gathering (2010) both social commerce (tools and platforms connecting customers and service providers and facilitating customer feedback, references and recommendations) and the global device/vendor duopoly were not that prominent (Butler, 2011; Z. Huang & Benyoucef, 2013).

It can be seen that in both studies participants reflect on the challenges of meeting the demands of the customer market (key insights 1-4) and the challenges of developing successful MDS (key insights 17-21), and consider service value as a primary motivator and factor in customer decision making (key insights 5-10). In both studies participants vary in their views about the MDS revenue model, with regards to the demand for free vs paid services (key insights 11-14).

In both studies participants similarly consider the role of MNOs as important and acknowledge the challenges and complexities of the market (key insights 24, 31, 25-26), especially in Study 2 where the impact of the emerging global device vendor duopoly is seen as a factor increasing the uncertainty (key insights 32 -33). However, while in Study 1 participants think of MNOs as having lost their leadership position and acting as a barrier to MDS development, Study 2 participants are not aligned in their views (key insights 27 -30). Also in Study 2, an emphasis is placed on the role of customers as participants in and contributors to the MDS development process (key insights 15-16).

As also evident in Figure 7-2, each study's thematic map was then explored further, searching for answers to the three specific research questions guiding the empirical investigation. The detailed findings of this analysis are presented in Chapters 5 and 6. Before synthesizing them in order to address the main research question and research aim (in Sections 7.3 and 7.4), the researcher returns to the important issue of research rigour, or trustworthiness, and reflects on how the implementation of the research design contributes to the trustworthiness dimensions discussed in Chapter 4.

7.2 Research Trustworthiness

In Chapter 4 emphasis was placed on the need for evidence of trustworthiness in the research design including its credibility, authenticity, confirmability, dependability, and transferability. During the empirical investigation itself the researcher deployed a number of strategies to ensure the trustworthiness of the research and its findings, as discussed below.

7.2.1 Credibility

The reader of a report on the findings of a qualitative enquiry makes a judgement about the "truth value " of the research based on perceptions of its credibility and authenticity (Miles et al., 2014, p. 312). A credible research account is believed to present a true picture of the object of the investigation; therefore, the investigator needs to make a conscious effort to maintain, and be able to demonstrate, the credibility of their work (Shenton, 2004) .

A number of strategies contributing to the credibility of the study were deployed in the work presented here. The study methodology was built on well-established and tested methods; as already shown both empirical studies involved a highly iterative process of coding and interpreting thus maximizing both the accuracy, and the inherent consistency of the coding. To enhance credibility, the predefined coding protocol was strictly adhered to. Code mapping (Saldaña, 2012) was continually applied in both studies: the initially developed codes were reorganized and mapped to a structure of overarching categories that were systematically examined and condensed in order to identify themes that represented the key points collectively made by the participants in each study. The mapping of data categories onto emerging themes in Study 1 and in Study 2 is discussed in Chapters 5 and Chapter 6, respectively.

Furthermore, the data analysis was supported by evidence that the data were interpreted and coded in a way that aimed to be "free from error and distortion" (Myers, 2009, p. 159). Coding and analysis related decisions that may have caused distortion, were followed up by checking the relevant outcomes. For example, in Study 1 the researcher was satisfied that data from both data domains into which the original data set was split during the first coding stages, contributed to defining the emerging themes (refer Figure 5-39). In Study 2, where coding started with applying the coding scheme developed in Study 1, identifying categories and codes common for the two studies, and adding new codes and categories as they emerged contributed to maintaining the overall coherence

of the research process, and the robustness of the findings (Firestone, 1993). Also in Study 2, the (albeit limited) member check that was carried out verified the results of the analysis as summarized in two of the three global themes that emerged from the data, and re-confirmed the existence of opposing trends (competition vs cooperation, need to invest vs decrease in ROI) as summarized in the third global theme (refer Subsections 6.6.2-6.6.5).

Last but not least the written reports (Chapters 5 and 6) include a reflective commentary on the effectiveness of the methods and processes as they were deployed, and on the emerging trends and patterns. Specifically in Study 2, the researcher compared the findings at each step of the analysis to the findings in Study 1 and documented in detail the commonalities and differences found. Note: there was no in-built *desire* to find commonalities or differences, as the intent was to arrive at a sufficient yet comprehensive understanding of the two cases separately as well as collectively. Interim versions of the written reports were discussed with the researcher's supervisors. Feedback from peers was also received (as the researcher presented some of her work as part of the departmental seminar series in 2009 and 2012).

7.2.2 Authenticity

In the context of qualitative data analysis authenticity refers to the quality of the evidence supporting the findings; evidence that is "genuine " and "of unquestionable origin" (Myers, 2009, p. 159) allows to create an "authentic portrait" of the phenomenon under investigation (Miles et al., 2014, p. 312).

In order to maximize the authenticity of the evidence in both studies the researcher maintained a detailed record of the coding process, preserving numerous intermediate states of the data dictionaries and the code taxonomies; the end-of-stage versions are shown in the appendices. Furthermore, the data meanings used to support the codes, and later - the themes, were explicitly linked to the source and could be traced back to the original interview (this process can be checked by the reader should they wish to follow the chapters and the associated appendices). Similarly, and data excluded at the different stages of the analysis were clearly marked and kept track of.

In both studies all interviews provided data for identifying and developing the emerging themes, with a very high proportion of the original data used: 92% of all coded meanings (87% of all data units) in Study 1, and 94% of the text representing coded

data in Study 2 (amounting to 70% of the combined interviewee responses as originally transcribed).

7.2.3 Confirmability

Confirmability refers to the effort made by the researcher to remain relatively neutral and free from their own biases (Miles et al., 2014) by not allowing "personal values or theoretical inclinations" to over-influence the conduct of the research (Bryman & Bell, 2007, p. 414). Demonstrating that the findings are based on the participants (and not on the researcher's) ideas and predispositions adds to the confirmability of a research study (Shenton, 2004)

To achieve confirmability in both studies the analysis followed closely and persistently the research design and methodology developed in Chapter 4, where the selection of the adopted methods and approaches were justified, considering their strengths and weaknesses. Step-by-step procedure descriptions and diagrams showing how data were processed and how the specific research questions were addressed were incorporated in the reports presented in Chapters 5 and 6. It should also be noted that, while the research instruments were created based on prior understandings and assumptions in the original model, the analysis was highly inductive and was not constrained by the models underpinning the research framework. Furthermore, decisions made in the process of the analysis (e.g., to split the data in two domains in Study 1, or to use descriptive rather than in vivo coding in Study 2), were reached through consultation with the relevant literature and discussion with the thesis supervisors.

7.2.4 Dependability

Dependability (in association with credibility) is mostly concerned with showing that the research process follows a consistent methodology (Miles et al., 2014) to derive justifiable inferences (Bryman & Bell, 2007). A dependable, well documented research process would also allow for the replication of the study applying the same methods (Shenton, 2004).

The stages and the steps of the research process followed in the two empirical studies (refer Chapters 5 and 6) were documented in minute detail, with Study 2 using the sequence of steps developed and justified in Study 1. In both studies, a dependable foundation for the final interpretation of the themes was built by following a stable process, traceable through the evidence. First, data were coded iteratively, with the data

codes systematically updated. Second, in each study the emerging themes were identified through a methodical pattern searching across the study's coded data, applying a predefined set of pattern codes. Finally, a theme definition framework was consistently used to ensure that the description of each theme contained the answers to the questions "What is happening in the theme", "How is it happening?", and "Why is it happening?". The theme descriptions and theme concept definitions were supported by excerpts from the data. In both studies a comprehensive audit trail was maintained and provided in the thesis chapters as well as in the relevant appendices, demonstrating the progression from data to inference.

7.2.5 Transferability

The transferability of the findings of a qualitative study relates to the question of how far its findings can be generalized, and transferred to other contexts (Miles et al., 2014, p. 314). Shenton (2004) highlights two important factors facilitating transferability: providing information about the size and pertinent characteristics of the sample, and providing a detailed description of the study context.

To help develop an understanding of the studies' background that may assist the reader in comparing the two empirical studies' contexts to other situations, ample information about each study context was presented in Chapters 5 and 6. The study setting in each of the two geographical locations was described in terms of mobile telecommunications infrastructure, relevant regulatory environment, and the state of the MDS landscape at the time of the data gathering (Sections 5.1 and 6.1 respectively). Furthermore, the descriptions of the data gathering process included the criteria used to identify potential participants and the number of actual participants, detailed information profiling participants and their respective organizations, a comprehensive description of the data collection method including developing the interview questionnaire, and the data gathering timelines (Sections 5.2 and 6.2 respectively).

As already noted, the second empirical study (Study 2) was conducted deploying the methodology applied and tested in Study 1 but in a different geopolitical context. The discussion in the previous sections already touched upon the value of transferring the coding scheme developed in Study 1 to the new context, and the extent to which the findings of the two studies were similar or different. Comparing and contrasting the two cases offers further opportunities for making tentative generalizations beyond the scope of each of the studies (VanWynsberghe & Khan, 2008).

Finally, an additional check on the transferability of the findings of the analysis in Study 1 (i.e., the key insights made by participants as summarized in the three global themes and their thematic maps) was made by scanning of interview data that were gathered during the initial data collection but were not used in the analysis (refer Section 5.8.5). Support for the study findings were found in the new data thus indicating that the findings may be generalized across the location of Study 1 (i.e., the Bulgarian geopolitical context).

7.3 Developing Theoretical Propositions

As reported in Chapters 5 and 6, the thematic maps emerging from the data analyzes were explored further by addressing the specific research questions guiding the study. While the emerging participant views about customers and the service environment were formulated and illustrated by supporting data excerpts in Chapters 5 and 6, the salient reference points are summarized in Table 7-5 and Table 7-6. This section extends the analysis of the data by applying a cross-case search for shared meanings relevant to the main research question and overall research aim, as a means to transcend the initial impressions and create a structured representation of the data (Eisenhardt, 1989) that brings out "links between cases and theories" (Firestone, 1993, p. 22). To this end, the researcher draws on the findings of the thematic analysis in order to identify plausible variables and relationships and advance propositions that may guide theory building and future empirical research. The resulting proposition framework (Figure 7-3) shows the dimensions of perceived customer demand as a factor influencing MDS developer and provider decisions. It includes as well the perceived decision making factors related to the service and regulatory environment.

The framework comprises 30 propositions, discussed in detail in the rest of the section. Central to the framework is Proposition 3 which links perceived customer demand for MDS to MDS supply (MDS developer and provider decisions about MDS). The nine propositions to the left of this convergent element of the framework show the relationships between the supply environment and MDS supply. The main characteristics of perceived customer demand are represented by a set of seven propositions situated to the right of the convergent element, including perceived service value (Proposition 1). The rest of the propositions represent links between perceived service value and its proposed antecedents, two of which are multidimensional (perceived service need and perceived service delivery quality, introduced in Proposition 2 and Proposition 8, respectively).

Table 7-5. Reference points: Participant views about customers

Study 1	Study 2
1. The range of specific requirements to be met by the service design is significant. 2. Customers conservative. 3. Customers have significantly high expectations about the quality of the service. 4. Customers looking for "value-for-money". 5. Customers expecting low-cost services. 6. Customers are aware of the technology opportunities, expect innovative "anywhere/anytime" services 7. Customers are aware of the choice of services; too many services 8. Customers know what they have and what they want and make informed decisions. 9. Innovative services have to compete with existing ones. 10. The viability of innovative services was not guaranteed as customer acceptance is difficult to predict *11. Customers would be prepared to accept the service cost if the service met their expectations and requirements ← → Customers would always prefer services at low cost, or free services* 12. "Mobility" is not necessarily associated with service based on mobile technologies as customers do not differentiate between the technologies used. Rather they consider them specific type of online (Internet) services 13. Mobile services needed to provide motivation to customers to use them by being innovative and providing an interesting experience, following latest trends. 14. Mobile services need to address privacy and security issues as customers have concerns about data safety and safe service provision. 15. Mobile services need to improve and enhance personal lifestyle and daily routines. 16. Innovative mobile services would need to meet specific requirements in order to be accepted. 17. Innovative services need to meet personal goals in order to be accepted. 18. Customers did not value innovativeness per se rather they evaluate services according to their needs.	*19. Customers still conservative ← → social media and customers' peer environment driving a change in attitude towards adoption.* 20. Customers becoming active participants in the process of creating service value (prepared to voice their opinions about services they received in order to help service providers engage with customers and gauge their expectations). 21. Customers evaluate its potential value when deciding to trial a service (initial adoption). Customer decision to trial a service determined primarily by customer perceptions about service value. a. Perceived value is bringing use benefits by meeting a perceived need (not just by being new). b. Perceived value is enhancing customer lifestyle: i. convenient: saving time; ii. empowering: aims to improve quality of life by being unique, or performing better than alternatives; iii. intuitive (simple to use): services - no special process to learn how to use them. 22. Customers evaluate its potential safety when deciding to trial a service (initial adoption). a. Security/safety service levels important for some customer segments, e.g., mature customers. b. Customer decision based on the perceived trustworthiness of the service provider. 23. Customers would expect to be able to choose between similar services offered by different providers 24. The decision to trial a service is influenced by expected service use experiences: pleasurable, engaging and enriching experience including interaction and connecting with others. 25. Continuing to use a service would depend on performance quality related to both the service design and content, and to network and device performance. *26. Customers would continue to prefer free services ← → customers accepting the need to pay for better quality; free services are less valuable, customers prepared to pay based on perceived value (a trade-off, as network access cost was still a consideration).* 27. "Auxiliary" services (enhancing access to an existing service by adding a mobile channel, such as mBanking, or mobile ticketing) would be expected to be free. 28. To decide to continue using a service customers evaluate its performance quality terms of the value provided by service design and content (efficient, meeting expectations, surpassing non-mobile alternatives). 29. To decide to continue using a service customers evaluate it in terms of the quality of the technology supporting the service: network performance (network speed, reliability, anytime/anywhere availability), device performance (display). 30. Mobile technology opportunities were not yet fully understood, nor fully utilized (multiple examples provided for An**y**where/anytime mobility supporting services and motion support services). 31. Mobile services need to improve personal productivity and enhance everyday life by enabling efficient time use, connecting with others, making life pleasurable.

Table 7-6. Reference points: Participant views about the service and regulatory environment

Study 1	Study 2
1. A complex customer market and the need to deal with the high customer expectations. Uncertain about what customers really want. 2. Relatively optimistic about the future of MDS, viable in the long term because of rapid technological progress. 3. MDS slowed by slow adoption pace, issues related to service cost including ongoing cost and issues related to the inherent limitations of the technology. 4. Market opportunities: a. offering a service ahead of other competitors; b. developing a very specialized service; c. creating innovative service that took advantage of the technology opportunities. 5. The service market is very competitive and MNOs have to keep up with it. 6. MNOs are still reluctant to support MDS and relatively slow to introduce such services themselves. 7. The regulatory environment is mature (with some relevant legislation already in place), and relatively supportive, or at least not presenting any significant obstacles to MDS development and deployment. 8. More regulation is needed in the area of data privacy, because of LBS (privacy of customer location). 9. Lack of specific MDA regulation makes it hard to obtain a licence for new service. 10. Lack of specific MDS regulation makes it easy to develop and offer a new service.	11. New technology opportunities for MDS development - potentially profitable MDS; however, MDS development is fraught with uncertainty and is risky. More of a trial-and-error development. Treating “mobile “ as a secondary channel. 12. Rather than innovate, many companies prefer to follow innovators. 13. Slow MDS development: limited, but highly segmented customer market, high cost of development due to development platform fragmentation and the fast rate of device /platform change. 14. Major MDS development drivers: the existence of a critical mass of smart device owners, and the “push” from device and platform vendors who rapidly release more and more technologically advanced models. 15. Factors critical to MDS success: understanding and addressing customer segmentation caused by different and specific requirements, raising customer MDS awareness, motivating and incentivizing service use, and creating and retaining a critical mass of service users. 16. Barriers to MDS development: lack of understanding of the customer market, the technology opportunities and limitations, fast pace of technology change, the presence of multiple device brands, platform fragmentation. 17. Device and platform providers are competing for dominance by maintaining a strong customer focus, supporting development of services and applications for their respective platforms, protecting device functionality. Expanding to provide already popular MDS (e.g., financial), providing independent network access. 18. MNOs who own infrastructure are affected negatively by regulations enabling competition among operators and protecting customer rights. Face profit erosion - recover revenue loss through high data cost. Benefit form advanced mobile devices, driven by the device/platform vendors (customer growth, increased mobile data use). 19. MNOs are not actively engaged in new MDS development, focused on being data carriers; no longer leaders in the MDS supply chain. Need to look for closer partnerships with other players. 20. *Future MNOs at the bottom of the value chain as “pure” data carriers ← → Future MNOs also provide service content. Synergies with other players; specialized auxiliary services such as customer authentication*. 21. Opportunities for MDS developers: exporting services to developing economies (local market using imported services). 22. Services based on specific device capabilities meeting identified customer needs will be successful in the market. Partnerships needed to create the necessary supporting infrastructure. 23. Opportunities for small and emerging companies (including service users) to get involved in service development. 24. Regulatory environment favourable (supports competition, not restrictive, protects customer privacy and security). 25. More regulatory intervention may be needed to balance needs: a. Ensuring competition (leading to lower data costs for customers) vs supporting the development of the national mobile data infrastructure; b. Protecting customer privacy and safeguarding vs lowering compliance costs for service developers; c. Aligning with global modalities (e.g., taxation) to support safe and secure use of non-local services and encourage MDS export vs creating incentives to attract global service providers.

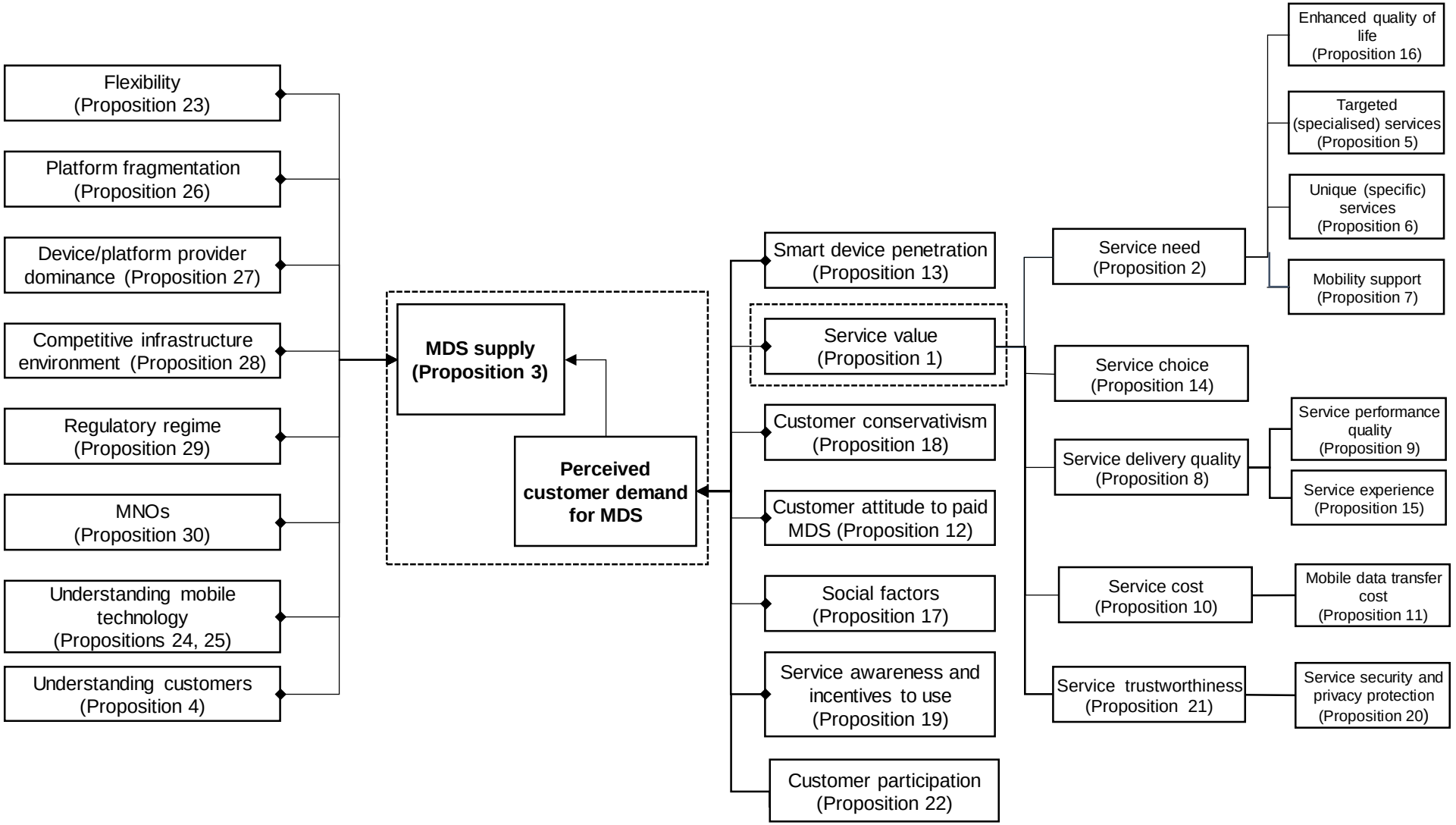

Figure 7-3. A theoretical framework of propositions

7.3.1 Service value, service need, support for mobility, and service quality

Data from both studies suggest that according to MDS suppliers, customer attitude towards using and continuing to use MDS is driven by perceptions of service value. Second, one of the most often mentioned factors having a significant impact on customer value judgement is the intensity of the customer's perceived need for a particular service (i.e., considerations about how much they need the service, reference points 1, 4, 8, 17,18, 21 in Table 7-5). The following two propositions are formulated:

Proposition 1: Service value

MDS developer and provider perceptions about customer-perceived *service value* influence MDS developer and provider perceptions about customer demand (*perceived customer demand for MDS*).

"What really matters is the value that the mobile product brings" (Study 1, P11R18). "People eventually tire of the gimmick aspect of it and, unless it's producing true value underneath, then people start dropping off those services…" (Study 2, NZInt2)

Proposition 2: Service need

Customer perceptions about the intensity of the need for a service (customer-perceived *service need*) influence customer perceptions about *service value.*

"Whether they would start using it directly depends on their needs" (Study 1, P3R8). "The consumers end up winning …because they say…'Okay,, here is the service that I'm going to use because it goes back to meeting my needs…" (Study 2, NZInt10). "What drives innovation is the need… but there's just no need for them" (Study 2, NZInt4).

Perceived specific needs vary according to personal preferences and goals and contribute to the segmentation of the customer market; participants are well aware of the complexity of the customer market and the challenge of meeting high customer expectations from varied customer segments. While optimistic about the future of MDS seeing it as driven by rapid technological progress that generates need for new services (reference points 1, 2, 11, 16 in Table 7-6), participants are somewhat uncertain about what customers really want (i.e., they do not know their specific needs); therefore developing and providing MDS is considered risky. Service development and provision areas already identified by innovators are considered relatively safe in terms of service profitability; however, leading new service development by identifying potential MDS needs and providing innovative solutions requires investment with no guarantee for

profit (reference point 4 in Table 7-5 and key points 12, 17, 22 in Table 7-6). The following two propositions are formulated:

Proposition 3: MDS supply

Perceived customer demand influences MDS developer and provider decisions about developing and providing MDS (*MDS supply*).

"Obstacles are: too high investment costs and unsatisfactory return on investment, too narrow customer base…" (Study 1, P11R18). "If new development is very well targeted they could be profitable – otherwise they don't bring much of the profits" (Study 1, P9R16). "…To develop at what level of innovation, how much innovation risk do you want to take becomes part of the decision making process for somebody who is in the business commercially of producing applications…" (Study 2, NZInt1)

Proposition 4: Understanding customers

Perceived lack of *understanding of customer needs* by MDS developers and providers influences *MDS supply.*

"There are no clear criteria exactly what the market wants" (Study 1, P7R12). "the whole space is so new and there's no knowing way of doing it or standard way of doing it. The whole process is innovative…we would try a new service and we'll see how that responds and then grow that and modify that or just change it up based on what we think they are" (Study 2, NZInt2). "… launch the app on the market…without testing … a month later we've got a version one point zero and it's sort of a trial/error …"(Study 2, NZInt5)

Opportunities to increase supply and demand include developing services that focus on meeting the unique needs of a targeted customer segment, and to leverage new device and technology capabilities (refer key points 4, 15, 22 in Table 7-6). The following two propositions are formulated:

Proposition 5: Targeted (specialized) services

Specialized MDS targeting a unique customer segment influence that customer segment's perceptions about *service need*.

"It is often easy for the developers of a mobile application to fill a 'niche' in the market" (Study 1, P12R19). "Mobile services, are all about micro-segmentation… focus on small segments required to succeed" (Study 2, NZInt11)

Proposition 6: Unique (specific) services

Unique MDS using new device and technology capabilities influence customers' perceptions about *service need*.

"This is an intensely developing sphere…there is much potential in it – in order to use this potential effectively, there is a constant need of new services" Study 1, P5R10). "…a lot of these services are never going to really hit online or other channels, they're just going to go straight to mobile…things that you couldn't do before…" (Study 2,NZInt9).

The data indicate that customers are perceived as expecting MDS to support mobility regardless of the technology used. They expect MDS to be available anytime/anywhere and designed to be used by a customer who is mobile (reference points 12, 15-16, 30 in Table 7-5). They also expect mobile versions of existing services (reference point 11 in Table 7-6). The following proposition is formulated:

Proposition 7: Mobility support

Customer perceptions about the need for *mobility support* influence customer perceptions about *service need*.

"Currently the "mobile" or the "mobility" became expression with very wide range and covering services and features which are not based on pure GSM or mobile technology" (Study 1, P2R4). "Primarily the convenience to be able to do whatever you want, whenever and wherever you want -something very important because it saves time" (Study 1, P6R11). "For the time-saving and money-saving mobile business services, their most valuable feature is simply being mobile. That may sound trivial, but is in fact massively important. Mobile enables people to use the in-between times while waiting for others, travelling, and so on" (Study 2, NZInt11). "Air New Zealand's mobile app… useful is that you are literally moving…when it's telling you about traffic, when it's telling you about checking online, when it's telling you to go to the gate, it's actually all about movement" (Study 2, NZInt12).

The quality of MDS is also a significant factor - customer expectations about overall service quality are perceived as high (reference points 3, 21, 25, 26, 28, 29 in Table 7-5). When making a value judgement, customers consider the service quality in terms of service content, service design, and specific functionality, and also the quality of the network and device performance. The last two ensure service availability and support a seamless service delivery. Therefore, the two interconnected aspects of perceived service quality are "service delivery quality"–service functionality, service content and service design (including an interface that is user-friendly and makes the service simple to use), and "service performance quality" (network availability, network and device performance, support and maintenance). The following two propositions are formulated:

Proposition 8: Service delivery quality

Customer perceptions about *service delivery quality* (service functionality, content and design) influence customer perceptions about *service value*.

"*Adoption following trial is probably driven by did it do what I expected" (Study 2, NZInt11). "Based on the service design, customers will estimate the value from the new development." (Study 1, P2R4)*

Proposition 9: Service performance quality

Customer perceptions about *service performance quality* (network availability, network and device performance, support and maintenance) influence customer perceptions about *service delivery quality*.

"Perform[ance]s because it has impact on the customer relationship management" (Study 1, P2R4). "The other thing that changes consumer perception once they are actually adopted, is around a requirement for availability, reliability, and robustness. So I've talked about speed, but basically they view mobile as a twenty-four by seven channel and they don't really tolerate very well when things are broken in some way" (Study 2, NZInt9).

7.3.2 Service cost

The overall MDS cost to the customer is determined by both the cost of the service content/functionality (as determined by the MDS provider), and the cost of accessing the service (i.e., the cost of owning a smart mobile device, and the cost of mobile data). Based on the revenue model of the MDS provider a service may be "free" in terms of content/functionality (e.g., Internet-based mBanking) however, most MDS are not "free" in terms of mobile data transfer cost, if accessed through a mobile data network. In this context the term "free services" refers to services where the customer does not pay the service provider but may need to pay for mobile data transfer. While the competition between the two main device vendors has led to lower device cost and has contributed to creating a significant mass of potential MDS customers (Study 2 data only; at the time of collecting data for Study 1 the global duopoly of device/platform vendors Apple and Google had not emerged yet), the perceived cost of network access remains high even though the MNO sector is relatively competitive (reference points 3, 15, 18 in Table 7-6).The following propositions are formulated:

Proposition 10: Service cost

Customer perceptions about *service cost* influence customer perceptions about *service value.*

"The price is a key factor, especially in Bulgaria" (Study 1, P9R16). "There's always going to be a trade-off… if it's priced fairly, people will continue to pay… It depends what you value your time at and the convenience…it depends what the cost is" (Study 2, NZInt3).

Proposition 11: Mobile data transfer cost

Customer perceptions about *mobile data transfer cost* influence customer perceptions about *service cost.*

"[people are] …not afraid to pay, what people wouldn't want to have is pay a fat bill for telephone for a mobile company" (Study 2, NZInt6). "Mobile internet prices in many aspects are making the use of applications expensive and thus unattractive."(Study 1, P7R12).

Two different views emerge in relation to customer acceptance of service cost (reference points 5, 11, 26, 27 in Table 7-5): on the one side, there are customers who regard free services as intrinsically less valuable and would be prepared to pay a reasonable price for a service perceived as valuable based on a trade-off (cost-benefit) considerations). On the other side, there are customers who expect free services and will always prefer a low cost/free service to a paid one regardless of the perceived value. Furthermore, certain support services (such as mobile ticketing) need to be free (except for the cost of accessing the mobile network) similarly to "brick and mortar" supporting services.

Proposition 12: Customer attitude towards paid MDS

Customer attitude toward paid MDS influences perceived customer demand for MDS.

"It was not affordable for everyone to pay to use something (this is also due to mentality) (Study 1, P6R11). "Nobody wants to pay for anything anymore… everybody assumes everything is free… don't think it's possible now to sell a service". (Study 2, NZInt12)

Proposition 13: Smart device penetration

The mass penetration of smart mobile devices influences perceived customer demand for MDS.

"…We've had mobile feature phones for quite some time but now it's starting to hit critical mass and now developers are jumping into it and so that's a piece that's happening fast" (Study 2, NZInt2); "The smartphone adoption and then usage… there's already a population of users, particular smartphone users… people who have got their smartphones just because it came free with their plan, and then before you know it they downloaded an application, and then they downloaded another and another, and then they just become active users when they never intended to…" (Study 2, NZInt9)

7.3.3 Service choice

MDS developers and providers perceive customers as expecting to be offered a choice of different service channels (including mobile), and choice of mobile service providers. According to participants customers take into consideration the different service options as part of their service value judgement (reference points 6, 7, 9, 23 in Table 7-5). The following proposition is formulated:

Proposition 14: Service choice

Customer perceptions about the availability of a *choice of services* influence customer perceptions about *service value*.

"Nowadays the user has a choice" (Study 1, P3R8). "Innovation is very important in this sector – single aspects are; The customer has the choice how to get something done" (Study 1, P10R17 "…did it do better than the alternative I might have used…" (Study 2, NZInt11). "..to choose the services you want, from who you want….is important, that is how the market is going to drive…" (Study 2, NZInt6). "Innovation is very important in this sector – single aspects are; The customer has the choice how to get something done" (Study 1, P10R17)

7.3.4 Service experience

According to participants expected and actual customer experience with an MDS played an important role in its acceptance and use (reference points 13, 24 in Table 7-5). Enjoyable services and positive and rich customer experience with a particular service is a strong motivator affecting continued use, and plays a significant role in service evaluation as it affects positively perceptions about service delivery quality. The following proposition is formulated:

Proposition 15: Service experience

Customer perceptions about their anticipated or actual perceived *service experience* influence customer perceptions about *service delivery quality*.

"To bring innovation that facilitates some activity, to contribute to a richer user experience" (Study 1, P6R11). "The other thing that's unique about mobile compared to other channels today, is the expectation around the user experience…"(Study 2, NZInt9).

7.3.5 Enhanced quality of life

According to participants customers expect mobile services that will enhance their quality of life by saving time, being more convenient than alternatives, using the advantages of mobility to support better their daily routines (key points 15, 31 in Table 7-5). The following proposition is formulated:

Proposition 16: Enhanced quality of life

Customer perceptions about MDS enhancing their *quality of life* influence customer perceptions about *service need*.

"An easy and quick to use interface allowing customers to use the full range of features and functions of the application while saving them time" (Study 1, P12R19) "In order to be successful, the undertaking has to offer something new that is better and more convenient for users than the ways they are currently using" (Study 1, P7R12). " I go in a Cafe I can see that some of the people that are part of my network are in the Cafe or in a two

kilometres area, so my phone is telling me that" (Study 2, NZInt5). "Games are very common and generally pleasure is sought at any moment, due to the limited free time in everyday life, a demanded feature would also be the entertainment potential of the applications" (Study 1, P6R11).

7.3.6 Social factors, customer traditionalism, and service awareness

MDS developers and providers see customers as still conservative and the MDS market may be even oversupplied (reference point 7 in Table 7-5 and key point 16 in Table 7-6). However, there are indications of an ongoing change in attitude towards MDS driven in part by peer and social influences (e.g., word of mouth, social media). In other words, customers are perceived as increasing their interest in MDS under the influence of social norm factors (reference points 2, 10, 19, 21 in Table 7-5). The trend towards change is more prominently manifested by the Study 2 data (in Study 2 participants refer to the already prominent app market which was still in its infancy during the Study 1 data collection). Also in Study 2 participants suggest that raising customer awareness using channels such as social media and providing incentives to engage with a service (e.g., a free trial, or a free version with limited functionality) may help overcome customer conservatism by making customers aware of their potential need for the service (reference point 15 in Table 7-6). The following three propositions are formulated:

Proposition 17: Social factors

Customer perceptions about the views of others (peers, media) about MDS (*social factors)* have an impact on *perceived customer demand for MDS*.

"Other factors which influence customer decisions are …Popularity" (Study 1, P12R19). "The main-stream opinion in the society about a product" (Study 1, P8R15). "Media outcome. " (Study 1, P2R4). "When you're talking about broad base appeal what people are going to decide on – Are my friends using it?" (Study 2, NZInt1); "… there's also a certain amount of social influence…' Everyone else I know is using this and says it's fantastic', or 'Everyone else I know is using this and I should get on board too" (Study 2, NZInt10).

Proposition 18: Customer conservativism

Customers conservativism (manifested as a conservative or even negative customer attitude towards non-traditional services) influences *perceived customer demand for MDS*.

"In my opinion, development of new services is going ahead of demand" (Study 1, P4R9). "In my opinion, it is difficult to persuade customers to break with the old routines and influence them towards adopting new innovative products if the need to do so is not urgent "(Study 1, P11R18). "The less technological segment of the population…are still reluctant to take advantage of the fact that their Smart phone can actually run applications" (Study 2, NZInt1) "Customers might not always appreciate all advantages a certain product could give them; there are very innovative users, but also many who are conservative and prefer to continue using older, better known options (Study 1, P8R15)."…to make customers try a new service or app… I think that's a very tough thing

that people who are building these applications need to work out how they drive the penetration to get people to use them the first time …[to] understand what the benefit is…" (Study 2,NZInt3).

Proposition 19: Service awareness and incentives to use

Customer perceptions about *service awareness* and additional benefits from using an MDS influence *perceived customer demand for MDS.*

"…make it possible for people to envisage themselves doing this rather than having to discover on their own because a lot of people are not going to take that initiative and they not want to download an application just on the chance it would be helpful. Someone's going to have to tell them how useful it is. They are going to have to see it being useful for somebody else before they would even consider the possibility…", (Study 2, NZInt1).
"…sometimes free pricing is not enough. You may need to stimulate early adoption not just through give-aways but bundling with another in-use service or other incentives to try it out…", (Study 2, NZInt11).

7.3.7 Security and trust

Customer decisions take into account the perceived service trustworthiness based on impressions about the MDS /device provider; according to participants the perceived security levels of the service are important factors influencing their evaluation of an MDS (reference points 14, 22 in Table 7-5); these include data and transaction safety and privacy protection. The following two propositions are formulated:

Proposition 20: Service trustworthiness

Customer perceptions about *service trustworthiness* influence customer perceptions about *service value*.

"…If I could put that one in one word, I would say 'trust'. I think so much of this technology is new that people want to get involved in something they know has some kind of reputation in the marketplace …Trust and security …may be come out even ahead of considerations like price…". (Study 2, NZInt1)
"People usually are not confident to use mobile devices for more serious stuff, e.g., e-banking or remote desktop." (Study 1, P7R12).

Proposition 21: Service security and privacy protection

Customer perceptions about *service security and privacy protection* influence customer perceptions about *service trustworthiness*.

"…you already know how to type things in, you already know how to search for friends, all this stuff on your phone, what would stop you doing mobile banking?' And the answer was always safety" (Study 2, NZInt9). "But some other factors are gaining more and more importance too: Safety of the personal information and the user's data" (Study 1, P8R15)

7.3.8 Customer participation

According to Study 2 participants as customers are becoming interested in new services they also become more prepared to express their views and opinions about their service

experience through public channels, including social media. The feedback helps service providers engage with customers and gauge their expectations (key points 19, 20 in Table 7-5). Thus customers become participants in the process of creating service value.

Proposition 22: Customer participation

Customer participation in the process of service value creation influences *perceived customer demand for MDS.*

> *"One of the things that is specific to mobile application delivery, is instant customer feedback… it's very important and a very useful tool in content or application providers being able to get response and feedback to the services…It's something that customers are willing to give freely based on their unique experiences of your, of what you provided…" (Study 2, NZInt13). "Some people call them 'pro the users'…because users is normally passive" (Study 2, NZInt7).*

7.3.9 Flexibility, limitations and opportunities

To ensure MDS viability (profitability) there is a need for a critical mass of using customers as such services are normally low priced. Therefore the service design and the provision model need to be flexible in order to be able to adapt and change in response to changing customer expectations (reference points 1, 4, 14, 15 in Table 7-6).

Furthermore mobile technology's inherent limitations related to the device interface need to be overcome as customers who are already using similar eServices are expecting (perhaps unrealistically) comparable ease of use (reference points 3, 16 in Table 7-6); not all innovative MDS ideas can be converted to sustainable service. On the other hand service and application development has become easier (less costly) and can be profitable, if successful with customers including the global market (reference points 2, 11 in Table 7-6). Given the limited size of the local customer market it was seen as competitive and costly to service developers. Therefore, a more profitable prospect would be to develop services for the global market, and/or for underdeveloped markets such as emerging economies (reference points 21, 23 in Table 7-6). The three propositions formulated below reflect the impact of MDS developer and provider flexibility and understanding of technology understanding on decisions related to MDS supply.

Proposition 23: Flexibility

MDS developer and provider *flexibility* and responsiveness to customer changing needs and expectations influences *MDS supply*.

"The developers of a mobile service have to ...be flexible to fit the changing market situation…" (Study 1, P12R19) "It's a two-way street, our customers want us to respond much faster so we need to respond much faster…" (Study 2, NZInt4). "…almost all fall into the trap of getting stuck when they have some traction, but are unable to change and refine elegantly…their architecture is complex and stagnant….their user base expectations are not managed to enable and support change"(Study 2, NZInt11)

Proposition 24: Technology limitations

MDS developer and provider understanding of the *limitations of mobile technology* influences *MDS supply*.

"Developers of mobile application … are restricted by the limited resources of the mobile device (or most mobile devices), in comparison with PCs – so, with much less options an application has to be developed that does not defer drastically to those, made for PCs"(Study 1, P7R12). "…The question is how practical and affordable are those things in practice …business use cases have often run ahead of the technology and affordability ….that tends to be the case that we've got plenty of ideas about business use case, but we have to kind of wait for the practicality of them to catch up…" (Study 2, NZInt12).

Proposition 25: Technology opportunities

MDS developer and provider understanding of t*he opportunities offered by mobile technology* influences *MDS supply*.

"Innovations of technical nature … very good support and…using new technologies for distribution (Study 1, P6R11). "We are only just beginning to scratch the surface in terms of what mobile are going to do…" (Study 2, NZInt1). "The industry are saying with very short term goals [,] doesn't understand the full potential of mobile…" (Study 2, NZInt7). "…that's what the smartphone has done, has made developing applications so easy…(Study 2, NZInt8).

7.3.10 MDS development platform fragmentation and device/platform provider duopoly

The current fast pace of mobile device change and the existing multiplicity of development platforms create a fragmented service development environment. Developing and maintaining services to keep up with technology development and also to meet different customer segments' needs is costly and time consuming and is an impediment to meeting customer needs, and to proper testing and implementing of new services (Study 2 data only, reference points 13, 16 in Table 7-6). The fast pace of development platform change and the development platform fragmentation are due in part to the competition between the two large device platform vendors (Apple and Google-Samsung) who aim to achieve dominance by "locking-in" both customers, and service developer and providers (Study 2 data only, reference point 17 in Table 7-6). The competition has already resulted in creating a significant smart mobile device user base as mobile device prices have gone down. Furthermore, the dominant device/platform providers are in a position to offer their own mobile financial services

in competition with other financial mobile service developers and providers. The two propositions formulated below reflect the impact of platform fragmentation and device/platform provider dominance on decisions regarding MDS supply made by MDS developers and providers.

Proposition 26: Platform fragmentation

The fragmented device and development platform market (*platform fragmentation*) influences *MDS supply*.

"…You've got android that is growing very rapidly, iPhone which is a closed shop, Symbian which used to dominate and is moving out more. You've got J2ME which is actually available on 80% of all phones which is a parallel platform, a Java platform, and it just fits in all these phones but it's a complete dog as well. It's generally a complete mess. …There's no coordination between the providers of how these platforms are going to operate, you're just left with all these individual platforms. As a developer, it makes it quite difficult because there's major fragmentation" (Study 2, NZInt2). "… [a] particular obstacle is ensuring that the applications can work across different networks and different platforms. [there is] fragmentation between different networks and the way that they operate and interface as well as the different platforms….We've got windows, android, Apple, there's going to be a winner and a loser and that sort of fragmentation is going to be difficult in bringing stuff to market…. You can't just develop one application, you have to develop three or potentially four applications…" (Study 2, NZInt3). "… there are so many mobile devices out there. …can you make it [the service] device ambiguous (agnostic) or can you develop a device specific version…" (Study 2, NZInt10).

Proposition 27: Device/platform provider dominance

The emerging *device/platform provider dominance* influences *MDS supply*.

"You've got these people providing platforms and they're all fighting one another to try and dominate and get more customers…. Applications have to run on a platform and so once you've started developing for a particular platform you have natural lock-in with your customers and your own development team on that platform. …I do think it's happening very fast if you look how fast android is taking over things…", (Study 2, NZInt2). "…that's where…the power of the Googles and the Apples and the whatever, they spend their money on things that consumers want, because they are consumer-centric organizations…", (Study 2, NZInt9). "…with marketplaces like Google, like Google Play, or even though the iPhone channels are more restrictive, they still provide an incentive for people… an incentive for people to write applications for mobile…" (Study 2, NZInt13).

7.3.11 Competitive infrastructure environment

The New Zealand regulatory environment (Study 2 data only, reference points 18, 24 in Table 7-6) supports competition between MNOs. While this ensures better price options for customer access to mobile data it also affects negatively the profitability of the MNOs who have invested in building a mobile data network, and who limit further investment. In the long run this may lead to a less developed mobile network infrastructure and lower service performance quality. As a counter trend, infrastructure owners continue to expand their mobile data capacity; the increased demand for mobile data due to the massive penetration of smart phone devices provides mobile network infrastructure owners with an opportunity to recover revenue lost due to decreased voice

traffic. Some of the new entrants in the market are already reinvesting their profits into building new mobile network infrastructure; the two dominant device/platform providers may also contribute by deploying wireless networks to support seamless connectivity in large urban areas and a connection to the Internet. In Bulgaria (Study 1 data only, reference points 3, 5 in Table 7-6) the MNO sector is also open to competition. Similarly, this has led to customers having to pay less for data access; MNOs are facing revenue loss. MDS developers and providers recognize service performance quality as a factor influencing customer perceptions about MDS quality. The following proposition is formulated:

Proposition 28: Competitive infrastructure environment

Regulations concerning mobile and wireless network infrastructure that support a *competitive infrastructure environment* influence *MDS supply.*

"Yes, because of competition prices are falling down and the operator has to be innovative and constantly work on its services" (Study 1, P9R16).The most attractive is data now. And that's really driven by smartphone adoption . there's net benefits for the carriers to do that, because you're really looking at this additional revenue that comes say from use of data for example, which wasn't there when they had voice and text only….Voice revenue's sort of tapered off and texts is basically free … stagnant growth of voice and text…you have to look for that next lift in revenue, so it's data… the driver is growth in data….as a whole, the industry is driving the market to smartphone…"(Study 2, NZInt8). "…There is the thought that companies like Apple and Google who are starting to corner the smart phone markets will have, at some point, enough of a markets share to actually start building their own networks across Wi-Fi and data …bypassing the mobile operators. Who's to say someone like Apple doesn't build a worldwide IP network?" (Study 2, NZInt4). "All they need to provide is data connectivity. And in fact it might not even be mobile networks… people are going to start using Wi-Fi . so why do I need a mobile network'… you'll start thinking, 'Why do I have my phone with a provider?" (Study 2, NZInt9)..

7.3.12 Regulatory regime

According to data form the two studies the respective regulatory environments do not provide for MDS specific legislation and therefore it is not restrictive to MDS development and provision; this is seen as conducive to developing and providing innovative MDS. Legislation around transaction security and customer privacy is needed to protect the interest of both customers and MDS developers and providers. This may lead to increased MDS development and provision cost (reference points 7-10, 24-25 in Table 7-6). Other regulatory needs include further steps towards reducing mobile data access cost to customers and supporting both the local use of global services and exporting MDS to the global market – for example, aligning local legislation with global modalities in the areas of authentication and taxation (Study 2 data only). The following proposition is formulated:

Proposition 29: Regulatory regime

The *regulatory regime* influences provider decisions about developing and providing MDS (*MDS supply*).

"The regulatory environment is relatively supportive, except for the area of private data abuse in terms of location based services and private person location information…" (Study 1, P11R18). "In Bulgaria, the regulatory environment does not provide much on the sector of mobile business services and applications. This makes it, on one hand, more difficult for companies to license a new product, but, on the other, this also means that because of the lack of detailed provisions much room is left for new services that are not restricted too much by regulations" (Study 1, P12R19). "…New Zealand's regulatory environment…it is not too restrictive for apps…" (Study 2, NZInt11). "…Commerce Commission ….need to make sure that the network operators don't charge as much as they're charging today with the marketplace. To increase usage of the people, increase value, you need to drop prices and these network termination charges…all these things are still not fully addressed not yet…" (Study 2, NZInt6)."…the New Zealand regulatory environment has reluctantly been opening itself…it's gradually become more conducive to competition…" (Study 2, NZInt12)."…. the Commerce Commissioner making sure that all mobile telcos have similar bandwidth spectrum…" (Study 2, NZInt10). "…in terms of …data and voice…, the regulation has probably made life more difficult for the carrier…" (Study 2, NZInt8)

7.3.13 MNOs

According to the study data (reference points 6, 19, 20 in Table 7-6) MNOs are not actively engaged in MDS development and provision. They focus on their role of data carriers in order to stay competitive and also because they benefit from the constantly growing demand for data services (as they are still able to control mobile data transfer pricing). The trend may continue in the future although MNOs may need to engage in partnerships with other MDS supply players. In order to stay relevant, they may need to provide specific value adding auxiliary services such as customer authentication. The following proposition is formulated:

Proposition 30: MNOs

Perceptions about the position and the role of *MNOs* influences MDS developer and provider decisions about developing and providing MDS (*MDS supply*).

"The telecoms are facing the threat to lose the customers loyalty and become only the transport link to the end-user services" (Study 1, P2R4). "Operators realize that new services may be useful as well as a threat and that is why they need to have a role in these services" (Study 1, P8R15). in our business sector, we need to find and develop innovative solutions which add value to existing services." (Study 1, P12R19). "…the reality is applications use data, but you can't say zero rate data for applications…you don't want to give away all your revenue…from …a mobile operator's perspective … [the] cost of infrastructure is too great to give stuff away…" (Study 2, NZInt8). "… there's a lot of competition ….it used to be where there was… a sole network operator, they don't have the dominance now that they used to have because there's a lot of competition in the market…" (Study 2, NZInt13). "…a fundamental change is happening in the place that MNOs are no longer as important, it's the service providers of cool services [who are important and] can become bigger than MNOs if they know how to own aps, application services, that fundamentally drives everything for the mobile…" (Study 2, NZInt6).

7.4 Discussion

The theoretical framework developed in the previous section addresses the main research question by representing mobile industry stakeholder views as a set of related propositions. The framework is centred on two related concepts – perceived customer demand for MDS, and MDS supply. It is posited that perceived customer demand for MDS is one of the factors that has an impact on decisions related to developing and launching MDS; the rest of the factors represent the influence of the supply and regulatory environment. The concept of perceived customer demand for MDS is expanded further to include five top level characteristics, and an in depth representation of perceived service value as a relatively major contributor to perceived customer demand for MDS (Figure 7-3).

One of the key findings of the study, formulated as Proposition 3 in the preceding section, confirms the assumption made earlier (refer Section 3.3 and Figure 3-3) - that perceived customer demand for MDS influences MDS developer and provider decisions about MDS supply (i.e., developing and supplying mobile services), and the related mobile service value proposition. This finding is particularly significant in the context of the research as it validates the rationale behind the study and the relevance of its aim.

Furthermore, the findings formulated as Propositions 23-30 that refer to MDS supplier perceptions about the context of MDS supply including the regulatory environment confirm the other main assumption underlying the empirical research framework – that factors related to the MDS supply and regulatory environment have an impact on MDS supplier decisions. Thus the study's findings provide empirical support for the balanced mobile service adoption model proposed earlier that was used to derive the conceptual model for the investigation of perceived customer demand for MDS underpinning the empirical investigation (Petrova & MacDonell, 2010).

It was asserted in Chapter1 that investigating mobile industry stakeholder perceptions about customer demand for MDS within the context of the MDS market environment would enable the researcher to contribute to the study's overall research aim: to achieve a better understanding of supplier perceptions about customer demand as a means of achieving a better understanding of MDS adoption and use in the competitive and technology-saturated service market. The dual-perspective model for the study of MDS adoption and use (Figure 7-4) meets this aim by identifying the dimension of the MDS

supply perspective based on the study findings and conceptualizing the link between MDS supply and MDS customers within an MDS adoption context.

The model draws both on the findings of this study, and on prior research. The constructs and the relationships between them situated on the left hand side (MDS Supply Perspective) represent perceived customer demand for MDS and perceived service and regulatory factors as the drivers of the MDS supplier decisions that lead to formulating the related MDS value proposition. The constructs and the relationships situated at the right hand side of the model (MDS Customer Perspective) draw on the classification of the customer-related adoption factors proposed in Gerpott and Thomas's (2014) meta-analysis of the literature on MI usage. The model thus suggests that MDS adoption depends on the interplay between the two perspectives: while studying customer adoption of MDS contributes to an understanding of how customers accept the value proposition studying perceived customer demand contributes to a better understanding of how the MDS value proposition is created.

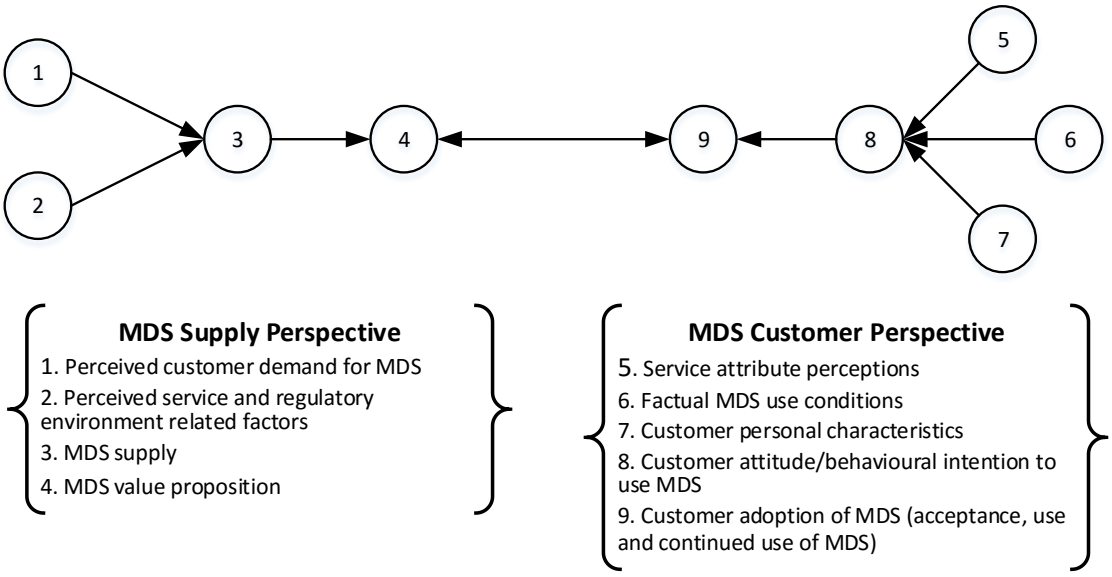

Figure 7-4. Studying MDS adoption and use: A dual-perspective model

As discussed previously perceived customer demand for MDS reflects MDS developers and providers' views about customer attitude and MDS adoption and has an impact on developing the MDS value proposition. The findings of this study indicate that MDS developers and providers may lack sufficient understanding of their customers' needs (Proposition 4). It may be contended that as a result the services on offer are not what customers really want and therefore the MDS value proposition is rejected. On the other hand, customers may not be fully aware of the benefits of services on offer (Proposition

19). In other words, there may be a misalignment between customers and MDS supply that hampers both existing MDS uptake and new MDS development.

Given the currently wide range of MDS service developers and providers (e.g., device/platform vendors, software houses, MNOs, banks) contributing to the MDS value proposition (Propositions 26-28, 30) it can be argued that including an MDS service supply perspective representing the assumptions made by MDS developers and providers about customers should lead to a better understanding of the MDS value proposition acceptance process. The next section examines the study's findings with particular respect to customer-perceived service value (as a contributor to perceived customer demand for MDS) in the context of the relevant literature and proposes variables and relationships that may enhance the empirical study of customer adoption of MDS. More specifically comparisons are sought between the findings of this study and the results reported in studies that critically review and synthesize relevant prior work, e.g., the proposed conceptual information, entertainment and transaction services adoption models proposed in (Ovčjak et al., 2015) derived form a systematic literature review, the meta-analysis of the empirical research on MI usage in (Gerpott & Thomas, 2014), and the findings of the critical literature reviews of mBanking and mPayment adoption research in (Shaikh & Karjaluoto, 2015) and in (Dahlberg, Guo, et al., 2015) respectively.

7.4.1 Perceived service value

In customer adoption and use studies, perceived value is commonly considered from a cost-benefit perspective – a trade-off between perceived cost (perceived monetary value), and perceived functional (utilitarian), hedonic (emotional) and/or social value benefits (Al-Debei & Al-Lozi, 2014; H. Choi et al., 2011; B. Kim, 2010; J. Lu et al., 2008). In prior empirical work perceived value has been found to be a strong predictor of MDS adoption (e.g., H.-W. Kim et al., 2007). However, recent results indicate that the strength of the effect of functional, hedonic and social benefits may be weak in specific MDS customer populations (R. S. Sharma, Li, & Govindraj, 2014) and that the strength of the effect of perceived hedonic and functional value may be different for MDS users compared to potential users.

This study identifies five main factors that influence perceived customer value judgements (Propositions 2, 14, 20, 10, 8): service need, service choice, service trustworthiness (including service security and privacy, refer Proposition 21), service

cost (including mobile data transfer cost, refer Proposition 11), and service delivery quality (including service performance quality and service experience, refer Propositions 9, 15). While perceived service trustworthiness, cost, and delivery quality resonate with service value and adoption variables investigated in prior research (e.g., Ervasti, 2013; H. Kim et al., 2008; Y. Lu et al., 2011), service need and service choice are new variables, proposed in this study; also new are the proposed relationships between service delivery quality and service experience, and service trustworthiness and service value, respectively.

It is suggested below that consideration of the effect of perceived service need, perceived service choice, and perceived service delivery quality on perceived functional and hedonic value may add to the explanatory power of perceived value as a determinant of MDS adoption. It is similarly suggested that studies should consider the direct effect of perceived trustworthiness on perceived service value, and to include perceived mobile data transfer cost as a determinant of perceived cost. The resulting perceived service value framework is shown in Figure 7-5 and is discussed in detail below.

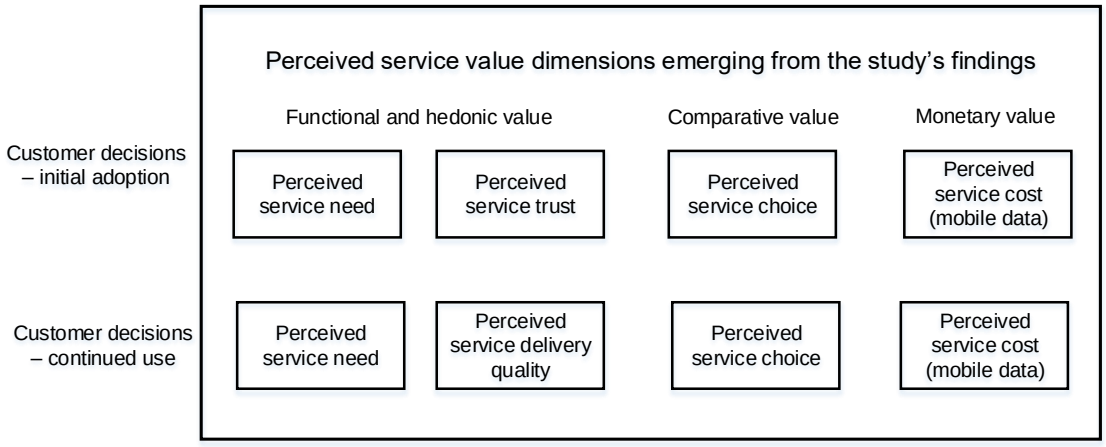

Figure 7-5. Perceived service value dimensions

7.4.1.1 Perceived service need as a dimension of perceived service value

The importance of customers feeling that they need service in a particular context as a factor influencing service use is mentioned in Jarvenpaa and Lang's (2005) study who asked customers what is the "real value" that mobile services and devices bring. In earlier eCommerce research utilitarian and hedonic customer needs have been suggested as customer satisfaction measures (Chi Lin, 2003), and both Kaasinen (2003) and (Bayer, Ross, & May, 2004) refer to user/consumer needs in relation to LBS customer expectations, preferences, and requirements. However, perceived service need has not

been identified and investigated in prior research as a factor influencing customer-perceived service value or MDS customer adoption.

The findings of this study identify service need as a set of factors. These include,: (i) specialization (Proposition 5), or the perceived service ability to satisfy the needs of a specific customer segment (e.g., senior citizens); (ii) uniqueness (Proposition 6), or the perceived service ability to create either a superior version of an existing service (e.g., GPS enabled navigation), or a new service that has become possible only due to the unique mobile technology capabilities (e.g., authentication services); (iii) mobility (Proposition 7), or the perceived service ability to meet the specific needs of an individual who is moving (changing location) (e.g., LBS services); and (iv) quality of life (Proposition 16), or the perceived service ability to enhance the individual's quality of life by added efficiency (e.g., a mobile loyalty card wallet).

As defined above perceived service need is an indicator of the acceptability of a new service as it reflects customers' understanding of how a service may meet their personal objectives. It is suggested therefore that perceived service need influences perceived service value (functional, hedonic and social) and plays an important role in customer decisions about initial service adoption. Furthermore, perceived service need plays a role in customer decisions to continue using a service as customers' needs change (Proposition 23).

Perceived service need can be measured empirically by adapting the measures used with existing related variables. In particular perceived usefulness, which refers to benefits provided to individuals in everyday situations (S. Rao & Troshani, 2007), is related to Propositions 5, 6, and 7, while perceived ease of use as explained by service usability characteristics (Coursaris & Kim, 2011; S. Rao & Troshani, 2007) and service compatibility understood as service integration in everyday life (Pagani, 2004; Shaikh & Karjaluoto, 2015) are associated with Proposition 16. Empirical research studying perceived service need as a component of perceived functional service value may be able to propose guidelines for "developing acceptable services" (Ovčjak et al., 2015) and assist MDS supply flexibility (Proposition 23) and MDS developer and provider ability to take advantage of mobile technology opportunities (Proposition 25).

7.4.1.2 Perceived service choice as a dimension of perceived service value

In this study service choice refers to the availability of alternatives to the mobile service channel. According to the study's findings, the MDS supply environment is highly competitive (Propositions 28, 30) and conducive to both developing and delivering services on multiple channels, including the mobile channel (e.g., banking services), and similar mobile services by different service providers (e.g., mobile wallet services). Furthermore, MDS suppliers believe (Proposition 14) that customers evaluate service options and make adoption decisions based on comparing perceived service value.

It is suggested, therefore, that perceived service need has an effect on perceived service value and influences customer decision about initial adoption as well as about continued service use by creating "comparative value". Comparative value takes into account the effect of service choice availability and the opportunity to compare options on customer adoption decisions.

In the reviewed literature multiple service channels have been considered in the context of the innovation diffusion theory variable relative advantage (Al-Jabri & Sohail, 2012; Cruz et al., 2010; H.-F. Lin, 2011). The variable reflects the assumption that if adopted (based on the comparison outcome) new technology will replace the one currently being used; relative advantage is included in the conceptual adoption model for mobile transaction services in (Ovčjak et al., 2015). However, new and old service channels will coexist and customers will make decisions on ongoing rather than on one-off basis. (Mallat, 2007; Mallat et al., 2009). In other words, the perceived relative advantage of the mobile service (e.g., time and location independence) does not make it a replacement for all existing service alternatives; rather it would be a preferred option in certain use contexts. Therefore, the empirical investigation of comparative value may help researchers and practitioners to better understand the role of channel complementarity and identify conditions and situations that support the use of both new and old technologies (Mallat, 2007).

7.4.1.3 Perceived service delivery quality as a dimension of perceived service value

This study identifies perceived service delivery quality as one of the dimensions of customer-perceived service value (Proposition 8). Furthermore, perceived service performance quality and perceived service experience are identified as determinants of perceived service delivery quality (Propositions 9, 15).

Perceived service performance quality depends on the experienced quality of the network connection, the functionality of the mobile device, and the quality of the service interface design while perceived service experience is measured subjectively – it is an overall evaluation of how the customer felt while using the service. It is suggested, therefore, that perceived service delivery quality has an effect on both perceived functional and perceived hedonic value and plays a role in customer decisions about continued service use.

Regarding the effect of perceived delivery quality on perceived service value and the effect of perceived service performance quality on perceived service delivery quality, the study findings corroborate results from the literature on customer adoption of MDS, such as those reported in (B. Kim & Han, 2011; H. Kim et al., 2008), and in (Gerpott & Thomas, 2014; E. Y. Huang et al., 2015; Ovčjak et al., 2015), respectively. Similarly, industry participants (telecommunications experts) have ranked the technical factors signal quality, network coverage, transmission speed, and service availability as four of the top ten factors perceived as influencing customer adoption of MDS (Shieh et al., 2014).

Regarding the finding that perceived service experience influences perceived service delivery quality (Proposition 15) there are no direct parallels in the literature. Adoption model variables that account in part for customer experience are perceived enjoyment (e.g., Dickinger et al., 2008; Hong et al., 2008) and flow experience (e.g., Shaikh & Karjaluoto, 2015; Zhou, 2013d); service experience has been studied in relation to satisfaction and/or value (e.g., B. Kim & Oh, 2011; Tojib & Tsarenko, 2012), and also in relation to the effect of satisfaction and flow on continued use (e.g., Y.-F. Kuo et al., 2009; Zhou, 2013a). Empirically service experience may be measured by adapting some of the measures used with these related variables. Studying the combined effect of perceived service performance quality and perceived service experience on customer intention to continue service use may be important as it may provide a measure of the combined impact of all MDS players involved in developing the service value proposition (MDS developers and providers, device/platform vendors, and infrastructure providers).

7.4.1.4 Perceived service trustworthiness as a dimension of perceived service value

This study finds that customer perceptions about service trustworthiness influence customer-perceived service value (Proposition 20) while perceived service security and privacy protection contribute to perceived service trustworthiness. It is suggested, therefore, that perceived service trustworthiness has an effect on perceived functional service value and plays a role in customers' decisions about initial service adoption.

The findings corroborate Shieh et al.'s (2014) results where the participants (experts from a telecommunications company) rank security/privacy as the most influential customer decision-making factor. Variables representing perceived trustworthiness (trust), security and privacy have been included in empirical MDS adoption studies (e.g., Amoroso & Magnier-Watanabe, 2012; H.-H. Lin & Wang, 2006). Perceived trust, privacy concerns (an antecedent of trust), and perceived security are included in two proposed conceptual MDS adoption models proposed that synthesize extant prior research (Ovčjak et al., 2015) Furthermore, perceived privacy concerns have been linked to service quality (Akter, D'Ambra, et al., 2013; E. Y. Huang et al., 2015) and thus indirectly to service value (following Cronin et al., 2000). However, the relationship between perceived service trustworthiness and perceived service value has not been investigated. Partial support for considering service trustworthiness as a factor influencing perceived service value is found in work where perceived risk (a variable related to trust) is investigated as a predictor of value (W.-P. Kuo et al., 2011).

7.4.1.5 Perceived service cost as a dimension of perceived service value

This study finds that perceived service cost influences customer perceptions of service value (Proposition 10), and perceived mobile data transmission cost influences perceived service cost (Proposition 11). It is suggested therefore that service cost and more specifically mobile data transmission cost have an effect on customer pre- and post-adoption decisions.

Even though perceived cost has been studied as a factor influencing customer adoption of MDS both directly (S. Yang, Lu, Gupta, Cao, et al., 2012; Yu, 2012), and indirectly (H. Choi et al., 2011; Hong et al., 2008) there is some uncertainty about its role. On the one hand some empirical studies have been unable to confirm perceived cost significance (e.g., Chong et al., 2010; Hsu et al., 2011). In the review by Ovčjak et al. (2015) perceived cost is included in only one of the three proposed conceptual adoption

models (information services). On the other hand Gerpott and Thomas (2014) found both monetary service value (service fee) and tariff (mobile data plan) as factual use conditions affecting MDS use. These findings corroborate results from a study in which the cost of the handset and the transmission fees are ranked by the telecommunication experts as the fourth most significant factor influencing customer adoption of MDS (Shieh et al., 2014).

Factual MDS use conditions are created as a result of the interactions between different stakeholders in the service and regulatory environments. For example, connection cost and data plans are determined by participating MNOs as part of their revenue models (Proposition 30) taking into consideration the relevant market regulations (Proposition 29) as well as the need to stay competitive (Proposition 28). As factual MDS use conditions are an essential part of the MDS value proposition, studying the effect of perceived service cost/perceived mobile data transmission cost on perceived service value contributes to the understanding of the MDS value acceptance process.

7.4.2 Customer segmentation

Participant data indicate that the customer market is highly segmented both in terms of customer requirements (e.g., Propositions 5 and 6) and in terms of customer attitude (Propositions 13, 18). It was suggested in Subsection 7.4.1.1 that perceived service need (which takes into account customer requirements specificity) is a perceived service value dimension and therefore influences customer adoption of MDS (Figure 7-5). Based on Propositions 12, 18 it is asserted that perceived service value and customer type have a direct effect on customer adoption and use of MDS (Figure 1.6), and that while mass penetration of smart devices (Proposition 13), social factors (Proposition 17) and service awareness and incentives to use may trigger customer type change, the effect of these factors on customer adoption and use of MDS is mediated by perceived service value.

More specifically, the study's findings first indicate that its participants see the MDS customer market as split into two by customer attitude towards paid MDS. While some customers would accept paid mobile services based on cost-benefit trade-off (as discussed in Subsection 7.4.1.5), others would be expecting "free" MDS services (Proposition 12). Second, according to participants, the customer market is significantly dominated by traditionalists, conservatively-minded individuals who are not quite ready to accept services offered on the mobile channel (Proposition 18). According to

Proposition 19, customer conservatism may be due in part to a lack of service awareness (promotion, including offering incentives for trialling a service). The resulting customer typology by attitude is shown in Figure 7-6.

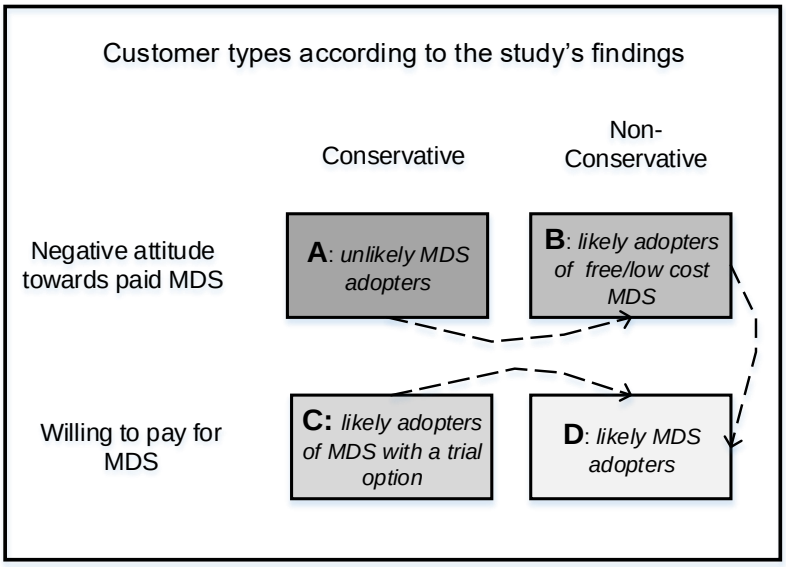

Figure 7-6. Customer type framework

Customers type A (conservative and with negative attitude towards MDS) are the most unlikely to adopt MDS while customers type D (non-conservative and ready to pay for MDS) are the most likely MDS adopters, users and repeat users. Customers type B (non-conservative but not prepared to pay for MDS) are the likely adopters and users of the various free or low cost MDS (such as free downloadable apps) while customers type C (conservative but prepared to pay for MDS) may adopt and use services once convinced in the service value, i.e., they are the likely adopters of services that offer a free trial and/or services that are well promoted (Proposition 19). The customer typology suggests that type D customers make adoption and use decisions based on perceived value judgement; perceived value dimensions include perceived service cost, perceived service need, perceived service choice, and perceived service trustworthiness/perceived service delivery quality (Figure 7-5). The decisions of customers belonging to the other three types are also strongly influenced by their conservatism and/or attitude towards paid MDS. However, certain changes in the MDS supply and in the social environment may also precipitate customer attitude change and as a consequence, affect customer likelihood to adopt and use MDS.

First, active MDS promotion and incentives to use (Proposition 19) may help change the conservative attitude of type C customers and persuade them to trial new MDS. Provided that their expectations and requirements are met (Proposition 2), type C

customers may become active MDS users (i.e., they may convert to type D customers). Social factors (Proposition 17) may make the conversion process even faster. In other words, customers type C are potential MDS users given an appealing service value proposition and an opportunity to understand it better before accepting it.

Second, according to Proposition 13, the mass penetration of smart mobile devices driven by the current dominant players on the device/platform market (Proposition 27) has led to lower device prices thus making them more affordable, and also to the emergence of app stores, with relatively low app acquisition cost (and with many free apps). These market influences may encourage type B customers to change their negative attitude towards paid MDS, thus converting to type D customers. Even though the already discussed influence of perceived mobile data transfer cost (Proposition 11) may play a negative role in the conversion process, type B customers are potential adopters and users of new paid MDS.

Finally, in the case customers of type A, the factors already mentioned may all play a role and drive a change of attitude from more to less conservative customers and/or from customers less willing to pay for MDS, to ones more willing to do so. Given the findings, the most likely change is from customer type A to customer type B (i.e., retaining a negative attitude towards paid MDS but changing from more to less conservative) under the influence of social factors (Proposition 17).

In relation to attitude to innovation, in the reviewed literature customers are often considered as “non-adopters/non-users” vs “adopters/users” (e.g., Laforet & Li, 2005; López-Nicolás et al., 2008; Verkasalo, López-Nicolás, Molina-Castillo, & Bouwman, 2010), or “potential adopters” vs “existing users” (B. Kim & Oh, 2011). In these and other related studies factors such as service awareness/cognition/knowledge (Bauer et al., 2005; S. E. Chang et al., 2007; Laforet & Li, 2005), personal innovativeness (López-Nicolás et al., 2008; Shaikh & Karjaluoto, 2015), behavioural control (S. Rao & Troshani, 2007; Verkasalo et al., 2010), reference group influences/subjective norm (Gerpott & Thomas, 2014; Laforet & Li, 2005), social norm (J. Lu et al., 2005; Verkasalo et al., 2010), and social influence (López-Nicolás et al., 2008; Ovčjak et al., 2015) have been studied as influencing customer attitude towards MDS, and acceptance of MDS.

In comparison the typology derived from the findings (Figure 7-6) considers all customers as potential adopters/users, and classifies them across two personal attitude

dimensions: attitude towards innovativeness (conservativism), and attitude towards paid MDS. Partial support for the first classification dimension is found in (P. Laukkanen, Sinkkonen, Kivijarvi, & Laukkanen, 2008) where "tradition" emerged as an mBanking adoption and use inhibitor. The second classification dimension is aligned with the split between "cost-sensitive" MDS user and "benefit seekers" in (R. S. Sharma et al., 2014). However, in Sharma et al.'s study the split is related to the research location (i.e., customers from two of the participating countries were cost sensitive while customers form the other three countries were benefit seekers). In this study the customer typology refers to both study contexts as it is supported by data gathered across the two study locations.

More importantly, the typology is dynamic as it shows how MDS supply decisions and the social environment can facilitate customer type change. The change factors identified, i.e., increased service affordability, increased service awareness and incentives to use, and social factors, relate to variables investigated in prior research of customer adoption of MDS, namely: perceived affordability (Chong et al., 2010; H.-F. Lin, 2011), perceived awareness (Laforet & Li, 2005; Shaikh & Karjaluoto, 2015), incentives to use (Z. Xu & Yuan, 2009), perceived trialability (Püschel et al., 2010; Shaikh & Karjaluoto, 2015), and social factors (Ovčjak et al., 2015; Sanakulov & Karjaluoto, 2015).

7.4.3 MDS adoption and use framework

The discussion in Subsections 7.4.1 and 7.4.2 suggests that in order to understand the MDS adoption and use process across all customer types, variables reflecting customer type, as well as variables reflecting the influence of the identified external factors need to be added to models that study perceived service value as a predictor of MDS adoption and use. A conceptual MDS adoption and use framework that includes perceived service value, customer type and the attitude change triggering factors is shown in Figure 7-7.

The framework posits that three main factors influence MDS adoption and use – perceived service value, customer type, and change factors. Perceived service value (as shown in in Figure 7-5) is a construct that considers the functional, hedonic, comparative and monetary value dimensions, and their antecedents as defined in Subsection 7.4.1. Customer type is a construct that includes a variable introduced in prior research (personal innovativeness), and the new variable "customer attitude to paid

MDS", discussed in Subsection 7.4.2 (Figure 7-6). Change factors is a construct that draws on prior research and includes the variables perceived awareness, perceived affordability, social factors, and perceived trialability (also discussed in Subsection 7.4.2).

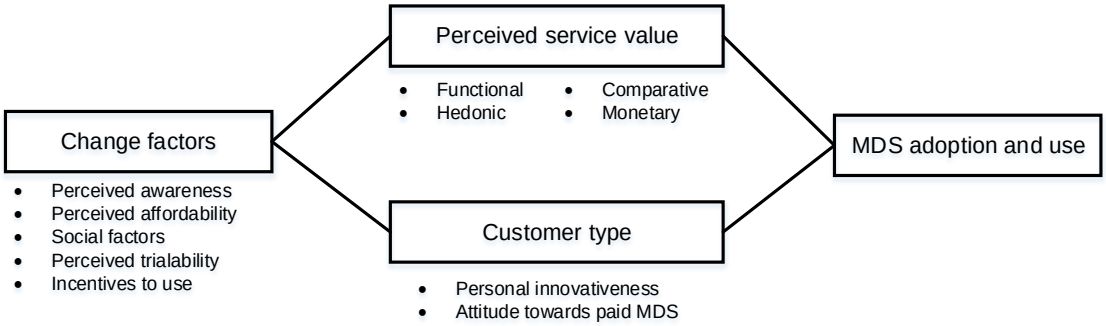

Figure 7-7. A conceptual representation of MDS adoption and use

7.4.4 The MDS environment

One of the drivers of the continued strong research interest in customer adoption of MDS and indeed a significant motivational factor underpinning this study, is the quest for the reason(s) behind the surprisingly low MDS adoption rate. "Slow MDS uptake" is a phenomenon still observable today (e.g., Al-Debei & Al-Lozi, 2014; Moser, 2015; Ozcan & Santos, 2015; Shaw, 2014) just as it was more than a decade ago (e.g., Carlsson et al., 2005; M. S. Y. Lee et al., 2003; Pura, 2005).

It was already shown in the preceding subsection that the MDS customer market is not homogenous in its readiness to adopt MDS. This may be one of the reasons for the slow MDS uptake. Based on the findings related to participant perceptions about the MDS supply and regulatory environment (Propositions 4., 22, 26, 24-25, 28-29) this subsection identifies a set of MDS supply and regulatory environment related factors that may affect MDS adoption (Table 7-7); it is asserted that rather than "lack of customer acceptance of the MDS value proposition" it may be the case of "lack of an adequate MDS value proposition".

Table 7-7. MDS supply and regulatory environment factors affecting MDS adoption

Findings	Factor
Proposition 4	MDS suppliers do not have sufficient knowledge about potential customers' needs
Proposition 26	The MDS development platform fragmentation increases significantly MDS development cost
Propositions 24, 25	MDS suppliers do not understand the opportunities and limitations of mobile technology.
Propositions 28-30	The cost of mobile data is still relatively high despite the increased competitiveness in the MDS infrastructure environment
Proposition 22	MDS suppliers rely on customer feedback and ideas

7.4.4.1 Knowledge about customer needs

As seen in Proposition 4, MDS developers and suppliers feel that they do not understand well their potential customers' needs, requirements and expectations, regardless of the significant volume of published academic research in the area and the managerial and practical implications drawn from findings and results[100]. However, the finding is not entirely surprising given that research on MDS customer adoption seems not to have produced yet a definitive answer to the question "what drives customer adoption of MDS?" (Gerpott & Thomas, 2014; Ovčjak et al., 2015; Sanakulov & Karjaluoto, 2015). It is suggested that the lack of sufficient knowledge about potential customer needs is a factor that may negatively affect perceived MDS value and MDS uptake, for two reasons. First, MDS services that are offered may not be aligned with any specific or general customer needs; such services would not be perceived as valuable. Second, negative customer acceptance may dissuade MDS developers and providers from offering new MDS. By not reacting flexibly to changing customer needs (as suggested by Proposition 23), MDS supply exacerbates the issue further.

7.4.4.2 Platform fragmentation, mobile technology and mobile data cost

According to Proposition 26 the need to develop versions of the same service for multiple mobile device platforms may lead to an increase in the cost of development and potentially to a low(er) return on investment. As ROI is an essential building block of business models (S. Sharma & Gutiérrez, 2010) the uncertainty resulting from the proliferation of MDS development platforms may discourage service developer and provider innovativeness and limit MDS supply flexibility; and while the emergence of the two dominant providers of MDS development platforms may lead to an MDS development costs reduction, it may limit innovativeness (Proposition 27). Furthermore, according to Propositions 24 and 25, MDS developers and providers may not understand well the opportunities and limitations of mobile technology (due in part to the very fast pace of technology innovation) and consequently may not be developing and providing advanced mobile services that are also efficient, robust and easy to use. In the literature reviewed these findings resonate with research that investigates mobile innovation failure, e.g., the poor penetration of mobile services in the European market (Weber et al., 2011) and the failure of mPayment to become the payment method of choice (Dahlberg, Bouwman, Cerpa, & Guo, 2015), due in part to the low degree of

[100] A Google Scholar search on "mobile service adoption" generated 182,000 references to work published between 2005 and 2010.

collaboration and cooperation across the different MDS supply players involved. Finally, in markets where the cost of mobile data transfer is still relatively high (Propositions 28-30) MDS may not be adopted due to low affordability (Dahlberg, Bouwman, et al., 2015; Y.-F. Kuo & Yen, 2009; Y. S. Wang et al., 2006). It is suggested that current interdependencies in the MDS supply and regulatory environment may negatively affect perceived MDS value and MDS uptake for two reasons: first, MDS cost to customers may be too high, and second MDS delivery quality performance may be too low.

7.4.4.3 Customer participation

According to Proposition 22, customers are seen as active contributors to the MDS value proposition, for example through customer feedback channels[101]. It has been suggested in the service science literature that customers are an important source of service innovation as their input helps create services that meet customer needs (Kindström, 2010); therefore, businesses that approach service development and provision form a customer perspective should benefit from the increased flexibility of the customer -oriented business processes (Demirkan et al., 2009). However, involving customers as active participants in the value co-creation process may also be potentially risky (Wong, Peko, Sundaram, & Piramuthu, 2015). First, managing customer feedback may also lead to increased service development cost. Second, it may lead to the development of services that are not viable as they meet the needs of a very small a customer market, and third, it may result in developing poorly conceived services, as the customer needs they are supposed to meet have not been well articulated.

Based on the findings and aligned with the literature it is suggested that customer participation also has the potential to negatively affect perceived service value and MDS uptake for two reasons. First, MDS developers and providers unaware of the risks may develop inherently unsuccessful services or services that are too costly. Second, in order to mitigate risks that are recognized, service developers and providers may need to carry out additional investigation in order to critically evaluate the received feedback thus taking a longer time to identify and develop acceptable (and viable) services.

[101] As already commented this finding is based on Study 2 data only; it was speculated that at the time of Study 1 the customer feedback channel had not yet matured; therefore, Study 1 participants did not realise its significance.

It can be concluded that, despite undisputedly fast customer adoption of the mobile technologies themselves (Laugesen & Yuan, 2010), customer adoption of MDS is affected by a number of factors that have the potential to slow down MDS uptake. While some of these factors may represent objective characteristics of the MDS environment (e.g., MDS design, and development platform fragmentation), involving customers as MDS value-co-creators may help improve the MDS value proposition and encourage MDS adoption.

7.4.5 MDS customer and supplier interactions as value co-creators

It has been noted in prior research that advanced mobile services rely on the "interaction and exchange of information" between the customer and the service supplier, and that service providers should view customers as more than "passive service consumers" (D. Johansson & Andersson, 2015). One of the conceptual models underpinning the study (refer Figure 3-2 in Chapter 3) assumes that MDS suppliers and customers interact with each other but does not identify the specific dimension of these interactions.

From a service science perspective, a service ecosystem may be improved through service interactions that result in service value co-creation (Spohrer, Vargo, Caswell, & Maglio, 2008). Service value co-creation is a fundamental service science concept (e.g., Makkonen, 2015; Vargo, Maglio, & Akaka, 2008). By providong input to the value co-creation process customers become actively involved as resource integrators and value contributors (Iyanna, 2016; Vargo & Lusch, 2008).

A value co-creation approach has been considered in studies of mobile service use (e.g., Smura, Kivi, & Töyli, 2009) and the mobile service environment (e.g., Wong et al., 2015). Drawing on the literature and on the discussion of the findings in the preceding section it is suggested that MDS adoption and use can be represented as an interactive value co-creating process.

First, MDS supplier input to creating MDS value (i.e., the MDS value proposition) consists of developing a trusted relationship with customers, offering acceptable and affordable services that can be used across multiple types of network connections and multiple /types/ brands of mobile devices, raising customer awareness of services, and incentivizing service use. Second, MDS customer input to creating MDS value (i.e., the realization of the MDS value proposition) consists of using their own resources (a mobile device and network connection), and applying knowledge (of how to operate

their mobile device) in order to adopt a service. Third, by continuing to use/drop the service, providing feedback and sharing ideas about new services customers inform MDS supplier decisions about maintaining existing services and developing new ones.

This interaction process is dynamic (cyclic) as MDS value is realized every time a service is used. While the initial uptake of MDS may be slow due to the risk associated with incorporating customer input into service design and provision, customer participation (if managed and used appropriately) may add to MDS supplier flexibility as it provides an opportunity to fine-tune the MDS value proposition (aligning it better with customer needs), and to build the critical mass of MDS users needed to ensure service viability.

7.5 Summary of Chapter 7

This chapter summarizes, reflects on and compares the outcomes of the empirical studies presented in Chapters 5 and 6, highlights methodological issues related to the trustworthiness of the research, addresses the study's research aim and main research question by developing a set of theoretical propositions, and discusses their implications for the study of MDS adoption and use. A service value dimension framework, a dynamic customer typology, and a conceptual MDS adoption framework are proposed and discussed. Also addressed is the issue of slow MDS uptake. The next (last) chapter of the study concludes the thesis by highlighting the study's main outcomes, contributions, limitations, and implications, and by providing directions for further research.

CHAPTER 8. CONCLUSION

The study presented here has been based on two central premises. The first premise is that managerial decisions about developing and providing MDS are influenced by MDS supplier understanding of the complex and dynamic reality of the MDS ecosystem (where MDS suppliers include developers and providers). The second premise is that MDS suppliers assess a service's potential to generate customer demand in terms of how the characteristics of any particular MDS (and especially a new MDS) may satisfy present and future customer requirements and expectations. In other words, it is assumed that MDS suppliers make decisions about investment and resource allocation prioritization based on their opinions about and perceptions of the reality of the situation. It was therefore considered central to the study design to add an MDS supply perspective to the study of MDS adoption and use. This last thesis chapter (as shown in Figure 8-1) presents a concise summary of the study, reflects on the work's contributions, limitations, and implications, and suggests opportunities and avenues for further research.

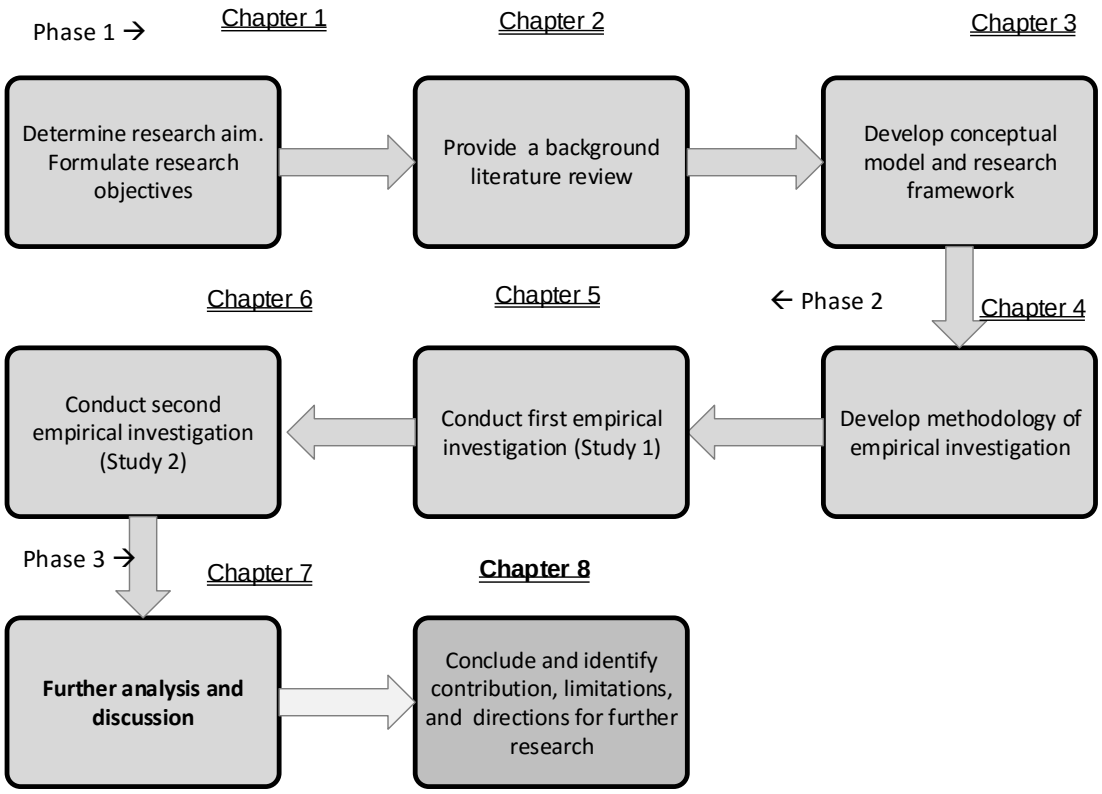

Figure 8-1. Research process path (Chapter 8)

8.1 Summary of Study Conduct

This study set out to investigate how MDS suppliers perceived customer demand for MDS in the context of the MDS supply and regulatory environment – presented as the main research question of the study. The ensuing empirical investigation was conducted according to the methodology developed in preparation for the field work. Data from two locations were gathered and analyzed, the assumptions underlying the study were validated, and conclusions were drawn.

The main outcomes of the study can be considered from the perspectives of the two main stages of the data analysis – namely, the within-case data analysis presented in Chapters 5 and 6, and the cross-case pattern searching and conceptualization presented in Chapter 7. With regards to the within-case data analysis, each case's empirical data were analyzed thematically through a rigorous data coding and theme development process. Applying a multistage approach, the case data were systematically represented first as a coded data set, then as a collection of emerging themes that were based on relationships between the data codes followed by representation as a three-level theme hierarchy, and finally as a thematic map that linked the thematic networks of the emerging global (top level) themes.

The two thematic maps embody the major key points made by each respective study's participants. They were explored further in order to address the specific research questions guiding the study; data-supported representations of participant views about customer requirements and expectations, mobility support, and the role of the MDS supply and regulatory environment were drawn and described. The coded data sets, the thematic maps and the representations of the participant views are the main outcomes of the within-case analysis (Figure 8-2). The specific content of these various representations can be found in the respective case study chapters (Chapters 5 and 6).

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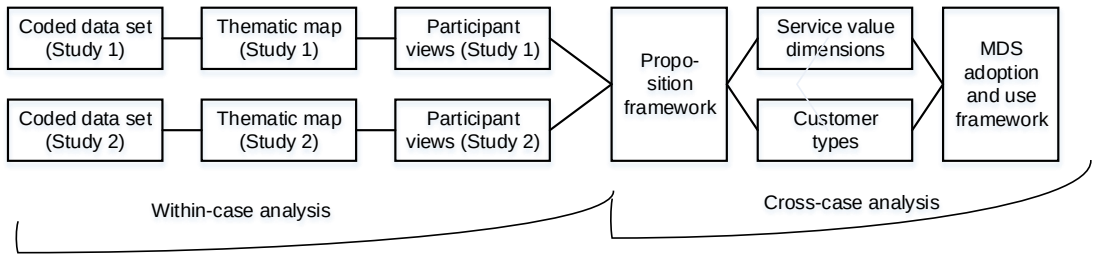

Figure 8-2. Main study outcomes

With regards to the cross-case analysis, first a set of propositions was formulated based on the interpretation and comparison of the key insights gained from the representations of the participants' views. The proposition framework links perceived MDS customer demand and MDS supply and includes both perceived MDS customer adoption drivers, and MDS supplier decision drivers. Second, a number of models and frameworks were then abstracted from the proposition framework and were positioned with regards to the extant literature: an MDS customer and supplier interaction model, a perceived service value dimension framework, an MDS customer typology, a framework of MDS supply environment-related factors affecting MDS supply, and an MDS adoption and use framework. Together, these models and frameworks provide an MDS supply perspective on MDS customer adoption.

The proposition framework, the value dimension framework, the customer typology and the MDS adoption and use framework are considered to be the main outcomes of the cross-case analysis. Even though it is grounded in data gathered at the two specific research locations, the proposed MDS adoption and use framework can be potentially applicable to other contexts.

8.2 Contributions to Research

In their discussion of the important and complex role of external validity in research McGrath and Brinberg (1983) regard the research process as a set of possible pathways that link research design and implementation to three distinct knowledge domains: the substantive domain (events and relationships between them that constitute phenomena), the conceptual domain (concepts and relationships forming conceptual models), and the methodological domain (methods for observing or computing variables and for exploring and comparing the relationships between them).

Although McGrath and Brinberg refer primarily to positivist/quantitative research in their discussion, Clear (2010) suggests that a three-domain view can be used to position research contribution regardless of the research approach (quantitative or qualitative). More specifically then, the substantive domain refers to context-specific research outcomes that represent and contribute to a better understanding of the phenomenon that constitutes the research context. The conceptual domain refers to research outcomes that contribute to a better explanation of the phenomenon under investigation and have the potential to be more generally applicable. The methodological domain refers to processes and procedures that can be used by others to explore further phenomena in

similar or related contexts. This subsection discusses the research contribution of this study from the perspective of each of the three domains.

8.2.1 Research contributions to the substantive domain

This study contributes to the body of knowledge in the substantive domain by providing a grounded, in-depth explanation of how the MDS supply and regulatory environment affects customer adoption of MDS, in two different ways. First, each of the two empirical investigations identifies, thorough the *basic themes* emerging from the interpretive data analysis, the key characteristics of the MDS supply and regulatory environment in each of the two cases. Second, by creating a *thematic map* of interrelated themes and analyzing it further in order to derive detailed and explicit representations of participant views, the study draws a clear, data-substantiated picture of the respective MDS supply stakeholders' understanding of the MDS adoption process. The actual substance of these contributions are reported in detail in the two case study chapters (Chapters 5 and 6). These contributions are novel as such studies have not been carried out previously. The contributions are important because they provide reliable grounds for further exploration (both cross-case, and longitudinal).

8.2.2 Research contributions to the conceptual domain

The outcomes of the cross-case analysis provide several important contributions to the conceptual domain. These contributions and their implications are discussed below.

8.2.2.1 Perceived service value dimensions

The study's findings indicate that the major drivers of MDS customer adoption and use include perceived service value, customer attitude (towards MDS in general *and* towards paying for MDS), the social and the MDS supply environment, and the emerging role of customers as MDS value co-creators. While each of these drivers has been investigated in prior research, this study identifies functional, hedonic and comparative value as the specific services dimensions that are supported by the study data. These outcomes contribute to the body of knowledge in several ways:

First, the study identifies *perceived service need* as a new MDS adoption driver and proposes that perceived service need influences perceived hedonic and perceived functional service value. This finding is important as it provides the grounds for building a concise MDS adoption and use framework. The framework includes variables that are specifically relevant to MDS rather than to technology adoption as are

prevalent in prior research. Furthermore, it is suggested that perceived service need can be measured by the degree of its specialization, uniqueness, mobility support, and ability to enhance quality of life.

Second, the study identifies another new MDS adoption factor, *perceived service choice.* Perceived service choice refers to customer expectations of being able to benefit from an "always competitive" service environment. It is proposed that perceived service choice contributes to the new "comparative" service value dimension identified in the study. The finding implies that use of any particular MDS may not be continual but rather a discrete process in the sense of customers adopting MDS as part of their service portfolio rather than as the one and only service to now and in the future.

This finding is important as it reveals an adoption aspect specific to MDS that may be added to MDS adoption models, in line with Orlikowski and Iacono's (2001) comment that specific variables need to be identified and used in adoption studies concerning specific technologies. It is suggested that perceived choice can be measured by adapting the items used to measure relative advantage and usefulness in traditional technology adoption models and by adding a measure representing customer's preferences when adopting a portfolio of services suitable to perform one specific task, and customer preferences in relation to the service use context.

Finally, the findings suggest that continued customer use is also affected by the overall service quality (*service delivery quality*). The antecedents of perceived service delivery quality include perceived service performance quality (i.e., network and device performance ensuring availability anywhere/anytime, and service interface design ensuring ease of learning, and ease of use), and service experience (i.e., the degree of effectiveness and efficiency of the service in meeting the particular service need). While variables related to service performance have been investigated in relevant prior research, customers' service experience has been studied mostly through the lens of perceived enjoyment.

The finding that the interplay between service performance quality and service experience may have a significant impact on customer decisions about continued MDS use complements prior results from studies of perceived service value and perceived service quality as antecedents of satisfaction (which reflects cumulative customer experience), and the effect of satisfaction on continued MDS use. Similarly, the findings add new aspects to the relationship between ubiquitous connectivity (a dimension of

perceived service performance quality) and flow (which includes perceived enjoyment), and between flow and intention to continue MDS use. It is suggested that customer service experience can be measured by adapting measures used in prior research to measure perceived enjoyment, flow and satisfaction.

8.2.2.2 Customer typology

The study develops and proposes a novel *two-dimensional MDS customer type framework* based on customer conservativism (attitude to innovation) and customer attitude to paid MDS. The framework provides a means to assess how likely a customer of a particular type is to adopt MDS. It also identifies factors that may facilitate attitude change and thus lead to a transition (e.g., from "a less likely to adopt MDS" type, to a "more likely to adopt MDS" one).

In prior research, customer segmentation has been traditionally considered from a customer demographics point of view (e.g., segmentation by age, gender, socioeconomic status). This study advances MDS adoption research by proposing a personal attitude view on customer segmentation, and by identifying the dynamic relationships between personal, and service characteristics. This outcome extends existing customer typologies and builds on prior research by offering an explanation for the existence of different customer types (i.e., the interplay between attitude to paid MDS and customer conservativism). Furthermore, the study contributes the "change factors" (perceived awareness, perceived affordability, social factors, perceived trialability, incentives to use) that may moderate the effect of perceived service value and customer type on MDS adoption and use.

8.2.2.3 MDS adoption and use

The proposed *MDS adoption and use framework* includes the two constructs discussed above (perceived service value and customer type) as factors that may predict MDS adoption and use. The framework contributes an MDS supplier-informed view of MDS adoption and use that can be used to extend existing customer- centric MDS adoption and use models. Measurements for the components of perceived service value are also suggested. Customer conservativism can be measured by adapting measures used in prior research (e.g., personal innovativeness, perceived awareness, social factors, perceived trialability). Attitude to paid MDS is a new variable; future research may identify measures additional to those used in prior research to assess perceived affordability and incentives to use.

Finally, Zolnowski et al. (2014) point out that mobile service business models need to consider customer value co-creation as an essential aspect of the service value proposition. This study contributes by suggesting that the mobile service business model needs to consider the potential *impact of including customers as value co-creators on the MDS adoption rate* and the associated MDS viability.

8.2.3 Research contributions to the methodological domain

To the methodological domain, this study contributes a robust and comprehensive methodology for gathering qualitative data guided by a research framework, and for preparing data for further analysis. The methodology is thoroughly documented and grounded in prior work, with all methods explained in minute detail, justified and considered with respect to research rigour (as shown in Chapters 4, 5, 6, and 7). The methodology contributes to the body of knowledge in the methodological domain in several different ways.

First, with regard to the investigation of the phenomenon of research interest in the substantive domain, the methodology is *inclusive* as it incorporates a set of procedures that comprise all steps of the analytical process, from data gathering to data coding to thematic analysis. Second, the methodology ensures that: (i) the coding procedures facilitate the development of a *comprehensive and structured* coding scheme that preserves the richness of the data, (ii) the context of the interpreted meanings is retained and is *traceable*, and (iii) the coded data are available for *subsequent analysis (*as demonstrated by the analyses presented in Chapters 5-7). Third, with regard to the investigation of other phenomena in the substantive domain, the methodology developed for this study can be applied to other contexts and other research topics where interview data are gathered and analyzed thematically (possibly but not necessarily applying a CAQDAS). The research-specific data coding scheme may also be used to inform code development in studies on similar topics in different contexts.

Finally, it is worth noting that audio-recorded and transcribed verbatim semi-structured interviews can generate large amounts of data. At times such data may contain themes only marginally relevant to the topic of the research investigation but of potential interest to other research topics. The detailed coding and theme development protocols described in Chapter 4 result in creating a coded data set which is “navigable” at several levels - at the data code level, at the emerging theme level, and at the global theme level. Such a coded data set can thus be re-analyzed without the need to re-code the

data. For example, Study 2 participants elaborated significantly on the role and the future of MNOs. These data were comprehensively coded and organized under the emerging themes and in the thematic networks (Chapter 6) but were used only to some degree in the further analysis in Chapter 7 (in line with the focus of the present study). It would be quite feasible to revisit the coded data set and use the emerging theme descriptions in order to conduct a further analysis specifically concerning the future of MNOs in the context of prior work on MNO's role in creating service value.

8.3 Implications for Practitioners

The study outcomes are based on analyses of the views of MDS stakeholders. Sharing the findings across the MDS developer and provider community may help MDS suppliers learn both from the experiences and the opinions of the research participants, and from the conclusions drawn by the researcher. Several important implications that are concerned with developing acceptable MDS and achieving a critical mass of MDS customers are discussed below.

First, the findings indicate that both MDS initial adoption and subsequent MDS use are driven by customer perceptions about how much they need the particular service, how well the service compares with similar services offered through other channels, and whether it is affordable to use the service given the ongoing cost of mobile data transfer; and while service trustworthiness influences the decision to adopt an MDS, the quality of the service performance and the customer's experience influence positively decisions about future use. Therefore, MDS suppliers need to focus on identifying the needs of *specific* customer segments (including potential needs), and to consider how to take advantage of the innovative mobile technology features in order to develop specialized and trustworthy MDS to meet these specific needs. Substantial attention needs to be paid to the service's overall performance, as a customer may never return again to an MDS that has not met his or her expectations. Furthermore, the findings indicate that customers expect to have a choice of services, and so developing mobile alternatives to existing services is still a viable option; however, in order to compete successfully, such new mobile services need to be carefully designed and priced.

Second, the findings suggest that, even within a well-defined customer segment (in terms of needs), suppliers are likely to find customers with different attitudes towards innovation and towards commercial (paid) services. With a new MDS, non-traditionalist customers who accept the commercial nature of MDS should be targeted first. In

addition, techniques already working successfully for eServices can be used to convert traditionalists to innovators (for example, by offering trial service versions), and to convert "not willing to pay" customers to paying customers (for example, by developing low cost but sufficiently functional versions of the original MDS). A strong MDS adoption motivator is smart device ownership; therefore, MDS developers and providers need to look for partnerships with device/platform vendors (and MNOs) in order to create MDS promotion platforms, and to offer appropriate adoption incentives.

Finally, the findings of this study indicate that MDS supplier and customer interaction is more than simply an exchange between an "active" MDS supplier who initiates the exchange and a "passive" customer who completes it by accepting the service value proposition. Rather, the customer is an engaged participant, actively involved as a feedback provider and eventually as a service value co-creator. Terblanche (2014) notes that, in the value co-creation space, the connection between the customer and the supplier "enhances the effect of trust and commitment on future intentions in customers to co-create value" and that customer involvement as a value co-creator may have a positive effect on the customer's quality of life. The study participants similarly consider perceived trust and perceived life quality enhancement as strong MDS adoption and use motivators. Therefore, MDS suppliers should seek to develop active relationships with their customers by providing a service value co-creation space (including social media channels) with opportunities for customer participation, and by opening up the service development process to facilitate critical evaluation and use of customer input.

8.4 Study Limitations

While every effort has been made to ensure that this study is both rigorous in method and relevant to practice, its inherently constrained scope (as a PhD), and the interpretivist research methods employed, mean that it has a number of limitations.

The data were collected in only two contextually similar countries, Bulgaria and New Zealand. Results from prior research indicate that MDS adoption and use patterns may vary significantly from country to country. Therefore, it may be speculated that MDS supplier views too will vary from country to country. As such, the conclusions of this study may apply only to contexts that are similar to those found in the two cases investigated here.

Another limitation of the study is that the Study 1 and Study 2 data were not collected simultaneously, rather, there was a year or so gap between the two rounds of data collection. However, there were only limited differences between the outcomes of the two studies, with no differing or contradictory findings across the two data collection sites that could be attributed to the gap. The one notable exception was related to the emergence of the two globally dominant device/platform providers where Study 2 participants elaborated at length on this occurring change in the environment, while there were very limited such data in Study 1. This particularity of the data was mentioned in the analyses.

A related limitation is the timeliness of the analysis, as the data were collected by 2012. The global environment has changed since the data collection, most notably with the emergence of the global duopoly phenomenon mentioned above, and the availability of more powerful mobile devices. However, recent research reviewed and cited in Chapter 7 indicates that the key concepts the study is founded on (refer Sections 1.2.and 1.3) are still valid. Therefore, it is contended that the assumptions underpinning the study are still relevant today.

The study's research methodology also presents some potential limitations in terms of the qualitative case study design and the associated small sample size, which may limit the extent to which the findings may be generalized, or transferred to other contexts. The issue of transferability was discussed in Chapter 7 as an aspect of the study's research rigour. It was noted that one of the outcomes of Study 1 (namely, the data coding scheme) was transferred to and used in Study 2. More importantly, Allen S. Lee and Baskerville (2003) propose and defend the notion that, in qualitative information systems research, it was appropriate to generalize from empirical descriptions to theory (rather than to a population). Earlier, Eisenhardt (1989) and (Firestone, 1993) highlight the potential to build a theory from case study research through the inductive and exploratory reviewing of case study data followed by a cross-case search for patterns, variables and relationships between them.

This study follows the stance taken by Lee and Baskerville (2003), Eisenhardt (1989), and Firestone (1993). It first builds a case by case set of thematic maps, searches for and identifies cross-case patterns, uses them to formulate propositions, and finally derives inter-related constructs that may be used to explain MDS adoption and use. Firestone and also Eisenhardt identify the danger of losing individual case identity by focusing on

the main common patterns and the danger of building a rich in detail but overly complex theory as two inherent limitations of case study research. The study mitigates these limitations by showing how the data *from each case study* supports the generalized propositions, and by synthesizing the propositions into concise and elegant theoretical conceptualizations.

Other limitations of method that should be acknowledged relate to the differences between some of the concrete approaches taken to data collection and analysis. These include the use of two languages when interviewing Study 1 participants and the ensuing need to translate interviews; the use of interview notes (Study 1) vs audio recording (Study 2) and the resulting difference in the amount of interview data gathered; the manual (Study 1) vs CAQDAS-supported (Study 2) data coding; and the choice of the inductive coding method (*in vivo* coding in Study 1, descriptive coding in Study 2). The measures taken to mitigate the risks to research rigour posed by these differences are described in detail in Chapters 4-7. Due to these efforts the researcher believes that these limitations have not had a significantly negative effect on the credibility and authenticity of the study.

8.5 Directions for Further Research

The study findings and analysis outcomes provide multiple directions for extending and expanding upon the scope and focus of the study conducted here. First, it would be of interest to carry out simultaneously a number of similar investigations at a wider selection of locations, adopting the methodology developed in the study. The cross-case analysis may provide further insights into MDS adoption and add to the findings of this study. Second, a longitudinal study at the same location(s) may evidence changes related to perceptions about the customer market (e.g., customer segmentation, perceived service value). Such a study may provide plausible predictions of future trends. Third, the proposed MDS adoption and use framework may be further validated by deriving research models for the empirical investigation of customer intention to use/continue to use MDS, including an investigation of the role of fast(er) mobile technology adoption (facilitated by increased smart device affordability) as an impact factor that may trigger customer profile change factor and have a flow-on effect on MDS adoption and use.

In addition, an associated empirical investigation could look into how mobile industry participants form their perceptions. The study findings indicate that industry

participants' perceptions play an important role in their decision-making processes and so affect the MDS value proposition. Therefore, it would be of interest to find out what factors influence industry participant perceptions and, in particular, how related and relevant academic research may be more effectively "fed" into them.

Finally, given the suggestion that the involvement of MDS customers as value co-creators may affect the MDS adoption rate, it may also be of interest to investigate further the MDS value co-creation process in the context of MDS supply business models so as to gain a deeper understanding of its relationship to MDS adoption and use; such investigations may also highlight factors that positively affect MDS adoption and use in relation to the characteristics of the MDS supply and regulatory environment in different geopolitical regions.

8.6 Summary of Chapter 8

This chapter concludes the thesis by summarizing the main outcomes of the study and discussing its contributions, limitations and implications. In addition, the chapter suggests directions for related further and future research.

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