Chinese Managers, Guanxi, and Using Business Intelligence: A Research Agenda

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Abstract

China is the world's second largest economy by nominal gross domestic product (GDP) and purchasing power parity (PPP). Despite the considerable amount of IS research in China, little work has been reported on the use of decision support systems (DSS), particularly large-scale business intelligence (BI). Because of the significant cultural differences between the West and China it may be that this Western technology is of little use in Chinese management structures and processes. In particular, the Chinese cultural norm of guanxi may affect BI usefulness. This research-in-progress seeks to contribute to practice by developing a theory that will help Western BI practitioners to understand and better use guanxi in dealing with Chinese organisations. It is also expected to provide an important addition to knowledge, including BI theory and IS research methods.

Keywords

Business Intelligence, Information Systems Use, Guanxi, Culture, China.

INTRODUCTION

The People's Republic of China (PRC) is the world's most populous country, and its population reached 1.35 billion at the end of 2012 (National Bureau of Statistics of China 2013). For the purposes of this research "China" is defined as the PRC excluding the special administrative regions of Hong Kong and Macau, and the disputed territory of Taiwan. At the end of 2010, China became the world's second largest economy by nominal GDP and by purchasing power parity (PPP) (World Economy Team 2013). China will overtake the United States and become the world's largest economy by nominal GDP forecast by 2030 (Fund 2013). In short, the Chinese economy is now overwhelmingly important for world trade.

Information system (IS) can be divided in to two major classes of applications: those that support the operations of an organisation and those that support the decision making of an organisation's managers. The latter class has been historically termed decision support systems (DSS). Business intelligence (BI) is a type of DSS, and it is defined as "a broad category of applications, technologies, and processes for gathering, storing, accessing, and analysing data to help business users make better decisions" (Watson 2009, p.491). The Gartner Executive Programs (EXP) annual surveys reveal that CIOs have consistently ranked BI as one of the "TOP TEN" technology priorities (Gartner 2013a). Columbus (2014) from Forbes reported that $14.4 billion were spent on the BI platform market in 2013. SAP, Microsoft, Oracle and IBM are the four megavendors for BI platforms, and China will remain the second-largest BI software market in Asia Pacific through 2017 (Gartner 2014).

A successful implementation of an IS requires technology, behaviour, and culture to fit each other in organisational settings (Hung et al. 2011). Examining IS and culture as a whole is essential, as culture is influential to IS beyond the impacts gathered from political, economic, and physical elements (Ford et al. 2003), and different cultures can have quite different IS usage outcomes (Leidner et al. 2006).

Managers are the target users of BI systems. A manager 'ensures his organisation serves its basic purpose by planning, organising, staffing, directing, coordinating, reporting, and budgeting' (Mintzberg 1973, p.95). This research takes a broad view of management and includes all managerial types and tiers. Chinese managers are significantly different from Western managers in their decision-making styles (Martinsons et al. 2007), and the use of BI by Chinese managers is a major gap in the literature.

Before continuing it is important to define another key construct in this research; the "West", or Western Countries, refers to a group of highly economically advanced countries. According to the OECD (2014), the West comprises Anglo America and Western Europe. Tselichtchev (2012) argued that 'China and the West need one another…China needs the rich, economically and socially stable, and technologically-progressive West, and the West needs dynamic, cash-abundant China' (p.151). Therefore, it is critical for Western managers to understand how BI systems are used in China, and how cultural norms affect BI use. National cultural difference is one of the barriers for the managerial understanding of social relationships in a multinational setting.

The aim of this research project is to develop and evaluate a framework to investigate managerial use of BI systems in Chinese organisations. It is valuable to investigate BI in organisational settings, because BI will remain as one of the fastest-growing software markets, and the transfer of the technology from the West to China is accelerating. The aim of this research-in-progress paper is to seek feedback from researchers regarding this research design. The remainder of this paper is structured as follows: The theoretical background of this research is discussed in the next section. Then, the research constructs and concepts that direct this research are developed. The following section describes the research method and design. The last section describes the potential contributions of this research.

LITERATURE REVIEW

Many Western studies of DSS and BI adoption and use have been published in elite IS journals, but studies in Chinese contexts are rare. Only one Chinese BI-related research has been published in an elite IS journal. Li, Hsieh, and Rai (2013) investigated BI users' post-adoption motivational behaviours toward routine use and innovation use in a large Chinese telecom organisation. As a result the level of abstraction of the literature review has been raised from BI/DSS to the whole IS discipline.

In terms of IS theories, two IS acceptance and use theories which are relevant to the nature of this project are the technology acceptance model (TAM) and the unified theory of acceptance and use of technology (UTAUT). The TAM and UTAUT model are Western-developed theories that explain and predict the success of introducing and using new technology. Almost all data in TAM related research has been collected via quantitative research methods, especially surveys and experiments. These studies use self-reporting measures on ease of use and usefulness (Straub et al. 2007). Due to the use of survey data collection technique, the actual organisational adoption and use has been left highly unexplored. Moreover, the early studies on this topic used very basic technology, such as electronic mail systems and a text editor (Davis 1993; Davis et al. 1996). BI systems, on the contrary, are sophisticated large-scale systems and require more effort from users. Thus, TAM should be re-tested for BI use because of the different responses that may be received from users in terms of perceived usefulness (PU) and perceived ease of use (PEU) in a different cultural context. Western-oriented IS may 'misfit' and may 'not be readily applicable' (Chen 2010), or need 'reconfiguration' before implementation and adoption (Westrup et al. 2008). Venkatesh et al. (2003) stated that UTAUT was an individual-based technology acceptance model. The UTAUT model still has uncertainties when used to test the use of advanced technology. Thus, TAM and UTAUT will still inform the design of the research constructs and concepts in this research, but adjustments are to be made to entertain the cultural dimension of this research.

Hofstede's cultural dimensions have been widely recognised as a system of measurement to investigate national culture's impact in IS research. However, problems have been identified around the legitimacy of Hofstede's theory. One of the premises of Hofstede's six dimensions is that culture falls along national boundaries. Australia, the UK, and USA (the core countries in Anglo-America) are three quite separate countries, but they have almost identical scores in Hofstede's six dimension model in terms of power distance, individualism, masculinity, uncertainty avoidance, pragmatism, and indulgence (The Hofstede Centre 2014). This means that culture can be trans-national as well as national. Further, Hofstede argued that national culture is static over time (Hofstede, 1980). This proposition should be

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adopted with caution as national culture can change, albeit slowly (Ford et al. 2003). China has seen major socio-economic change over recent decades. As a result of these concerns, amongst others, Hofstede's theory will not be used as the core cultural theory in this project. Chinese culture is significantly different from Western cultures in every analysis, even in Hofstede's. Accordingly, the theories and guidelines that are developed under a Western context may not be applicable to, or be operationalisable, in China.

Confucianism has been integrated to traditional Chinese culture norms for more than two thousand years. Confucianism focuses on educating people on how they should behave, emphasising loyalty, forgiveness and self-discipline. Guanxi is a unique operationalisable concept that can be operationalised to guide personal relationships in everyday life. Guanxi is defined as 'relationships or connections between two or more people (or organisations) in which each can prevail on the other(s) for help' (Martinsons 2002, p.334).Some authors believe that guanxi is a unique concept embedded in traditional Chinese culture, and guanxi activities fades when societies diverge from China, such as the case of Taiwan (Davis 2005). Others argue that, guanxi is ubiquitous in all Confucian societies and has been demonstrated to be valuable even when doing business among different cultures (Yang et al. 2011). For instance, Taiwan arguably preserves more Confucian culture and puts more emphasis on guanxi than mainland China (Lin 2011). In IS studies, the researchers have been aware of the cultural impacts on the research they conducted in China, but have not followed up on this awareness. As a result there is a general lack of research on cultural aspects of China in the IS domain. Many Western managers and scholars find that even though guanxi in Chinese society is similar to "relationship" in Western society, guanxi and relationship are actually significantly different in expression and results (Xin et al. 1996).

The core cultural construct that will inform this research project is guanxi, as most Chinese business activities and processes rely on the utilisation of guanxi (Park et al. 2001). Guanxi is embedded in Chinese life as an important social element. The concept of guanxi in China acts as a surrogate for social influence in western culture. The maturity of guanxi determines the relationship among employees, within and among organisations. Guanxi has strong implications on all the phases of development and implementation of BI systems because of the system used by employees.
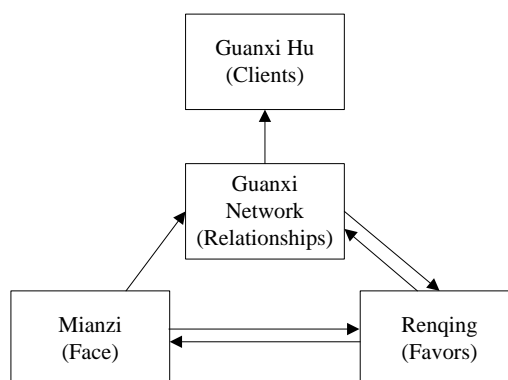

Figure 1. A Model of Guanxi, Adapted from Park et al. (2001)

A model describing guanxi, adapted from Park and Luo (2001), is shown in Figure 1. A Guanxi network (relationships) is a pre-condition of exchanging renqing (favors). It is difficult to ask for favors from others without establishing a well-maintained relationship network. If a person requests and accepts a renqing (favor) from others, the person is expected to return it in the future. Refusing to return renqing may destroy an already established guanxi network. It may also hurt mianzi (face), the primary philosophical personal value in society. The value of mianzi can differentiate one from another, and it is often determined by one's credibility, honesty, income, network, position, power, and reputation (Park et al. 2001). Mianzi and renqing have reciprocal effects on each other. A person needs to exchange renqing in order to maintain the values of their mianzi. Mianzi can be used to manipulate and cultivate the guanxi networks. Guanxi hu refers to the clients of a guanxi network who usually pair with each other in exchanging favors. A guanxi network is transferrable between different guanxi hu.

For most Chinese, who were raised in socialist China, the social practice of guanxi is a taken for granted part of everyday life. Building a guanxi network is essential for all aspects of life from obtaining new goods and services to entry into a good school. Guanxi that applies to individuals also applies to organisations, from obtaining rare materials to getting permissions considered and granted faster. Pye (1992) demonstrated that guanxi is one of the key factors to reach cooperative agreements between organisations. Guanxi can even be treated as a strategy to overcome competition and resource shortage

(Lin 2011). Zhang et al. (2006) categorised guanxi into three gradual types based on a closeness dimension, which were obligatory, reciprocal, and utilitarian. Yang et al. (2011) also used similar classifications that they termed emotion, reciprocity, and utilitarian benefits.

Individual and organisational guanxi are inter-connected. Zhang et al. (2006) argued against an inter-connected relationship by stating guanxi was individual concept which cannot be transformed into organisational assets. However, in Chinese society, guanxi not only has strong implications for both interpersonal and organisational dynamics, but also is a strategic mechanism in order to obtain scare resources for organisations seeking competitive advantage (Park et al. 2001). Xin et al. (1996) argued that personal guanxi was critical for executives in developing stable business relationships. The maturity of guanxi decides the relationship among employees, within and among organisations. Besides, personal relationships can be promoted into the organisational level, and business partners often develop personal relationships at the same time. For instance, if there were two private organisation owners, and one of their family members are going to have a wedding party, often they will invite the other business owner and his/her family to attend the ceremony. Both individuals and organisations can be the subjects of a guanxi network, but organisational guanxi works through individual connections. Individual and inter-organisational guanxi are interrelated and transferrable.

The concept of guanxi has been used in previous IS research. For example, Shin et al. (2007) investigated information sharing in the PRC and employed guanxi theory to explain a trust-based relationship model between foreign companies and their non-western business partners. Building a harmonious relationship enabled partners to share essential business information confidently. They conducted a survey in the PRC with high level managers, general managers, and deputy managers. Their findings can assist Western managers who undertake work in China in understanding the Chinese business environment in order to create more efficient and effective information sharing in IS design. Therefore, guanxi has been selected as the key cultural concepts for this research.

In summary, post adoption BI use is under-studied in IS research. In addition, China has a different cultural environment from the west, and key cultural concept that may explain the difference is guanxi.

RESEARCH CONSTRUCTS AND CONCEPTS

Drawing on the notions of cultural difference and IS adoption and use theories, the research constructs define four distinct user perceptions related to behavioural intention (BeI) and use behaviour (UB). The four user perception constructs are consisted of perceived facilitating conditions (PFC), perceived usefulness (PU), perceived ease of use (PEU), and perceived guanxi. The argument underlying the formulation of the constructs is embedded in the idea that the variation in BeI and UB may be explained by corresponding variations among user perceptions. Because of the exploratory nature of the research no relationships between the constructs are formally hypothesised.

Table 1 shows the origin of the research constructs and a concept from other models. Researchers have used TAM and UTAUT to investigate not only technology acceptance but also use behaviours. For example, Liu et al. (2011) examined the continuous use of online shopping channel; and Zhou (2011) investigated the use of mobile Internet in China. In addition, a related concept from guanxi theory are discussed.

Table 1 Research Constructs, A Research Concept and Origins

TAM	UTAUT	Guanxi	This Research	Definitions
System Design Features	Facilitating Conditions	None	Perceived Facilitating Conditions	Perceived facilitating conditions is a subjective factor and refers to the degree to which an individual believes that an organisational and technical infrastructure exists to support the use of the system.
Perceived Usefulness	Performance Expectancy		Perceived Usefulness	Perceived usefulness refers to real user's subjective belief that using a specific system will increase his or her job performance within an organisational context.
Perceived Ease of Use	Effort Expectancy		Perceived Ease of Use	Perceived ease of use refers to the degree to which the real user believes the use of the target system to be free of effort.

TAM	UTAUT	Guanxi	This Research	Definitions
Attitude Toward Using	Behavioural Intention		Behavioural Intention	Behavioural intention refers to an individual's positive and negative attitudes towards using the system to perform the target task.
Actual System Use	Use Behaviour		Use Behaviour	Use behaviour refers to the use of a system.
	Social Influence	Guanxi (Concept)	Guanxi (Refers to Figure 1)	Guanxi refers to a complex process of social practices, strategies and ethics of the exchange and reciprocity of gifts, favours and banquets.
Moderating Factors				
None	Gender	None	Gender	Male or female.
	Age		Age	Age refers to different generations.
	Experience		Experience	Experience refers to education and working experience, and whether the experience was overseas or domestic.
	Voluntariness of Use		Voluntariness of Use	Voluntariness of use refers the degree of that individuals perceive that they have freedom to choose to use or not use the system.

This research focuses on BI use rather than adoption. It is informed by the adaptation of UTAUT for clinical DSS in Shibl et al. (2012), Li, Hsieh, and Rai (2013), and the literature gaps identified in the previous sections of this paper. The adapted definitions of the identified constructs are shown in Table 1. In UTAUT, use behaviour (UB) is the actual use of a system; and, behavioural intention (BeI) is an individual's attitudes towards using the system. Early research indicated that BeI is a major determinant of UB (Davis 1985; Davis et al. 1989). In the UTAUT model the social influence factor refers to the degree to which an individual perceives that important people believe that they should use the system (Venkatesh et al. 2003). Social influence is a subset of cultural norms and lacks power in terms of examining and explaining other cultural impacts on system use. The social influence construct in UTAUT has been replaced by guanxi. The cultural norm of guanxi concept will be used as theoretical lens to investigate Chinese BI use.

The next two UTAUT factors are outcomes of the system use that are perceived by systems users. Perceived usefulness (PU) refers to the degree to which an individual believes that using a particular system would enhance his or her job performance within an organisational context (Davis 1985; Davis et al. 1989). PU has significant impacts on BeI, and is an effective predictor of system use behaviour (Taylor et al. 1995a; Venkatesh et al. 2000). Perceived ease of use (PEU) refers to the degree to which an individual believes that using a particular system would be free of effort (Davis 1985; Davis et al. 1989) and has consistently been found to have a significant impact on attitude towards using, both directly and through PU (Davis 1989; Davis 1993; Davis et al. 1989). Perceived facilitating conditions (PFC) refers to the degree to which an individual believes that an organisational and technical infrastructure exists to support use of the system (Venkatesh et al. 2003). Gogindarajan et al. (2012) argued that the degree of innovation is higher in an emerging economies than in Western countries. This is because emerging economies often have not had established legacy systems and as a result these older systems do not constrain the level of IS innovation. PFC may have a higher influence in a Chinese context compared to the West.

There are four supplementary research constructs: gender, age, experience, and voluntariness of use. Gender and age are self-explanatory constructs. Gender difference affects Chinese society profoundly in many dimensions. In 1968, Chairman Mao stated that "women can hold up half sky", which implies equality. Age usually affects an individual's status in an organisation, as respecting elders is a key moral principle in China. In addition, different generations may perceive the same system differently, and young people can often adopt innovations faster. Erickson (2009) summarised a forum discussion on generations of traditionalists, boomers, generation X and generation Y in China. The gap among generations is not just a generation gap, but it is a value, wealth, education, relationship, and an

information gap. Experience is defined as work and educational experience, because both of the work environment and the education environment have influences on managerial styles and how people behave in general. This means that managers, who have worked or trained in the West can have difficulty in adapting to Chinese circumstances. Voluntariness of use refers to the degree to which BI users are forced to use the system (Venkatesh et al. 2003). Chinese managers may have less discretion in their use of BI systems.

RESEARCH METHOD AND DESIGN

The aim of this research project is to develop and evaluate a framework to investigate managerial use of BI systems in Chinese organisations. To achieve the research project aim requires rich, detailed data about the actual use of BI systems. Qualitative data are an effective source of well-grounded, rich descriptions and explanations of human processes (Miles et al. 2013). Case study, as a research method, explores contemporary phenomenon in a real life context (Yin 1981) and offers descriptive research opportunities that suit the nature of this research. The nature of this research is exploratory; the researchers have no control over events; and, the focus of this research is BI systems, a contemporary technique in an organisational context. Those three criteria fit the prescriptions of Yin (2009) exactly. Furthermore, Gonzalez et al. (2007) argued that if the aim is to investigate IS within organisations, then case study is a strong option. Therefore, case study, as a research method, is particularly appropriate for conducting this study.

Miles et al. (2013) discussed the trade-offs between 'tight' versus 'loose' designs in qualitative research, where a 'loose' design is preferred when researchers are exploring unfamiliar cultures, understudied phenomena or very complex social processes. The cultural norms of guanxi are poorly investigated in the Western-oriented journals, BI use is poorly understood in China; and, guanxi is a very complex social networking construct. For that reason, a 'loose' design will offer the researchers flexibility in designing interview protocols (semi-structured) and will help identify emergent constructs during investigation. It also suits the principle of inductive reasoning for an exploratory case study. In the previous section only the conceptual research constructs and a concept has been formulated but the factors of each construct in the framework remain undefined. The logic linking the data to propositions is an essential feature of positivist case study research design (Yin 2009). However, the existing literature base of this study is so thin that it cannot provide potential propositions. As a result this study has been treated as an exploratory case study and no causal relationships have been hypothesised. Given that currently no theories or models are available to describe BI use in China, nor the effect of guanxi on BI systems use, this study is a theory building endeavour. Instead of formulating propositions, an exploratory case study can choose to have statements on what needs to be explored, the purpose of exploration, and the criteria that an exploration could be considered as successful (Yin 2009).

The research process, as shown in Figure 2, adapted Eisenhardt (1989)'s guidelines of building theory from case studies. Phase I consists of three steps from Eisenhardt (1989), namely 'getting started', 'selecting cases' and 'crafting instruments and protocols'. In the conceptual study phase, relevant literature has been collected and reviewed systematically; the rationale of conducting this research was discussed; the initial research aim, constructs and a concept have been formulated. Then, the boundary of this study has been defined, and potential case study sites are discussed. Currently, the researchers have completed the tasks listed above. Next, the interview protocol and data collection strategies will be designed to assist smooth data collection. The first exploratory case study and research framework development count as Phase II, when the researchers will select one organisation that fits the criteria of this research. The researchers will develop a framework to explore BI use and how guanxi affects BI use in China. This phase will adapt two steps of 'entering the field' and 'analysing data' from Eisenhardt (1989). It is also a theory building phase. The aims of the first case study are to begin theory development and a preliminary research framework, and to refine the interview protocol and data collection strategies. Phase III consists of an evaluative study to evaluate and refine the framework of managerial use of BI systems in China. The nature of the second study will be determined after the completion of the first study. It could involve follow-up interviews, focus groups, or surveys. The research framework will be refined after data collection and analysis.

Case study is a linear but iterative process (Yin 2009). Data collection in Phases II and III will have an influence on the research framework, interview protocols, data collection strategies, and even the research design itself. The last phase is to analyse all gathered data and enfold literature to reach conclusions. This is consistent with the last two steps of 'enfolding literature' and 'reaching closure' in Eisenhardt (1989)'s guidelines. Literature review is involved in all phases and steps.
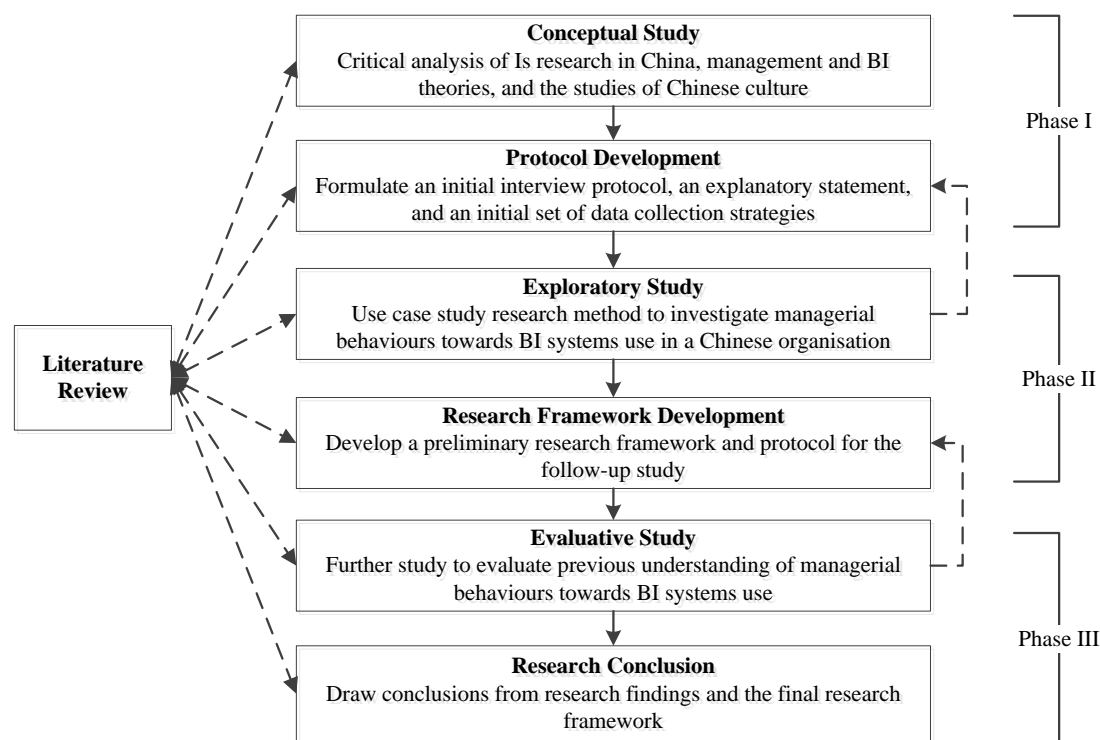
Figure 2 Research Plan

In China (more so than in the West) interviewees may tell the interviewer what the organisation wants them to report instead of what the interviewees think for the sake of saving 'face'. Chinese employees tend to report successful cases rather than failures. This could have a significant effect on data quality. In order to eliminate those biases, the researchers will partly conduct the first explorative study to identify the methods of entering Chinese organisations and collecting data effectively. Additionally, the researchers will collect data from multiple sources when possible, such as semi-structured interviews, field notes, and other relevant documents (e.g. annual reports or internal memos).

Data Collection and Analysis Strategies

This section adopts Miles et al. (2013) and Yin (2009)'s recommendations for qualitative data collection and analysis. It contains five elements, which are data sources, data collection procedure, units of analysis, data analysis techniques, and case study design quality evaluation.

Currently the implementation of BI systems has been reported in large organisations in large cities in China. Yin (2009) pointed out that researchers should not consider sampling logic in case selection if researchers seek theoretical generalisation. For the purpose of this study, Chinese organisations with large turnovers in large cities remain the primary target. Currently, the researchers have made personal contact with one large insurance company, and the IT department head is interested in this research project. The potential population of interviewees in this organisation is estimated to be 30 to 40 senior professionals, managers, and senior managers.

To commence the first case study, the researchers will immerse themselves in the target organisation for a number of days (up to two weeks) before formal interviews take place. No formal interviews will take place during this familiarisation stage. The next research stage will collect data using semi-structured interviews that will each last up to one hour. The data will undergo preliminary analysis using codes based on the research constructs and concepts. Based on the results of this preliminary analysis, one or more follow-up interviews, focus groups, or surveys may be conducted with the participants. If the follow-up questions are brief, they may be addressed in a telephone interview. After completion of the first case study the interview protocols and data collection technique will be refined for the next phase to reflect the first case study's findings. The two phases are required as, in addition to learning about BI use in China, the researchers will also have to learn about conducting intensive case studies in Chinese organisations.

The unit of analysis should be consistent with the research project aim. Individual interviewees will be the units to analyse. In order to explore organisational use of BI systems through individuals' lens, this study involves both an individual level and organisational level of analysis. This method is supported by

Jeyaraj et al. (2006). Each organisation will be presented and analysed as a whole, and each case study will involve multiple analysis at an individual level. The study of different organisations can be obtained through individual lens. Therefore, this study has two units of analysis, and is classified as (Type 4) multiple-case or embedded designs (Yin (2009).

Following the recommendation of Miles et al. (2013), the researchers will keep a data log while conducting fieldwork, and concurrently, a variable-by-variable matrix will be created in order to explore and understand the interrelationships between multiple pairs of variables. This research project adopts a multiple phases design, so having cross-case analysis may be possible in the last phase if the second study is a case study. Data collected from all sources could be aggregated and analysed according to the cross-case synthesis guideline suggested by Yin (2009). After interviews, all transcripts will be imported into Nvivo for analysis purpose. The transcripts will be kept in Mandarin during analysis, but the Nvivo nodes will be in English. After initial analysis, all transcripts will be translated into English for further analysis by English speakers and research data storage.

POTENTIAL CONTRIBUTIONS

This research proposal has described research for investigating the nature of BI use in China. Understanding how Chinese managers use enterprise level decision support is an important study, especially given the differences between Chinese and Western cultures and the overwhelming importance of China to world trade. There has been no similar study of Chinese managerial practice to date. It will be valuable to see if a large-scale decision support philosophy and technology that has been developed, and is dominant, in the West is applicable in a Chinese context. This research is expected to contribute to the understanding of Chinese management and decision support, especially in terms of the theory of guanxi. It will contribute to theory by evaluating whether a model based on constructs from mainly Western studies is relevant in a Chinese setting. In terms of IS practice, the project is expected to help BI strategists and developers understand how large-scale decision support systems are used in China. Further, China and East Asia countries share a Confucian culture (Lovett et al. 1999) so those understandings can be potentially generalised into East Asia Regions. It is also expected to provide guidance for other researchers about how to conduct intensive case studies in Chinese organisations.

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