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NEW PERSPECTIVES ON THE SUPPLY-CHAIN AND CONSUMER-DRIVEN INNOVATION

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NEW PERSPECTIVES ON THE SUPPLY-CHAIN AND CONSUMER-DRIVEN INNOVATION

ABSTRACT

This paper considers the interrelationship between innovation and the control of the supply-chain in consumer-driven industries. In particular the paper employs the concepts of Control and Innovation Networks as an analytical framework to examine the coordination of the supply-chain and inter-organisational collaboration. In-depth empirical evidence is provided by two cases industries: the UK supermarket and the UK consumer magazine publishing sector. By separating the process of supply-chain integration and coordination from the control of supply-chain, motives for collaboration and conflict were explored. A detailed analysis is given of the innovation process in both sectors, and new patterns of inter-organisational cooperation are identified. Network Hubs were shown to be able to use their control of the critical information of consumer demand to drive innovation and extract value-adding activities. In both cases examined the Innovation Hub was able to greatly extend the industry supplier base through the incorporation of external actors into the value system. This has widened the industry participation, but acted to change patterns of innovation within sectors. Consumer-driven Innovation Networks dependent on access to consumers through retail channels were found to be potentially vulnerable to retailer Control Networks.

1. INTRODUCTION

This paper considers the interrelationship between innovation and the control of the supply-chain in consumer-driven industries. In particular the paper employs the concepts of Control and Innovation Networks as an analytical framework to examine the supply-chain in two cases industries. In the search for competitive advantage in fast-moving consumer-driven markets, firms are increasingly attempting to differentiate and innovate new products and to manage the supply-chain to react quickly to changes in demand (Mason-Jones and Towill, 1998). Increasingly this capacity is being derived from inter-organisational collaboration between firms within the supply-chain, and these flexible arrangements have been the subject of much recent interest. The collaboration made possible by close inter-firm ties is generally discussed in terms of competitive advantage, especially with regard to the strategic innovation made possible by the use of alliances and network forms of organisation (Jarillo, 1998; Dicken, 1997; Nohria and Ghoshal, 1998; Dyer, 2000). Studies have also examined the shift to network forms of organisation in consumer-driven industries as examples of industrial transformation facilitated by the adoption of the IT-based systems that make supply-chain coordination possible (Abernathy *et al*, 1999; Cox, and Mowatt, 2004 in particular provide detail of the development of the systems involved: figure 1). Integrated systems allow firms to develop products jointly, and to enhance new product success by involving consumers in the process of design (Gruner and Homburg, 2000). It is timely to examine in detail how changes in the processes of coordination have affected innovation in the contemporary supply-chain.

1.1. Using Networks of Control and Innovation to Examine the Supply-Chain

We draw on two consumer-driven case-industries to provide some insights into the operation of the supply-chain and the process of innovation. The first case is that of UK supermarkets and the second is that of the UK consumer magazine publishing industry. Both of these industries have undergone transformation under the joint pressure of changes in their competitive environment and the process of integrating the supply-chain. The supply-chain can be defined as the network of organisations that are involved through upstream and downstream linkages in the different processes and activities that produce utility in the form of products and services in

the hands of the ultimate consumer (Christopher, 1992). Cooper *et al* (1997) have extended this understanding to encompass Supply-Chain Management (SCM), placing more emphasis on the function of the supply-chain to add value, and also to include the provision of information to consumers. The supply-chain spans both the channels of physical distribution and virtual product delivery to the associated inter and intra-organisational linkages that add value to products, services and information in the industry value-system. Recent changes in competition and the role of technology within the supply-chain have had profound effects on both the physical distribution of goods and the way in which organisational linkages within the value-system operate. For this reason this paper explicitly treats these aspects of the supply-chain independently in order to examine how their interrelationship facets innovation in consumer-driven industries.

There have been different approaches to studying recent changes in the supply-chain in the SCM, strategy, logistics and retail literatures, and also from competition policy. SCM, as well as strategy approaches in general as outlined in 1.1, have focussed on the benefits of and the process of coordination (Hughes and Merton, 1996; Ross, 1997); the logistics field have examined operational issues and optimal patterns of internalisation and externalisation within the supply-chain (Buck, 1990; Ross, 1997; Bourlakis, 1998), and the optimisation of integrated distribution systems (Van der Vorst *et al*, 1998; Van der Vorst and Beulens, 1999). These approaches usually assume that efficiency throughout the system benefits all the actors involved (although in relation to outsourcing there has been some acknowledgement that partners may not be equal). In examining contemporary supply-chains the retail literature has acknowledged the shifting balance of power from manufacturers to retailers (Ferne, 1997; Fernie and Sparks, 1998), but has not generally pursued whether this has negative as well as positive affects. In considering ethical issues in the UK food supply-chain Stainer, Gully and Stainer (1998) purposely cite Battaglia (1994) that supply-chain partnerships reduce costs and nurture long-term value-added relationships, despite a growing awareness from manufacturers, consumers and policy makers that there are contradictions within the contemporary supply-chain that may have negative welfare consequences. The growing power of retailers, such as Walmart in the United States of America and of supermarkets in the UK, has been of growing concern to competition authorities. The UK Competition Commission

(2002) recently investigated supermarket power, but was ultimately unable to reconcile evidence of both close-cooperation and conflict within the supply-chain in their market-power based approach.

Drawing on the work of Cox, Mowatt and Prevezer (2003) we employ two concepts to analyse the issues in detail: 1) Control Networks, for the physical distribution of goods and services and; 2) Innovation Networks, to examine organisational linkages. Considering the supply-chain separately as Networks of Control and Innovation provides a lens with which to examine the issues of coordination and innovation, providing a detailed picture of the processes and exposing conflicts of interest. Cox, Mowatt and Prevezer (ibid, 2003) provide a detailed exposition of a Control Network but did not provide a definition. We can consider a Control Network as the integrated information system which coordinates the physical end-to-end distribution of goods that could theoretically be controlled by a single actor. Separating the *control* of coordination and the *process* of coordination is important, as the two issues are often understood to be the same. However, the ability of firms to dissociate *control* of the information system – a Control Network – from ownership of it is a key feature of transformation within the supply-chain (ibid, 2003), and one that is underplayed by the essentially transaction cost-based approaches prevalent in the logistics and SCM literature.

Innovation Networks are the value-adding linkages between and within firms in the development of new products and processes. The Innovation Network approach lends itself to analysis using network-based approaches that address the issues of control, cooperation, power and trust within relationships, and will be discussed more fully in section 4. Examining the supply-chain from this perspective allows us to disentangle different aspects of the supply-chain, consider control and coordination discretely, and to then consider the importance of the interrelationship between Control and Innovation Networks to firms within the system.

2. METHODOLOGICAL APPROACH

The detailed descriptions of the operation of the Control and Innovation Networks drawn on to inform this paper are the outcome of a four-year empirical investigation

completed in December 2002. The study of the UK magazine publishing industry was undertaken by a programme of 28 semi-structured interviews in the consumer sector with publishing firms, primary distributors, wholesalers and retailers. In support of the interview-based research we also undertook a census questionnaire survey of 246 publishing firms in the magazine publishing sector. A response rate of 23% by firm was obtained from a statistically representative sample, comparison being made with a random selection of firms in the industry. The grocery retail industry was researched with a similar interview-based programme, concentrating on the supply-chain of a leading retailer that we name SuperCo for reasons of confidentiality. Suppliers, contract distributors, internal distribution and new product developers were interviewed. In addition to this concurrent studies by the UK Office of Fair Trading and Competition Commission have investigated both the distribution of newspapers and magazines and the operation of supermarkets over the same period, providing supporting evidence (OFT, 2002; Dobson, 2000; Competition Commission, 2002). In particular the Competition Commission report surveyed small suppliers, providing us with a comparable survey to our publishing company survey and underling that our detailed cases were representative of general trends.

3. CONTROL NETWORKS: THE TRANSFORMATION OF LOGISTICS, DISTRIBUTION AND THE PHYSICAL SUPPLY-CHAIN

The supply-chain is becoming increasingly driven by consumer demand (Ross, 1997; Smart, 1995), and a manufacturer moving to just-in-time production system is one typical example of this transformation (Dyer, 2000). The literature often considers customers who are also firms (Gruner and Homburg, 2000; Clark *et al*, 1987), but product markets which are driven by end-consumers provide clear illustrations of the transformation of the logistics system. Fast Moving Consumer Goods (FMCG) and products that are highly perishable lend themselves to SCM solutions that are demand-driven and time sensitive. Efficient Consumer Response (ECR) is the recent terminology for replenishment-driven customer focused distribution systems. Food is perishable, and so is the information contained in consumer magazines, and both of these industries provide interesting examples of development of ECR strategies and the evolution of Control Networks. Distribution channels in the food supply-chain have always been constrained by the perishability, spurring food suppliers and

retailers to forge close relationships with partners or to integrate to ensure tight coordination (Cox, Mowatt and Prevezer, 2002; Hughes and Merton, 1996). Coordination is effected through electronic systems which were developed largely as open standards to allow inter-firm synchronization; coordination and control were assumed to be synonymous. In section 3.1 we will examine in some detail how the transition of supermarket distribution has enabled retailers to become the Hub of the transparent information system, transforming systems established to coordinate the supply-chain into a Control Network by managing information about demand and knowledge of consumer trends.

As a counterpoint to the clear example of a Control Network in the supermarket sector, magazine logistics is in transition as the actors involved attempt to establish the systems that can support a Control Network. In addition to this, there have been major changes in the magazine distribution that may affect the position of the Network Hub: first magazines are largely no longer physical products until the printing stage as they can be originated as digital files; second magazines can potentially be distributed directly to consumers through the postal system (a long-term feature) or as digital files through electronic channels. For the magazine sector in the UK the primary form of distribution is still through the physical distribution system to retail outlets. We will examine the sector in detail in section 3.2.

3.1 The Supermarket Control Network

The UK supermarket supply-chain is managed for ECR. Retailers capture consumer demand data at the electronic point of sale (EPOS) via scanning technologies, and data warehousing and data mining exploit sales and loyalty card information to allow inventory to be managed centrally with replenishment-based and strategic forecasting systems. The initial transition of the supermarket logistics system from a warehouse to a replenishment-based system has been well documented (Burt and Sparks, 1997; Fernie and Pierrel, 1996). The establishment of the regional distribution centres (RDCs) shown in figure 1 enabled retailers to gain firsthand knowledge of the costs and process of distribution (McKinnon, 1989) and to install transparent Electronic Data Interchange (EDI), and later internet-platform, supply-chain systems to co-ordinate and control distribution. Much of the literature employs a transaction cost-based analysis to suggest optimal ratios of internalisation and

external contracting for the ownership and operation of assets such as RDCs and the haulage fleet, but these studies underplay the control that retailers have over the supply-chain through the integration of the information systems employed. “If you go to a contractor RDC it’s our hardware even if they own the depot ... unless you knew that RDC 2 was owned by us and RDC 12 was owned by a contractor, you can’t see the difference as you have the same information and the computer systems dictate the processes and methods of working. Throughout the supply-chain really you have our systems.” (logistics manager, SuperCo). Retailer control of the distribution system can be examined for the less well documented and more recent the development of primary consolidation centres (PCCs) as show in figure 1. SuperCo’s Control Network (in 2002) spanned 24 RDCs (of which they owned 9, and 50% of the haulage from RDCs to outlets) and 13 PCCs. Retailers do not own or manage directly any of the haulage fleet or assets in the PPC-chain except the information system that they require suppliers to employ. PCCs allow very small crate (rather than pallet) based deliveries to be made, and larger manufacturers can co-ordinate the collection of stock from small suppliers with guidance from the retailer. Since 2002 RDCs no longer undertake a warehousing function, but consolidate goods for demand-driven direct delivery to retail outlets. The distribution and logistic structure, using both RDCs and PCCs, allows small manufacturers to join the supply chain efficiently, and for large manufacturers to supply products on demand rather than by bulk-delivery. The information system constitutes an overarching transparent coordination system that is driven by information about consumer demand; information generated by and owned by the retailer. This critical information gives the retailer complete control of the Control Network acting as the Hub of the supply-chain as a whole. There have been three major outcomes from of the establishment of the Control Network: 1) A shift in power from manufacturers to retailers, to the point where as Control Network Hubs retailers can effectively employ manufacturers distribution systems for the PCC network; 2) A move towards fewer contractors in the management of the supply-chain (ie. logistics companies) with more open book, long-term relationships based on productivity improvements. This is as the Control Network removes the information asymmetries that encourage transacting firms to act opportunistically and encourages collaborative relationships; 3) The grocery supply base is enlarged. Small manufacturers can feed crate-based deliveries into the PCC network. In the chilled-ready meals sector for example SuperCo coordinates

small deliveries from 288 suppliers, the majority of which have no other form of distribution (95% of chilled ready meals are produced as supermarket own-brands).

These three factors are important in the operation of the Innovation Network examined in section 4.

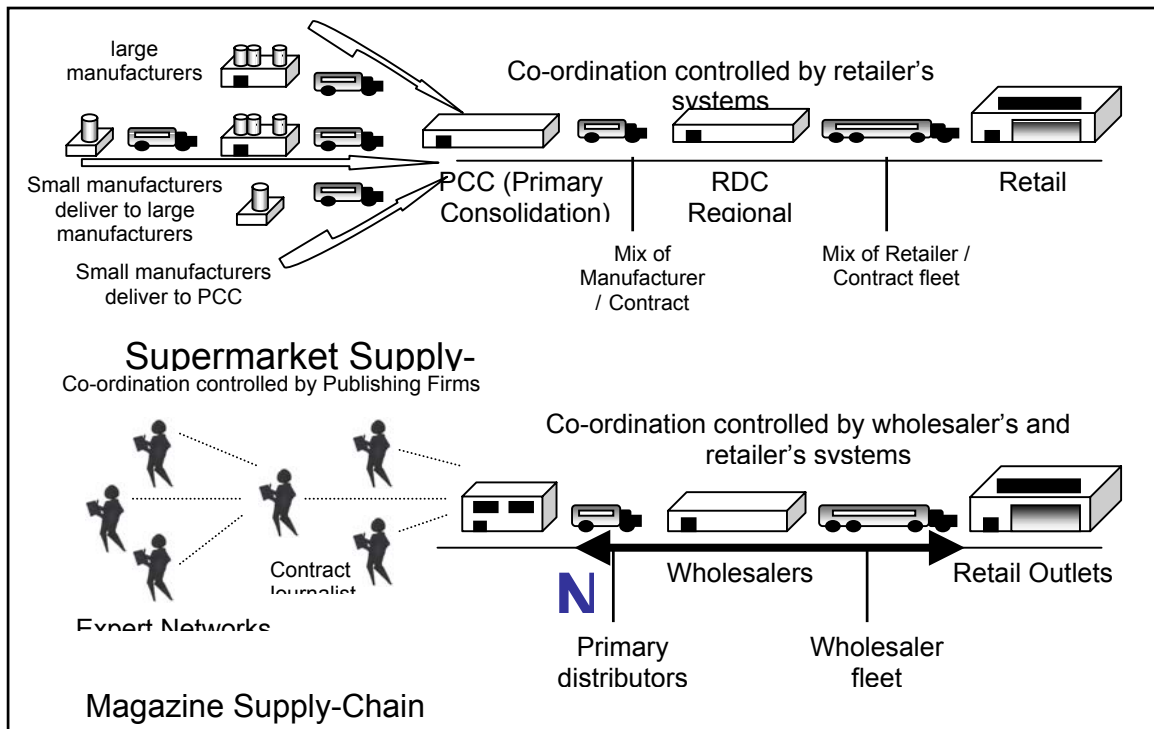


Figure 1: Supply-chains in the supermarket sector and magazine publishing.

3.2 Logistics and Distribution of Magazines: the Search for Control

The newspaper and magazine distribution system “delivers a higher line volume, of the shortest shelf-life product, to a higher number of consumers, through a greater number of retail outlets, during a more compressed time period than any other supply-chain” in the UK (Freight Transport Association, 1998). Despite this, to date there is no complete overarching information system in the magazine supply-chain, although the actors involved are attempting to create one. The distribution of magazines in the UK shares its historical development with that of newspaper distribution, but is becoming increasingly specialised despite being part of the same chain where “rubber hits the road” (interview transcript, wholesaler). There is another interesting aspect to the magazine distribution system: it is two-way. In the mid-1980s the German publisher Grunn & Jahr entered the low-cover price woman’s magazine market in the UK by offering to supply on a sale-or-return basis (SOR). In

order the respond the incumbents also moved from firm-sale to SOR, and by 1990 the magazine market was entirely SOR. SOR has three impacts upon the supply-chain: 1) actors in the supply-chain can observe demand by subtracting returns from deliveries; 2) it allows publishers to set retail prices and combat discounting; 3) necessitates a returns system to the publisher (or disposal agent). The distribution system is three-part: first in the form of origination as the inputs are assembled by publishers into magazines and transmitted to publishers; second from the publisher/printer to the wholesaler, and third from the wholesaler to the retailer. The movement of the physical product can be seen in a simplified manner in figure 1. Figure 2 shows the structure of the supply-chain: primary distributors, wholesalers and retailers. Wholesalers are primary represented by the ‘big three’ firms which have increased their control of the trade from 52.5% in 1989 to 79% in 2001 (OFT, 2002) and 85% in 2002 (industry supplied figures). This concentration also reflects a reduction from 502 wholesalers in 1970 to 72 in 2002. In 1994 an Office of Fair Trading review lead to the establishment of the industry Code of Practice that allows these distributors to supply exclusive territories with the proviso that they supply all retail outlets that meet basic criteria. This expanded the number of retail outlets by 22.8% between 1992 and 2000 from 44,474 in 1992 to 54,621 in 2000 (ANMW, 2003).

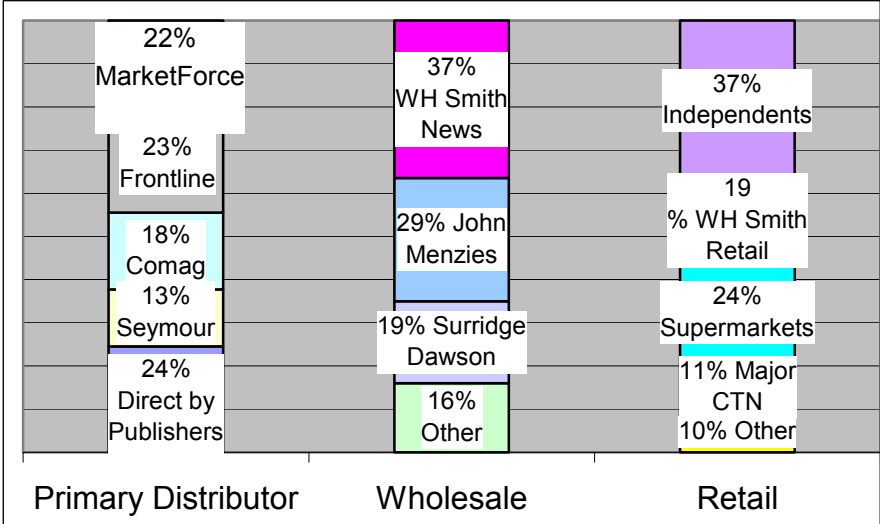


Figure 2: The structure of the UK magazine distribution system. Source: Industry supplied figures.

At the time of writing (2004) there is no complete Control Network comparable to that in the food industry described in the previous section. The EPOS data that allowed supermarkets to establish consumer demand and build inventory management

systems to exploit this is not captured completely by the retail sector for magazines. Around 48% of off-the-shelf sales are from independent (37%) and multiple (11%) confectioners, tobacconists and newsagents (CTNs), many of which may not record data with EPOS systems. The large retailers such as supermarkets and the multiple newsagent and book seller WH Smith do have EPOS data. WH Smith is responsible for 19% of magazine sales (and is independent from the wholesaler WH Smith News). 24% of sales are from supermarkets, but ironically for actors who have used their mastery over sales data to such effect they have found magazine sales data difficult to manage. One of the reasons for this is that until 2002 UK supermarkets, unlike WH Smith, scanned only 13 of the 15 digits in the barcode, and as the last 2 are information about the production number this is usually irrelevant for retailers. For magazines however this is the month of publication, and effectively separates different retail products. This deficiency is built into hardware and is likely to persist for some years as retailers refit. Until recently the supermarkets felt little pressure to remedy this 'grey area' for magazine sales as the SOR system meant that retailers did not lose profit by stocking titles that did not sell, and the wholesalers could manage magazine replenishment on their behalf. However, retailers are increasingly attempting to maximise profits with category management, placing a premium on retail space: it is no longer enough that unsold returns incur no loss as they divert space from lines that would produce profit. Retailers have therefore made a serious attempt to establish a Control Network. SuperCo began refitting EPOS hardware in late 2002. The supermarket Tesco and WH Smith proposed a joint venture to undertake magazine and newspaper distribution directly (Dobson, 2002), leveraging their existing Control Networks to coordinate distribution and to pool demand data. In this instance the retailers' alliance became subject to an Office of Fair Trading review that, largely to ensure the widespread distribution of newspapers for welfare considerations, allowed the wholesalers to preserve the regional distribution system in place in the UK for the present. However, wholesalers see this as a temporary "uneasy coexistence" (wholesaler) with retailers as the imperative to create a Control Network remains.

Wholesalers have been in a key position to collect demand information until this point, but the process of collecting returns to work out sales data in cases results in an information lag of some months. Publishers and retailers increasingly need real-

time sales data to manage for ECR and also to facilitate the development of new products, discussed in section 4. Wholesalers have been attempting to develop their information systems in order to become an information Hub. WH Smith News for example has introduced case-based automated picking systems and bar-code delivery control and tracking systems similar to those used by actors in the food supply-chain. Wholesalers “are moving to long-term joint investment contracts with publishing firms” to jointly establish Control Network architecture (wholesaler).

The increasing need to gain accurate demand information, particularly for the establishment of new titles, has also driven publishing firms to attempt to establish information systems, either jointly with wholesalers, or independently. For this reason publishing firms are progressively moving into primary distribution, establishing firms such as Frontline as joint ventures (50:50 Dennis and Seymour) and establishing their own information management systems to collect sales information data, manage ordering, marketing and forecasting – a role until recently undertaken by wholesalers. The information systems obtain EPOS data directly from retailers, indirectly through brokers (some supermarkets for example sell their non-strategic EPOS data), and from wholesalers.

The need to establish an information system for the industry as a whole is pressing, and in 1998 magazine and newstrade supply-chain representative groups formed the Joint Industry Group (JIG) to examine the development of Supply-Based Replenishment, electronic communications standardisation and the centralisation of information on magazine titles (range, issue, price, bar coding) in the National Title File. In terms of physical distribution, publishers, wholesalers and retailers are attempting to establish a Control Network, and all aspire to act as the Hub.

Publishers are in a stronger position to act as Control Network Hub due to the nature of their product. Unlike most FMCG products, magazines can potentially be virtual products. Since the computerisation of the industry in the 1990s this is being realised (see Cox and Mowatt, 2003, for a review of this transition). This has in fact allowed publishing firms to ‘virtualise’ supply-chain inputs, moving from physical to virtual copy from journalists through the development of their own and public computer systems (such as the e-mail and the internet). Table 1 illustrates this recent

shift. Printing is also undertaken by virtual means, sending files to printers rather than printing plates and film in use up to the late-1990s. Publishing firms are the information Hub of this stage of the supply-chain, and have extended this into the Innovation Networks examined in 4.2. Prior to this, printers were involved in the process of layout and design: the publisher’s Control Network has allowed them to appropriate this value-adding activity from printers. As in the supermarkets relationship with contract distributors, printer’s fees have decreased but the relationships have become longer-term and geared towards quality and productivity improvements.

<i>Method of Supply</i>	<i>Two Years Ago</i>	<i>Now</i>
<i>Physically (e.g. Film by post/couriers)</i>	40	31
<i>By EDI or Integrated Network Linkages</i>	9	43
<i>Electronically through the Internet</i>	4	23
<i>Only Electronically</i>	4	26
Total Respondents	44	57

Table 1: How Publishing Firms Receive Copy from External and Contact Staff (author’s survey, 2002)

Magazine publishers have additional channels to reach consumers: directly via computer intermediation (extending their Control Network to consumers) or by post. To date consumers have not defected from their preference of printed magazines to online alternatives; something that was widely predicted towards the end of the 1990s. So far, online products have been more important in generating consumer interaction with the Innovation Networks discussed in 4.2. Postal distribution is another alternative channel, but poses problems for the operation of the Innovation Networks (see 4.2). As a final consideration, publishers also derive revenue not only from copy sales, but from advertising, and this ability is driven by sales. Publishing firms need to reach the end-consumer to establish new products, and for this innovation process retail distribution is vital. However, publishing firms alone in the supply-chain have the full potential to capture the critical information of demand.

4. ORGANISATION AND INNOVATION NETWORKS

Consumer-driven industries need to respond to consumer demand, not only by being able to supply products through distribution systems, but also in terms of innovating and differentiating products. The Innovation Network approach allows us to examine this aspect of the supply-chain in terms of the inter-firm linkages that create value to

consumers through the development of new and modified products. Transaction-cost and network based approaches are useful analytical approaches to understanding organisation in the supply-chain. Transaction-cost approaches (Williamson, 1975) acknowledge information and power asymmetries within network relationships, especially where idiosyncratic assets are concerned (Smith and Dickson, 2003). Approaches from organisation and network studies give more emphasis to trust and reciprocity in relationships and are particularly useful in exploring new product development partnerships. The role of trust is usually taken as pivotal in the development and maintenance of networks relationships (Coles, Harris, and Dickson, 2003); Smith Ring (1997) provides a useful study of the sources and types of trust. Boyce (2001) and Lane and Bachmann (1998) provide useful books to exploring the role of trust in collaborative ventures. This perspective also allows conflict within relationships to be examined (Elg and Johansson, 1997). Coles, Harris and Dickson (*ibid*) provide a review of the literature pertaining to collaborative innovation networks, making the observation that the mechanisms within have still not been studied in enough detail. In sections 4.1 and 4.2 we examine the operation of the Innovation Networks in our case sectors. The following observations highlight aspects that are theoretically novel. We have already observed the ability of the Control Network Hub to control distribution systems as *if* it owned them by maintaining control over the critical information on demand. This information asymmetry, in conjunction with information transparency in coordination systems, removes the potential of opportunism from supermarket supply-chain partners. This has allowed supermarkets and logistics contractors to then negotiate as *if* they were already in trust-based relationships, and then to move towards a situation in which trust became engendered. This is in contrast to the literature whereby trust is taken to be a precursor to open transacting in networks (Casson, 1997:122). This is also found in the Innovation Networks studied. Innovation Hubs provide access to the market through Control Networks, bringing new actors into the industry and into the information system. These value-adding collaborative relationships exploit complementarities, and trust prefigures these relationships. These empirical examples identify two novel forms of trust-based collaboration: 1) Control Networks creating trust-based relationships; 2) Innovation Networks creating collaborative relationships by widening the industrial base.

4.1 Supermarket Innovation Networks

In this section we examine the operation of SuperCo's Innovation Network to understand how new products are created through firms in loose strategic alliances. SuperCo's Innovation Network evolved from its initial development of own-label specifications through internal hygiene, and later, new product development departments for own-brand goods (Fernie, 1997; Hughes and Merton, 1996; Senker, 1986, 1988). The UK supermarket sector is driven by differentiation strategies; firms compete on quality and through their own-brands. Own-brands are often novel products, such as chilled-ready meals, that branded manufacturers do not produce rather than own-label low-cost alternative to branded goods (Cox, Mowatt and Prevezer, 2002). To supply own-brand goods supermarkets coordinate manufacturers, packaging firms, standards and hygiene and distribution. The consumer demand data that SuperCo collects is considered in conjunction with these strategic alliance partners, whose activity is act in a co-ordinated way is possible because of the retailer's Control Network. SuperCo accepts that "many new product ideas come from our suppliers and we work very closely with some of the top chefs ... we follow those consumer trends which are very fashionable." (SuperCo NPD manager) SuperCo accepts that trust within long-term relationships is critical, especially as SuperCo has no capital stake in suppliers and there are few formal contracts between retailers and food suppliers in the own-brand sector. Relations essentially take the form of a "gentleman's agreement" and this is made possible by the structure of the industry created by the innovation network itself. SuperCo uses many small suppliers who otherwise would not supply the market by using the Control Network to bring them into the industry supply-base. For example, some fresh dips are produced by the excess capacity of hotel kitchens; providing high-quality fresh goods to supermarket customers and providing a new business stream to the hotel. Small farms are also able to supply exclusive products such as hand-crafted cheeses to the retailer in small crate deliveries via the PCC network, without which national distribution would not be economic. These products supplied in small quantities add value to consumers by providing choice. To ensure it has access to a large variety of products the retailer also has long-term reciprocal agreements with major suppliers. These plans range from non-contractually based agreements in which SuperCo agrees to "deliver a volume of business to a manufacturer for five years and the manufacturer invests in a dedicated factory" (SuperCo NPD manager),

to arrangements to supply small firms with technical assistance in return for access to new products. Relations in the Innovation Network are “fluid and dynamic” within and between firms. SuperCo staff and supplier staff spend around 50 per cent of their time in each other’s firms and meet in other locations. Flexibility and face-to-face contact is important when “it has become more and more specialized and the runs have become smaller”. This is far from the picture of adversarial price-based negotiation between suppliers and retailers that was partially responsible for the Competition Commission enquiry into the activities of supermarkets in the UK. Trust-based relationships are created where the complimentary assets of supermarkets (the critical information of demand, distribution) and suppliers (the ability to flexibly supply new quality recipes) are brought together. However, the Control Network allows supermarkets to discriminate between suppliers by bringing those that add-value into the Innovation Network and conversely is a powerful tool for exposing suppliers costs and extracting margins from them when collaboration is not desired.

4.2 Innovation Networks in the Consumer Magazine Industry

Publishing companies are able to use innovation networks to supply new titles and services to customers willing to pay high prices for quality narrow-interest magazines. Computerisation greatly lowered entry barriers to the industry, allowing actors to exploit consumer demand to originate titles and use contract printers. Established publishing firms have also been able to proliferate their range of titles. This is shown in the increase in the number of magazine titles, from 2000 consumer titles in the mid-1990s to over 3000 titles in 2002 (Pira International, 2002: Figures 8.12 and 9.2). The Innovation Network in magazine publishing spans the functions necessary to produce (journalists, editors, design, layout, printing) and distribute a magazine. Publishing directors and editors have personal networks of technicians and journalists, and can form new Innovation Networks when new market niches are identified.

A typical example from one publisher interviewed in a large firm detailed how he and his editor on a style magazine received a lot of feedback from readers concerning a feature on celebrity diets. The publisher was able to put together an informal team comprised from his personal network to develop a spin-off title to cater for this market. In the last few years large magazine publishers have realized that they are Innovation Network Hubs themselves: repositories of expert knowledge that

can be used not only to publish existing magazines but flexibly rearranged teams to generate new titles quickly in response to consumer trends. Firms have reformed around consumer interest groups, and essentially to pool information on consumer demand and spin off new titles and products.

Many small publishers formed in the first wave of digitization in the mid-to-late 1980s have also grown on this principle, using experts from leisure interest areas to inform the company about new opportunities and to put together a team to develop a new title. This process relies on contributions from external actors (contract journalists and experts commissioned for work), which has greatly increased the scope of the production system coordinated by the publisher's Control Network. For consumer-driven areas it is vital that these informants, who may compose copy, send reports or be bought in as technical advisors, journalists or editors, are authentically connected to consumer trends, which is one reason why a flexible external network rather than purely in-house journalism are features of Innovation Network. In examining the initial externalisation of journalism made possible by computer systems Stanworth and Stanworth (1988) noted that relationships in the publishing industry were becoming adversarial as power shifted between firms and their contractors. However, the Innovation Network facilitates trust by establishing value-adding collaborative relationships between the Innovation Hub and contributors. The publishing director of a small consumer-driven magazine firm remarked "it is simple finding local experts to develop your copy once you have found a market". For specialist monthly titles these experts would not otherwise be drawn into the industry value-system. For example, one publisher described how he contracted surfers write for a surfing magazine to be credible to readers, and later noticed that surfers were socialising with cyclists and riding mountain bikes after surfing. He was later able to contract mountain bikers as writers and to put together magazine teams from his technical network to launch a new title for the mountain bike market. Online interaction and feedback is becoming increasingly important for publishing firms in order to find new market niches. The Innovation Hub is able to feed external experts into their Control Network to produce high value-added niche titles, and as we shall explore in the following section, services. However, launching a new title requires the ability to reach end-consumers, and to then establish demand to ensure that the magazine is sustainable (this is particularly important to attract advertising revenue).

Initially persuading a consumer to buy a new magazine, then obtaining feedback is important (this is why retail rather than subscription is important for new titles). UK firms have been quick to develop Innovation Networks to develop new products, and the UK distribution system has been conducive: since the wholesaler Code of Practice the number of retail outlets has grown and the SOR system has allowed easy access to the retail shelves. SOR has assumed that publishers assume risk for titles that do not sell; especially relevant for the launch of new products. Trial supermarket distribution for a new title was often granted up to 2001. SuperCo, for example, allowed 5 stores to be selected for trials, with sales monitored directly by the publisher for seven months to prove viability. Due to the deficiencies of the information network the magazine publishing sector currently accepts a 37% return rate for magazines. This helps establish new titles in the market but as section 6 explores, runs counter to the principles of ECR in the supply-chain.

5. EXTENDED NETWORKS

In the preceding two sections we have examined how firms in two distinct consumer-driven sectors have been able to use Innovation Networks to produce and supply high-value niche products and Control Networks to coordinate processes across interlinked firms and actors. A key element of this strategy has been for firms to be able to identify and supply end-consumer demand. The ability to assemble teams to source, design, manufacture, and deliver products is in itself a key element of competitive advantage in consumer-driven industries. This flexibility has also enabled firms to compete across industrial and market areas by exploiting information about key consumer demand through the extension of Innovation Networks by offering additional products and services. The publishing industry questionnaire responses revealed that consumer magazine companies have extended their activities to supply products and services based on magazine brands, such as licensing for foreign distribution, internet advertising, event sponsorship, fairs, exhibitions and direct activity with consumers (table 2). In this way Innovation Networks in magazine publishing have made innovation a widespread and multi-faceted activity, something that can be overlooked if innovation is measured by only counting the development of new magazine titles for example (an approach taken by a major recent survey, DTI, 2002). Ultimately these brand-extending activities, and the establishment of spin-off

titles, depend on the existence of the printed product and the core-consumer group, ensuring a dependency on their ability to reach consumers through the physical distribution system.

<i>Innovation Form</i>	Number of Firms
TV channel	3
Radio station	2
Internet advertising	28
Internet sales/subscriptions	18
Internet services for third parties	16
Marketing services	17
Licensing of titles	12
Contract printing services	17
Event sponsorship	21
Fairs/ exhibitions	23
<i>Direct involvement with readers</i>	18
<i>Telephone services</i>	11

Table 2: Forms of Innovation Other than New Title Launches. (author’s survey, 2002)

Similar observations can be made in the supermarket sector as the multiples have exploited their proximity to consumers and ability to innovate products through contractors to enter market areas in addition to the traditional areas of grocery, non-food and clothing provision. Two examples provide a flavour of the extension of networks of Innovation and Control. First, the retailer J Sainsbury has used its Innovation Network to enter the consumer magazine market where it competes directly with publishing firms. J Sainsbury uses its contract publisher New Crane (who do not publish any other titles and operate solely as a Sainsbury contractor) to offer *The Sainsbury’s Magazine*, which, although only sold in Sainsbury’s supermarkets has a circulation of 278,043 copies (first half 2003, ABC data). With its Control Network Sainsbury can extend Innovation Networks not only backwards through the grocery sector, but across sectors. Second, as we have already examined in section 3.2, retailers attempted to leverage their control over distribution systems into the newspaper and magazine supply-chain. This is an example of the extension of Control Networks.

6. THE ROLE OF HUBS IN SUPPLY-CHAIN NETWORKS AND THE IMPACT ON INNOVATION

In both of the case sectors examined the Hub of the Innovation Network has extended the industrial base by bringing in suppliers to supply specialised products

and services as partners. In order to then supply products to end-consumers the integration of the distribution system has been vital, a role of double importance as information as to consumer demand necessary to innovate and establish new products is created and transmitted through the supply-chain itself in the form of EPOS data. This section evaluates the interrelationship between the role of the network Hub and the process of innovation in the case industries.

First let us consider the Control Networks examined previously. In the supermarket Control Network the retailer is the Hub. The ability to manage an ECR crate-based replenishment system allows the Hub of the Innovation Network to develop niche goods. The Innovation Network also integrates suppliers entering the market into the retailer's Control Network. Table 3 reveals the scope of this involvement, highlighting not only cooperation but also conflict. From our empirical work and this data we can offer the following interpretation using the Control and Innovation Network framework. The Hub of the Control Network is able to dictate processes through control of the supply-chain. Where suppliers collaborate with supermarket to exploit the critical data of demand through Innovation Networks, relationships are open, trust-based, and geared towards new product development and new idea generation. In many cases these relationships are with firms who have been bought into the supply-chain by the retailer. Where innovation is not important, retailers have been able to exert strong price pressure on both branded and own-label suppliers. Indeed, retailers are able to extract value-adding potential from suppliers by creating Innovation Networks to replace branded goods and dilute their market importance by innovating new retailer-dominated product areas such as chilled ready meals. The mixed evidence of cooperation and adversarial relations revealed by the Competition Commission enquiry (2002) would be expected from our perspective. More than this it reveals a shift in the patterns of innovation from being driven manufacturers to retailers through their partners.

	% Yes	% No	% No Response	% If 'Yes' Do You Welcome This?
Training	19	61	20	11
Health an Safety	37	47	16	24
Hygiene	55	33	12	38
Working Methods	36	46	18	21
Use of their Intranet	40	37	23	24
Quality Assurance and Traceability	72	21	7	47
Joint Product Development	16	13	71	13
Ideas Generation	14	15	71	11
Other	2	12	14	2

Table 3: Major Multiples Involvement in Supplier's Business. Source: Competition Commission 2002:362, table Q30.

The interrelationship between Innovation and Control Networks in the magazine industry is more problematic, as outlined in section 3.2. Retailer's Control Networks are being exploited to move to category management and ECR approaches: prioritising high value and selling lines. This posed problems for publisher's Innovation Networks as their approach has been to assume risk through SOR to get titles onto the shelves. As retailers establish sales information for magazines and move to replenishment ordering and sales maximisation access to shelf-space is not guaranteed. Supermarkets in particular stock around 400 titles in large stores compared to WH Smith that lists over 2000. Fig. 3 shows the increasing importance of supermarkets as retail outlets.

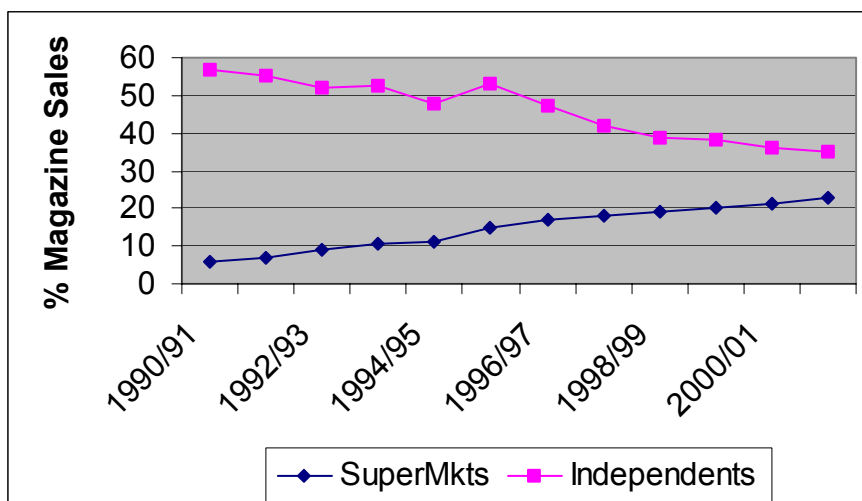


Figure 3: Increasing importance of Supermarkets for magazine sales. (Source: Industry data supplied to author.)

There is some recent evidence that retailers can exert power over suppliers in the supply-chain that may affect innovation and investment (Dobson, Waterson, and Chu, 1998). Asked whether supermarket power is an impediment to innovating new magazine titles 69 *per cent* of respondents in the consumer sector agreed. Arguments that stress the high number of titles sold by large retailers as evidence that they do not have a detrimental effect on consumer choice and innovation (such as ANMW, 2003) fail to consider the impact of category management on the *composition* of this range (the top 100 sellers) and the impact on the innovation of *new* titles. With the SOR structure publishers only take the risk for new titles if the possible benefit for the retailer is potentially greater than for an alternative use of the space and resources required. Until recently retailers did not have the information systems to make this judgement, but category management has begun to highlight the tradeoffs. In addition retailers are increasingly charging manufacturers for shelf-space and in-store promotion: “costs can be substantial to entry, with ‘display prices’ for new titles being around £3000”. The “need to pay retailers to enter the market” may have the effect of making market access difficult for new titles. This observation was a general feature of the interview sample in the consumer market: “it is now very difficult to launch a magazine as the need to launch in big retailers means a big ad spend.” One Publisher for a high-circulation men’s lifestyle magazine with a long history of new title launches perceives that “the days of being able to launch a title without retail distribution by selling [directly] and then getting into the supply-chain are over ... increasing retail consolidation not only of supermarkets but of other multiples such as petrol forecourt sales are reshaping sales of print media.”

	Yes	No
Consumer	69%	31%
Business to Business	63%	37%

Table 4: Is the Growing Power of Large Retailers (Such as Supermarkets) an Impediment to the Innovation of New Titles? (Source: Author’s Survey)

Actors in the publishing supply-chain are seeking to establish a Control Network and to establish themselves as the Hub; control network Hubs are able to use their position to drive innovation and extract value-adding activities. In both cases examined the Innovation Hub was able to greatly extend the industry supplier base through the incorporation of external actors into the value system. The value that these actors were able to add was contingent on the information about consumer

demand owned by the Hub as well as the Hub’s ability to distribute the product or service to end-consumers and to influence price, place and promotion. The differing position of supermarkets and publishers within their respective Networks can be summarised as in tables 5 and 6. Access to the critical information of consumer demand is central to the operation of both Innovation Networks, and as this information is partially encoded in the sales information that flows through the information network from the Point-of-Sale it is possible for Control Network Hubs to capture it. In FMCG access to the final consumer through retail is still the most vital sales channel that facilitates the development of new products, good and services necessary to maintain competitive advantage.

	<i>Control of Primary Distribution</i>	<i>Ownership of Primary Distribution</i>	<i>Control of Secondary Distribution</i>	<i>Ownership, Secondary Distribution</i>	<i>Information System Controlled</i>	<i>Information System Owned by</i>
Supermarkets	Yes	No	Yes	50% Typically own and	Supermarket	Supermarket and partners
Publishers	Partial (some JVs)	Partial (some JVs)	No; Wholesaler dominated	No	Supermarkets Wholesalers Primary Distributors	Supermarkets Wholesalers Primary Distributors

Table 5: The Position of Supermarkets and Publishers in the Control Network

	<i>Control of Innovation Network</i>	<i>Internalisation of Innovation Network</i>	<i>Access to Consumer demand</i>	<i>product</i>	<i>Control of price</i>	<i>place</i>	<i>promotion</i>
Supermarkets (relational contracting)	Yes	No	Yes	Yes	Yes	Yes	Yes
Publishers (external contracts)	Yes	No	Yes, but incomplete	Yes	Yes*	No	Partial

Table 6: The Position of Supermarkets and Publishers in the Innovation Network

By examining the control of the supply-chain through the prism of Control and Innovation Networks it has been possible to incorporate approaches that are able to explain both cooperation and conflict, especially with reference to the importance and role of network Hubs.

7. CONCLUSIONS AND FUTURE DIRECTIONS FOR RESEARCH

This paper has examined the operation of Control and Innovation Networks employed by firms within two consumer-driven industries. Both of these sectors have moved away from being previously dominated by the concerns of production to take on a more demand orientated focus, and as such provide discussion points for other

industries that are reconfiguring under similar competitive pressures. Competitive advantage in these industries is driven by constant innovation dependent on satisfying quickly changing consumer fashions, trends, tastes and patterns of demand. As an outcome of this the supply-chains have become highly integrated and managed from for ECR. Innovation in this environment depends of the close interaction between firms, their extended Innovation Networks and through their Control Network, their customers. The interrelationship between the role of the firm as an information Hub in the Innovation Network has been contextualised with the role of the firm in the control of the physical logistics-chain, as this forms a vital link in the information channel between consumers and product development. From this perspective it is can be argued that it is increasingly important for firms in these segments competitive position to act as Hub in both networks – Innovation *and* Control.

It can be suggested that Control Network Hubs increase their span of control not only throughout their supply-chain but into other supply-chains. This is illustrated in this paper where retailers have attempted to move into the supply of newspapers and magazines (Dobson, 2000). If there is an interrelationship between Control Hubs and innovation, then this issue should be pursued as the effects are potentially cross-sectoral. For example, whilst the control of multiple logistics channels has increased the innovative capacity of the retailer's Innovation Networks there is evidence that is beginning to have an impact on the function magazine publishing Innovation Networks. Within the supermarket supply-chain there is also a growing perception that the innovative capacity of established suppliers, both large and small, is being negatively affected.

Whilst the close collaboration between partners in the supply-chain is usually viewed very positively, this paper argues for a more sophisticated understanding of the relative positions of the actors with the value-system. The role of Hubs within the Innovation Networks who are able to identify and co-ordinate actors with complimentary assets supports the accepted wisdom of the positive operation of value-chain integration: increased knowledge, cooperation and speed. The widening of the supply-chain by Innovation Networks also fosters innovation in new suppliers and ultimately provides consumers with more choice. However, Control Networks

allow the Hub firms to identify and appropriate value-adding activities and acquire a much stronger bargaining position relative to other actors. In addition suppliers are required to adopt the systems required by the Hub. Future research directions should attempt to examine further Control and Innovation Networks, in particular examining the issue of the relative and changing power relationships and control. Whether long-term impacts of powerful Hubs augment or impair the *overall* innovative capacity of a supply-chain or simply represent a change in locus is an issue that could be examined further.

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