



Annotated Bibliography III

Integrated Research Sub-Project (IRSP) I – The Role of Technology Companies in Promoting Surveillance Internationally

Supply Chain Management

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April 2009

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Section 1: Aims, Introduction and Key Terms

Aims

The aim of this biography is to provide a resource base, a set of conceptual tools and a vocabulary of supply chain management to enable New Transparency collaborators and co-investigators to support the delineation of a domain of studies for research activities on the role and influence of technology companies in surveillance. This bibliography aims to contribute to addressing the following questions:

- What comprises an ‘industry’ and where are its boundaries?
- What different organizations are involved in producing new surveillance technologies and techniques?
- What are the key processes involved in the design and uptake of a new surveillance product?

Specifically, this biography concentrates on how the supply chain management and emerging supply network literature helps to address these questions with a particular focus on the following issues:

- Which key works in these literatures are concerned with identifying the different kind of organizations involved in making a product¹ and the relationships between them?
- What factors govern the formation, governance and operation of supply chains?
- What should co-investigators and collaborators read in order to understand the chains of organizations involved in the production of surveillance technology or technique?

Introduction

Supply or supply chain management (SCM) has gained prominence over the past decade, yet the gap between theoretical prescription and empirical practice remains wide (Storey *et al.* 2006). From its origins in materials flow management and logistics (Christopher 1998), SCM seeks to explore the linkages between those parties engaged in managing product and services demand and supply. To date, the empirically-driven theory of the Industrial Marketing and Purchasing (IMP) group has been particularly influential (Ford 1990; Gadde and Hakansson 2002) with its focus on business relationships between actors engaged in activities and controlling resources. Though SCM measurement constructs have now been refined (Chen and Paulraj 2004) as a theory, SCM remains in its infancy. The focus within the field has been largely on prescriptive, technical management issues (for a comprehensive overview, see Kouvelis *et al.* 2006). Even case exemplars presented, for example, in Harvard Business Review report the significant

¹ Given the nature of the surveillance industry, a wide definition of this term which includes both physical products and information services has been assumed.



challenges of supply relationship building (HBR 2006). A recent reorientation in some parts of the field has given rise to the related term ‘demand chain management’ (Heikkala 2002) and attempts to integrate more closely with marketing (see, for example, Hakansson *et al.* 2004). Likewise, interest in contingent relationship approaches has increased (Lambert and Cooper 2000; Kempainen and Vepsalainen 2003). In this regard, the move away from supply chains to supply networks (Harland 1996; Harland *et al.* 2001; Lamming *et al.* 2000) captured in the second part of this bibliography seems to provide particularly relevant concepts for surveillance research. Though significant gaps in understanding inter-organisational relations within such technical services area remain (Hui *et al.* 2008), recent typologies of the management of innovation, dominant design and application nets (Moller and Rajala 2007) seem, a priori, highly applicable to surveillance industry studies.

Key terms

Whilst discussion and debate over key terms continues, the following provide useful initial working definitions for some of the key terms used in the field:

Supply Chains (Chen and Paulraj 2004)

Supply chains are defined as ‘a network of materials, information and services processing links with the characteristics of supply, transformation and demand’ p.119.

Supply Chain Management (SCM) (Christopher 1998)

The management of upstream and downstream relationships with suppliers and customers to deliver superior customer value at less cost to the supply chain as a whole

Supply Networks (Johnsen *et al.*, 2008)

The set of supply chains involved in the production and supply of a particular product or product family. What happens in a relationship between one set of companies depends upon a number of other direct or indirect relationships.



Section 2: Annotated Bibliography

Part One: Key References

Chen, I. J. and Paulraj, A. (2004). 'Towards a theory of supply chain management: the constructs and measurements', *Journal of Operations Management*, 22: 119-150.

Maybe the most comprehensive analysis of wide-ranging, multi-disciplinary supply chain management research, this article identifies and consolidates supply chain initiatives and factors to develop key supply chain management constructs. Four hundred articles are analyzed and synthesised to produce a set of reliable, valid and uni-dimensional measurements to pave the way for SCM theory building. The term supply chain management is used to refer to planning and control of materials and information flows as well as the logistics of internal and external activities. Constructs are identified for supply uncertainty, demand uncertainty, customer focus, competitive priorities, supply network structure, long-term relationships, communication, cross-functional teams, supplier involvement and logistics integration.

Christopher, M. C. (1998). *Logistics and Supply Chain Management: Strategies for Reducing Cost and Improving Service*, Financial Times Prentice Hall London (second edition).

Martin Christopher describes the goal of supply chain management as to link the marketplace, the distribution network, the manufacturing process and the procurement activity in such a way that customers are serviced at higher levels and yet at a lower total cost. In this clearly written and accessible postgraduate text, he discusses the role of logistics in achieving these goals. He outlines how service levels can be used to segment markets and explores appropriate measures to assess logistics productivity and service performance. This practical guide provides information on how to map and audit logistics systems, describes how greater supply chain responsiveness can be achieved through lead time reduction and presents a number of informative, illustrative case studies drawn from a wide range of industries and countries.

Ford, D. (1990). *Understanding Business Markets: Interaction, Relationships and Networks*, Academic Press London.

An edited collection of articles that charts the history and development of the 'interactional' approach advocated by the European Industrial Marketing and Purchasing (IMP) group. Grounded in inter-organizational theory and new institutionalism (transaction cost economics), the focus of this group's empirically-driven research is on episodic interactions (related to a transaction of industrial goods) within relationships (described in terms of adaptations, commitments, trust and conflict) between companies. Four theoretical assumptions underpin the interaction model produced: firstly, that both



buyer and sellers are active participants. Secondly, buyer-supplier relationships are frequently long term, enduring and involve a complex pattern of interactions between companies. Thirdly, these links often become institutionalised into expected roles which can involve both cooperation and conflict. And finally, the focus of such relationships is on raw material or component supply. Accordingly, the buyer-supplier relationship forms the unit of analysis and equal attention is paid to industrial marketing and purchasing. This book considers the implications for marketing strategy, international marketing and industrial purchasing and includes non-traditional interaction studies in the areas of professional services, banking and technology. It concludes with an early discussion of networks².

Gadde, L-E., and Hakansson, H. (2002). *Supply Network Strategies*, John Wiley & Sons Chichester.

From the IMP school, this book focuses on the supply side of companies and summarises 25 years of research in the area of purchasing. Its main focus is on current issues related to developing appropriate supplier relations and combining these relationships into efficient supply networks. Divided into three parts, the book starts with an exploration of the challenges facing the purchasing function. The second part explores network analysis from an interactional viewpoint. Purchasing and activity, resource and actor structures are considered in turn. In part III, these authors turn to consider how the boundaries of a firm are determined the nature of supplier relationships and how supply networks can be designed. The book concludes by considering how efficiency may be determined for different units of analysis (e.g. single transactions, a series of transactions with a specific supplier, a range of suppliers and at a network level).

Heikkila, J. (2002). 'From supply to demand chain management: efficiency and customer satisfaction', *Journal of Operations Management*, 20: 747-767.

This paper presents an inductive case study of six customer cases of Nokia Networks to address the research question, how do companies in fast growing industries achieve good customer satisfaction together with efficiency in supply chain management? Results are organised into three areas: demand chain structure, customer-supplier relationships and demand chain performance. Research findings are summarised in a demand chain management model, which consists of five propositions. 1. Good relationship characteristics contribute to reliable information flows. 2. Reliable information flows contribute to high efficiency. 3. Understanding the customer situation and need and good relationship characteristics contribute to cooperation between the customer and supplier.

² See Hakansson, H., Harrison, D. and Waluszewski, A. (2004). *Rethinking Marketing: Developing a new understanding of markets* John Wiley & Sons Chichester for a more recent account related to the development of this thinking into the 'markets-as-networks' approach



4. Good cooperation in implementing demand chain improvement contributes to high efficiency and high customer satisfaction. 5. High customer satisfaction contributes to good relationship characteristics. Managerial implications, including alternative demand chain structures to serve different customers in the mobile network business are discussed.

Part Two: Current/Emerging Ideas

Harland, C.M. (1996). 'Supply Chain Management: Relationships, Chains and Networks', *British Journal of Management*, 7 (Special Issue): S63-S80.

This paper identifies and discusses various definitions and system levels of supply chain management: the internal supply chain, the dyadic relationship, the external supply chain and the inter-business network.

Harvard Business Review on Supply Chain Management (2006). Harvard Business School Press Harvard.

A selection of clear introductory articles written for managers and other professionals by leading thinkers in the field which includes case studies of the supply chains of Toyota and Zara. Includes discussion on incentive alignment, challenges of relationship building and flexible manufacturing forms. Includes discussion of developments in the field of supply chain management, specifically the role played by information software and systems, the importance of business relationships and the opportunities and problems presented by globalization.

Kemppinen, K. and Vepsäläinen, A. P. J. (2003). 'Trends in industrial supply chains and networks', *International Journal of Physical Distribution & Logistics Management*, 33: 701-719.

Drawing upon survey research conducted across six supply chain in the Finnish electronics, mechanics and paper industries, these authors argue that the management and structure of 1990s supply chains has transformed from the linear flow of materials to a multi-tier structure, enabled by information sharing and collaborative planning. A distinction is drawn between efficiency-driven and platform-based networks. Though coordination efforts remain limited to order process and operational scheduling, specialization and outsourcing are identified as the preconditions for networking. Typical product factories are being replaced by high volume component suppliers, flexible assembly and installation operations. Service relationships have polarised from general services into internet-based self-serve and expert provision. Firms need to position themselves strategically either as integrators or general component developers. The geographical scope of operations will be determined by functional focus.



Kouvelis, P., Chambers, C., and Wang, H. (2006). ‘Supply Chain Management Research and Production and Operations Management: Review, Trends and Opportunities’, *Production and Operations Management*, 15: 449-469.

A comprehensive review of SCM articles published in *Production and Operations Management* from 1995-2006, supplemented with key papers from top journals to give an overview of important issues addressed in recent supply chain management research. This paper covers supply chain dynamics such as the bullwhip effect, supply chain design, capacity and sourcing decisions (see, particularly, the work of Fine (2000) on fast-clockspeed industries), vendor managed inventory and re-engineering programs (including seminal work by Fisher (1997), supply chain planning and scheduling, supply chain co-ordination, information sharing, incentives and contracts, the challenges of multi-channel co-ordination (e.g. offline and online procurement and distribution) and agile postponement and product variety interventions. Operational hedging strategies and risk management are also discussed. The paper concludes with some directions for future research, including the stream of literature related to RFID.

Lambert, D.M. and Cooper, M.C. (2000). ‘Issues in Supply Chain Management’, *Industrial Marketing Management*, 29: 65-83.

This paper presents a framework for supply chain management, raises questions related to implementation and suggested avenues for future research. This paper advocates supply chain business processes linked across intra- and inter-company boundaries. From case study findings, the paper reports upon three elements of SCM: supply chain network structures, supply chain business processes and supply chain management components. An approach to supply chain mapping that considers physical and technical as well as managerial and behavioural components is proposed. These authors argue that successful SCM requires integrating business processes with *key* members of the supply chain. Four different types of business process links are identified: managed business process links, monitored business process links, not-managed business process links and non-member business process links.

Storey, J., Emberson, C., Godsell, J. and Harrison, A. (2006). ‘Supply Chain Management: theory, practice and future challenges’ *International Journal of Operations and Production Management*, 26: 754-775.

This paper presents research from a three –year detailed study of six supply chains which encompassed 72 companies across Europe. It suggests that supply management is at best, still emergent. Few practitioners were able – or even seriously aspired to extend their reach across the supply chain in the manner prescribed in much modern theory. Four drivers of supply management were identified: globalisation, outsourcing, fragmentation and market polarisation. Substantial gaps were revealed between theory and practice.



Harland, C.M., Lamming, R.C., Zheng, J. and Johnsen, T.E. (2001). ‘A Taxonomy of Supply Networks’, *The Journal of Supply Chain Management*, Fall: 21-27.

Supply networks are defined as ‘interconnected entities whose primary purpose is the procurement, use, and transformation of resources to provide packages of goods and services’ (p.22). This paper positions supply networks as a more complex concept than supply chains and develops an empirically-derived taxonomy. Drawing upon an exploratory survey, eight in-depth cases and a structured telephone survey encompassing in total 136 firms, four differentiating factors are identified: the degree of supply network dynamics (high or low) and the degree of focal company supply network influence (high or low). The paper focuses particularly on how these four types of supply network are created and operated. Nine different types of co-ordinating and managing activities (partner selection, resource integration, information processing, knowledge capture, social coordination, risk and benefit sharing, decision making, conflict resolution and motivation) are identified. Also highlighted are four contextual variables that may influence the processes of supply network creation and operation: market environment, product and process, network structure and the network strategy of the focal firm.

Hui, P.P., Fonstad, N.O., and Beath, C.M. (2008). ‘Technology Service Inter-organizational Relationships: An Agenda for Information Technology Service Sourcing Research’ in (eds) Cropper, S., Ebers, M., Huxham, C., and Ring, P. S. *The Oxford Handbook of Inter-Organizational Relations*, Oxford University Press Oxford.

These authors argue that existing inter-organisational relations research inadequately addresses the management of technological *services*, particularly those involving transactions of customised services rather than products. Four dimensions that set technology services apart are examined: 1) technology services often require specialized capabilities, heterogeneously distributed across organisational boundaries 2) technological services by nature are highly uncertain 3) technology service value cannot be evaluated by the acquisition of tangible assets 4) technology service feasibility depends upon the technology and related capabilities in place in an organization. These authors survey existing inter-organisational relations theories, transaction cost theory, capability theory and institutional theory to identify new research paths. Though as they acknowledge, there is great diversity in levels of knowledge dispersion, uncertainty, interdependence and path dependency across technology service IORs they suggest moving to a network level of analysis is likely only to exacerbate the current research gap created by treating technology services either as research context (as in IOR) or as a technology (as in the IS literature).



Lamming, R., Johnsen, T., Zheng, J., and Harland, C. (2000). ‘An initial classification of supply networks’ *International Journal of Operations and Production Management*, 20: 675-691.

This practical paper explores how supply networks of different types can be managed. Since networks tend to cross sector boundaries, these authors argue for a contingent approach to network management based upon product distinctions rather than sectoral characteristics. Following Harland (1996) supply networks are defined as ‘sets of supply chains, describing the flow of goods and services from original sources to end customers (p.676). Drawing upon existing supply chain categories and the strategic management literature that relates to innovation, a new supply network categorisation based on product type is proposed. These authors extend Fisher’s (1997) innovation: functional supply chain dichotomy, arguing for a contingent approach to supply network management based on 3 product-related aspects namely, the degree of product innovation, product uniqueness and product complexity. Two distinct supply network types are identified: those for innovative-unique (rare exceptions to the common offer) and functional products. Several key management differences are identified: the nature of information and knowledge sharing, the relative emphasis on cost, service, quality and innovation and network complexity. Complex product networks exhibited broader upstream networks, though each component may have few suppliers with single/dual sourcing preferred. In downstream network structures, information management was difficult and investments in IT to coordinate material flows were common. The supply networks of less complex products tended to be dominated by a single or small number of companies. A high degree of information secrecy was found in innovative unique networks. Strategic priorities and network structures were affected. These networks were found also to emphasis quality and innovation, as opposed to functional networks where cost and service were more important.

Moller, K., and Rajala, A. (2007). ‘Rise of strategic nets – New modes of value creation’, *Industrial Marketing Management*, 36: 895-908.

This paper focuses on the type and management of intentionally created business networks called nets. Three generic ideal net types are identified: ‘current business nets’, ‘business renewal nets’ and ‘emerging business nets’. The authors argue that these pose widely different conditions and requirements for net management. Relevant here are emerging business nets which seek to create more effective technological applications and business concepts by means of radical innovation and business system change. Management of these emerging business nets is discussed in terms of three sub-types relevant to the surveillance industry: innovation nets, dominant design nets and application nets.