

CONCEPTUAL FRAMEWORK FOR DEVELOPING GENERIC INTEGRATED SUPPLY CHAIN MANAGEMENT MODEL FOR CONSTRUCTION INDUSTRY

Tayyab Maqsood

Department of Building and Construction, City University of Hong Kong, Hong Kong

Akintoye Akintola

School of Built and Natural Environment, Glasgow Caledonian University, UK

Salman Azhar

Doctoral Candidate, Department of Civil and Environmental Engineering
Florida International University, Miami, Florida, USA

ABSTRACT

Supply chain management concept has flourished under different labels. The paper argues that after a decade use of confusing terminologies it is now possible to obtain a consensus on supply chain management terminology and establish its problem domain. There is a need of advancing the theory and developing robust supply chain management models to put this philosophy in actual practice in its true form. The supply chain management emphasizes 'Inter-organization cross-functional integration'. This attribute is suitable for construction industry, which is characterized by 'fragmentation'. The paper provides a conceptualisation of supply chain management by proposing its structural make up consisting of two components; essential components like supply management and chain management and driving components like outsourcing, relationship management and power management. The research is being undertaken to theoretically advance all these components for supply chain management implementation and utilization as a management tool that may plan, monitor, control and synchronizes various business processes and activities in a supply chain from one end to other with a view to obtain waste elimination, increased efficiency and improved end customer satisfaction.

KEY WORDS

Supply Chain Management, Purchasing, Logistics, Integration, Theoretical Constructs

1.INTRODUCTION

Supply Chain Management (SCM), is a most debated concept of today in almost all the industries. This concept has undergone tremendous evolution since its inception. The phrase 'Supply Chain Management' conjures up different meanings to different people. According to Tan (2001) Supply chain management is a most widely and abused term in the literature these days. New (1997) stated that there is no explicit description of supply chain management or its activities in the literature. Croom et al., (2000) supported that because of its multidisciplinary origins and the sense of holism, it has been defined in a variety of ways. It is precisely the broad perspective and coverage of supply chain management that makes the concept so difficult to study and visualize and hence comprehend and the challenge of the research to this point has been conceptualising the supply chain management (Ellram, 1991). Recently, research efforts by the Croom et al., (2000) and Tan (2001), by carrying out an extensive literature review of supply chain related terminologies, have contributed to recognize supply chain management as a 'discipline' that has a certain problem domain. Their efforts have helped address a concern of New (1997) who noticed a problem with the definitions of supply chain management domain that strict definitions of supply chain management close the productive avenues of development and loose definitions allow the label to collapse into an amorphous study of everything.

2. CONSENSUS ON SUPPLY CHAIN MANAGEMENT TERMINOLOGY

Supply Chain Management lacks a universal definition. Hakanson (1999) noticed that there might be as many definitions as the number of the practitioners. The lack of universal definition of supply chain management is due to the way concept of supply chain has been developed (Croom et al., 2000). The concept of supply chain has been considered from different point of view in different bodies of literature. As a result it has given rise to a variety of the definitions. Some definitions are too strict to draw any practical benefit out of the concept and others make study of supply chain management, a study of everything (New, 1997). Owing to the variety of these definitions, with in supply chain management literature, there is a confusing profusion of overlapping terminologies and meanings (New, 1997; Saunders, 1995). For this reason one can find many labels referring to supply chain and to practice supply chain management. Integrated purchasing strategy, supplier integration, supply base management, buyer-supplier partnership, supplier alliances, supply chain synchronisation, network supply chain, value added chain, logistic integration, lean chain approach, supply network, value stream, etc. (Dyer et al., 1998; Burt, 1984; New and Ramsay, 1995; Lee and Bellington, 1992; Nassimbeni, 1998; Tan et al., 1998; Ellinger, 2000; Nishiguchi, 1994; Lamming, 1993). While each terminology addresses elements of phenomenon, typically focussing on immediate suppliers of an organization, supply chain management is the most widely used (but abused) term to describe this philosophy (Tan, 2001).

Tan (2001) organized the literature on supply/supply chain/supplier’s related terms described above into two broad categories, which have been considered as supply chain management at its own place by the researchers. He referred these two categories as two perspectives of supply chain management: 1) Purchasing and supply perspective 2) Transportation and logistics perspective and identified that over the past decade the traditional purchasing and logistics functions have under gone tremendous evolution on separate lines and in their evolved form they are being referred to as supply chain management.

Evolution of Purchasing into Supply Chain Management: Purchasing function in an organization has gone tremendous challenges because of changes in technological, economical and political changes throughout the world. It is no more a clerical function in an organization and has evolved into an important strategic aspect that can determine the vary survival of the organization (Dobler and Burt, 1996). Over the years, it has become more complex, more professional and more encompassing evolving in many firms into procurement and now into, what some leading-edge firms call ‘supply management’ or ‘supply chain management’.

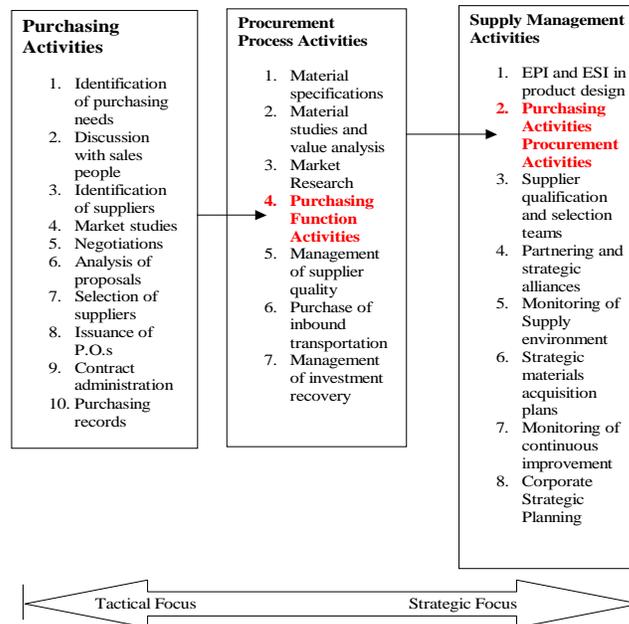


Figure 1: Evolution of Purchasing Function into Supply Management (Source: Dobler and Burt, 1996)

The shifting focus is from the tactical to strategic. It has become a management philosophy that extends traditional internal activities by embracing and inter-enterprise scope, bringing trading partners together with the common goal of optimisation and efficiency (Harwick, 1997). It occupies a pivotal position in a firm’s information and decision-making systems and is a key linkage, along with marketing, between a firms’ various product design groups and its ultimate customers. Components and sub assemblies that were previously manufactured in house are being brought to suppliers. This has caused the shift in responsibility from the manufacturing departments and production planning

departments to the purchasing departments and to the suppliers. For this reason purchasing became the supply management (Kraljic, 1983). The evolution of supply management is shown in Figure 1.

Evolution of Logistics into Supply Chain Management: Supply chain management has also been used to describe the strategic intent in traditional logistics function (Oliver and Webber, 1982). The purpose was to consider logistic as a strategic tool that made it different from classical transportation. This concept gained attention and researchers focussed to give structure to it but their understanding of supply chain management was not different than contemporary logistics management (Davis, 1993; Lee et al., 1993; Camp and Colbert, 1997; Scharlacken, 1998; Copacino, 1997; Lee and Billington, 1992; Handfield and Nichols, 1999; Bowersox and Closs, 1996) as defined by Council of Logistics Management (CLM) ‘The process of planning, implementing and controlling the efficient, cost effective flow and storage of raw materials, in process inventory, finished goods, and related information flow from point of origin to point of consumption for the purpose of conforming to customer requirements’. Cooper et al., (1997) made a distinction between logistics management and supply chain management by mentioning that supply chain management is more than a new name for logistics and is concerned with integrating and managing key business processes across the supply chain in addition to the logistics activities. Based on this emerging definition CLM modified the definition of logistics in October 1998, as ‘Logistics is that part of supply chain process that plans, implements and controls the efficient, effective flow and storage of goods, services, and related information from the point of origin to the point of consumption in order to meet the customers’ requirement’ and made it clear that logistics management is not supply chain management but only a part of it.

2.1 Unification of evolved forms of purchasing and logistics into Supply Chain Management

Tan (2001) described that these two evolved functions ‘purchasing into supply management’ and ‘transportation into logistics management’ should be considered together to constitute a paradigm of supply chain management. An extensive literature review conducted by the authors also endorsed his recommendations. Supply chain management takes a whole system approach that starts from one extreme end to the other extreme end in a supply chain. Supply activities and logistics activities are consisted of various business processes. The supply chain management in its true form is the integration of these business processes across a supply chain with the objectives of better customer satisfaction, competitive advantage, waste elimination and improved productivity. For a long time researchers have identified either supply activities integration or logistics activities integration with the trading partners as a supply chain management. Unless these two evolved functions are considered together and extended from one end of the chain to the other end seamlessly integrating all the trading partners in a supply chain, the true potential of supply chain management cannot be recognized.

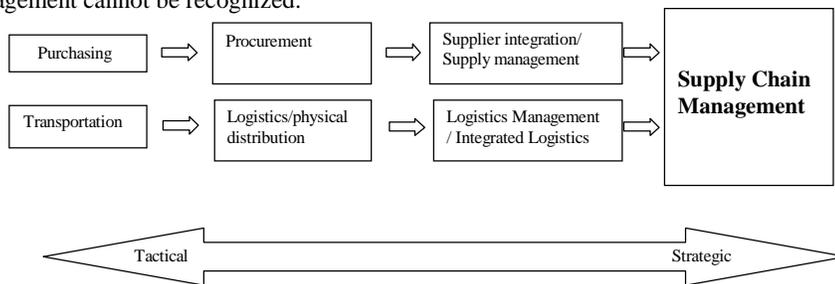


Figure 2: Unification of evolved form of purchasing and transportation into supply chain management

Hence, by considering all these, we agree with the definition of supply chain management as adopted by the Global Supply Chain Forum (GSCF), a group of non-competing firms and a team of academic researchers dedicated to improve the theory and practice of supply chain management, ‘Supply Chain Management is the integration of **key business processes** from end user through original suppliers that provides products, services, and information that add value for customers and other stakeholders’.

3. LACK OF ROBUST SUPPLY CHAIN MANAGEMENT MODELS

Croom et al., (2000) indicated that there is relatively poor supply of empirically validated models explaining the scope and form of supply chain management, its costs and its benefits. The reason is because supply chain has been considered from different points of view in different bodies of literature as described above. Such a multidisciplinary origin and evolution is reflected in the lack of robust conceptual frameworks for the development of theory on supply chain management. Most of the work done in the field so far is of empirical deductive nature, which means that it reports current practices and does not provide theoretical models or propose normative models to explain cause and effect and define underlying principles. In some cases theoretical work is available but they are largely connected with dynamics of inventory systems (material flows and stocks). There is a need of building theory and developing normative tools and methods for successful Supply Chain Management practice (Lambert and Cooper, 2000).

4. COMPONENTS OF SUPPLY CHAIN MANAGEMENT

In this paper, we have not advanced the theory of supply chain management *per se*. Instead we have conceptualised the framework to develop supply chain management model by identifying following five components:

- a) Outsourcing: Identification of supply chains or network structure (trading partners selection) and recognition of key or all trading partners.
- b) Supply Management: Identification of key or all business processes (both purchasing and logistics related) that are to be integrated with trading partners' business processes.
- c) Chain Management: Identifying a mechanism to transfer the effect of supply management activities, taking place between any two immediate trading partners, up stream or downstream and seamlessly integrate all the trading partners to achieve synchronization.
- d) Relationship Management: Identification of nature of relationships among trading partners for driving supply chain management.
- e) Power Management: Identification of trading partner holding a vintage point.

Supply management and chain management forms the basis for supply chain management and may be termed as 'essential components' Outsourcing, relationship management and power management are needed to facilitate implementation of supply chain management and may be termed as 'driving components'. The next sections discuss these components in detail.

a) Outsourcing: The outsourcing occurs as a result of strategic decision of an about what are the things to make by itself and what are to buy. Supply chains start building up as soon as organizations enforce outsourcing decisions. A significant feature of business management in 1990s has been the practice of outsourcing (Lonsdale, 1999). Firms and public sector bodies have reconsidered where the boundary of their organizations should be set and passed to third parties responsibility for many business activities. Construction has long since had a high degree of customisation and outsourcing. Projects have been traditionally carried out by multiple parties. More than 100 companies may be involved in the complex construction project (Kornelius and Wamelink, 1998). The industry is heavily dependent on subcontractors and suppliers of the building materials (Eccles, 1981). Purchased materials and services may be as high as 75% of total costs (Dubois and Gadde, 2000). A large practice of outsourcing in construction industry makes it ahead of all the industries in terms of outsourcing. The reasons for outsourcing can be either the need for specialists like assembling the ventilation equipment within a building or the repetition of several activities like ground work, brick laying, the erection of scaffolding, floor finishing, and painting. Because of the fluctuations in capacity needs it would not be sensible to employ all these disciplines within the main contractors firm (Kornelius and Wamelink, 1998).

Outsourcing is an important part for driving supply chain management as lesser number of suppliers would form lesser number of supply chains and makes the job easier to handle. The role of outsourcing in facilitating supply chain management is to strategically select and identify the trading partners and establish supply chains. Tan (2001) recognized that typical pattern of the research is to focus on the immediate suppliers. Supply chain management requires all suppliers back to the point of origin and all products/services out to the point of consumption to be considered. It is the role of outsourcing to identify all trading partners from point of origin to point of consumption. Lambert and Cooper et al (2001) noticed that considering all trading partners from point of origin to point of consumption increases the degree of complexity. For simplification they recommended that only key trading partners should be identified in the supply chain but they did not mention the criteria following which a partner can be termed as a key partner. There is need to extend research on outsourcing mechanism to devise such criteria so that a supply chain may be simplified but without affecting the key objectives of supply chain management.

b) Supply Management: We have used the term 'Supply Management' to highlight that part of supply chain management, which deals with integration of both purchasing and logistic related activities taking place between any two immediate trading partners. These activities may be different for different immediate trading partners. Lambert et al. (1998) noted that implementation of supply chain management has been found limited in scope in actual practice as companies do not integrate their all business processes. According to Lambert and Cooper et al. (2001) the integration of all the business processes is not required and a company may identify its key business processes. They provided nine key business processes a firm should integrate with a trading partner. The domain of applicability of these business processes is manufacturing industry. Therefore, it is required to develop a mechanism to identify key business processes related with purchasing or logistics activities occurring in between any two immediate trading partners in a construction supply chain.

c) Chain Management: The changes in supply management activities between any two immediate trading partners should immediately be reflected in supply management activities of other trading partners in the supply chain to achieve synchronization. A mechanism needs to be identified that may transfer the effect of any activity or business

process happening between any two immediate trading partners on the business processes taking place between other trading partners downstream or upstream in the same supply chain. Through this mechanism, it is possible to integrate the business processes of all the trading partners who are not immediate and hence achieve synchronization throughout the supply chain. For this reason, we have defined this mechanism as 'Chain Management'. To obtain holistic view, the effect of supply management activities between immediate trading partners on other trading partners' supply management activities must be determined. Chain management deals with the investigation and determination of all such effects and furnish the appropriate strategy to handle those effects.

d) Relationship Management: Supply chain management emphasizes 'integration' across organizations. Such integration is possible only in collaborative and cordial atmosphere. Recognition to good relationship and partnership exists in business world for a long time (Hallen et al, 1991; Arndt, 1983), as closer relationships are necessary for industry profitability (Shaw and Gibbs, 1995). In the context of supply chain management, good relationships are required to drive the supply chain management. Relational exchange or contracting is a key to drive supply chain management successfully. After the outsourcing decisions are made and supply chains are formed, organizations require decisions about the nature of relationships so that the integration of key business processes may become possible with immediate trading partners.

In construction industry, transactional exchange is dominant form of business (Dubois and Gadde, 2001; Thompson et al., 1998; Gann, 1996). Firms traditionally placed very little attention to the relational elements of business transactions (Thompson et al., 1998). Supplier competition in each transaction is assumed to be the most appropriate means of securing efficiency in operations. Due to this reason, actor constellations change all the time, making it difficult to utilize the experience gained in previous projects (Dubois and Gadde, 2001). Cox and Thompson (1997) added that this creates inefficiencies for the client as the supplier climbs a new learning curve each time. To deal with the above mentioned problems, collaborative relationships are emphasized (Dale et al., 1994; Carlisle and Parker, 1989; Dubois and Gadde, 2001).

Our purpose here is to define relationships that are suitable for driving supply chain management across the supply chain. We believe that collaborative relationships have the ability to overcome the prevailing problems in the construction industry and in addition they provide a medium to employ supply chain management. In Figure 4, we propose conceptual framework for developing partnership model for driving supply chain management. Our approach is based on the work of Sako (1992) who identified that there is a continuum of buyer-supplier contractual relations between the poles of 'arms length contractual relations (ACR) and obligational contractual relations (OCR) and Spekman et al., (1998) who suggested four types of interactions, in such continuum, between trading partners; Open market negotiation, Co-operation, Coordination and Collaboration. We consider that for facilitating supply chain management, Co-operation (CP), Coordination (CR) and Collaboration (CL) are important interactions that encompass different levels of trust and commitment and involve different roles and responsibilities an organization has to carry out.

According to Spekman et al., (1998) cooperation is threshold level of interaction where firms exchanges bits of essential information and engage some suppliers/customers in longer-term contracts. The next level of intensity is coordination where by both specified work flow and information are exchanged in a manner that permits JIT systems, EDI, and other mechanisms that attempt to make seamless many of the traditional linkages between and among trading parties. The next stage is collaboration where by partners engage in joint planning and processes beyond levels reaches in less intense trading relationships. Collaboration requires high levels of trust and commitments, and information sharing among supply chain partners and partners share common vision of the future. An organization may decide to work at any of these three levels of trust and commitment with other trading partner to facilitate the supply chain management and may modify its selection after monitoring the interaction for a certain time pertaining to the change in affecting factors.

Spekman et al. (1998) has proposed a 2x2 matrix approach to select the interaction level depending on the intensity (high and low) of the two variables complexity (financial or commercial) and strategic importance. We feel that the selection of the level of interaction is dependent upon on further other factors as shown in Figure 4 (Organization style, transaction cost, position in the chain, nature of the work, nature of the industry, company vision, etc.). These factors are not exhaustive and we are carrying out research to determine other influencing factors and testing them empirically. Moreover, in a certain level of interaction a trading partner needs to agree to carry out certain roles and responsibilities. The research is also being carried out to develop extensive interaction activities among trading partners and group them under cooperation, coordination and collaboration.

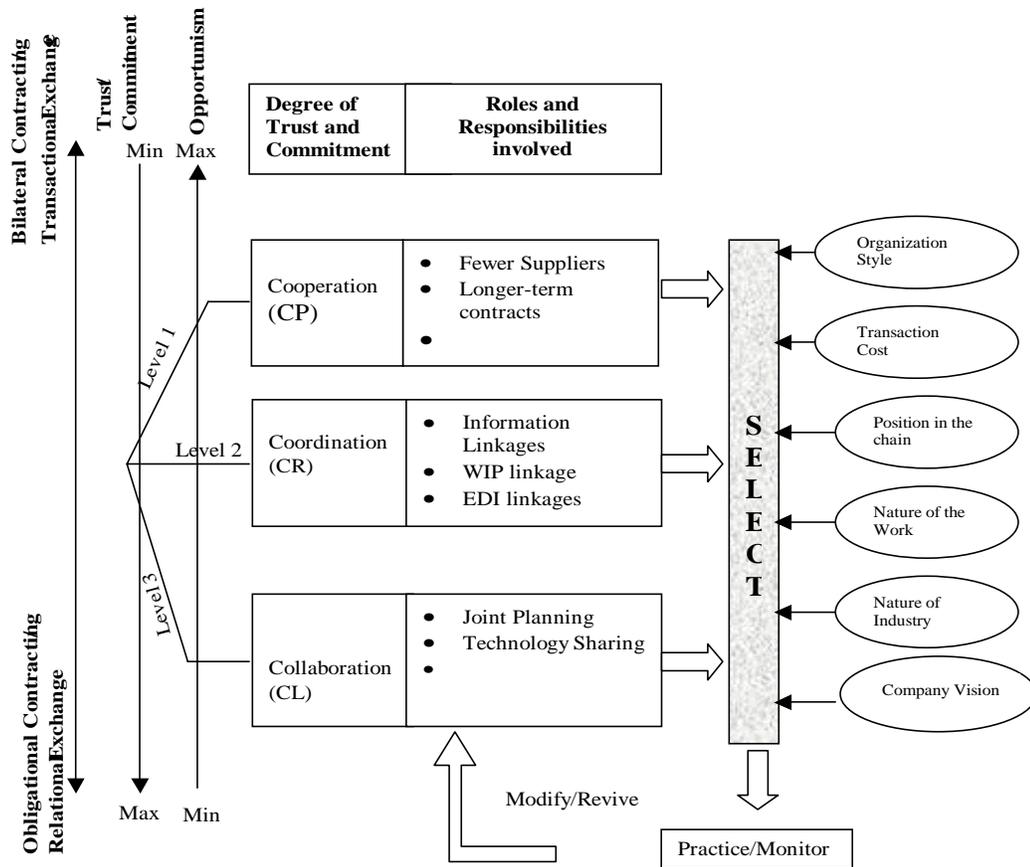


Figure 4: Conceiving relationship management for driving supply chain management

e) Power Management: Love et al. (1999) mentioned that various actors in a chain develop their own objectives, goals, and values systems without considering the impact on others or the effects on project performance. The functional attitudes and goals in most companies are in conflict and this hinders integration along the supply chain. Supply chain management suggests that it is necessary to think in terms of single integrated chain rather narrow functional areas of individual organizations (Stevens, 1989). This raises an issue who should focus in this aspect to make sure what ever is happening any where in the chain should contribute positively. This is to be admitted if every trading partner starts exercising supply chain management, based on its view and capabilities, from one end of the chain to the other end, their efforts would overlap and in some ways would conflict. There is a need for a single party, that is best suitable to control integration aspects of a supply chain to emerge out and put forth its efforts. Trading partners need to realize their place in the supply chain that they should control the chain or be controlled. Ganeshan and Harrison (1995) mentioned that there is a need of such balance creating mechanism through which different functions and organizations can be integrated together. Lamming (1996) is of a view that fundamental to the theory of supply chain management is the notion of the exercising control of an identified sequence of activities from a vintage point. This vintage point is usually occupied by the firm or organization conducting the last significant transformation of the product before it reaches the consumer through the downstream supply chain. Manufacturer in the manufacturing industry or contractor in the construction industry or in some cases, the facility or real estate owner may drive the supply chain management if they have sufficient construction volume (Vrijhoef and Koskela, 2000). With the advancement of knowledge in supply chain management applications, it may be possible for some parties to act as supply chain management consultants. This party referred to as ‘third party’ should be responsible for initially constructing the supply chains based on the product (project requirements) and drive supply chain management.

5. CONCEPTUALISATION OF GENERIC INTEGRATED SUPPLY CHAIN MANAGEMENT MODEL

Based on the above mentioned discussion, we can show the conceptualisation for developing generic integrated supply chain management in Figure 5. The outsourcing process is responsible for the formation of supply chains. In a supply chain, immediate trading partners (buyer-supplier) may select one of three interaction levels (CP: Co-

operation, CR: Co-ordination and CL: Collaboration) to work together in harmonious atmosphere to execute the supply management activities (comprising of purchasing and logistics related activities). The effect of supply management activities between any two immediate trading partners is transferred upstream and downstream by Chain management aspect of supply chain management to achieve synchronization. (For example any delay in a certain purchasing activity between 'B and C' should immediately be reflected into supply management activities between 'B and A' and 'C and D'). The party holding a vintage point in the supply chain should execute chain management aspect of the supply chain management so that positive integration of business processes in a supply chain may take place and objectives of waste elimination, improved productivity and end user satisfaction are met.

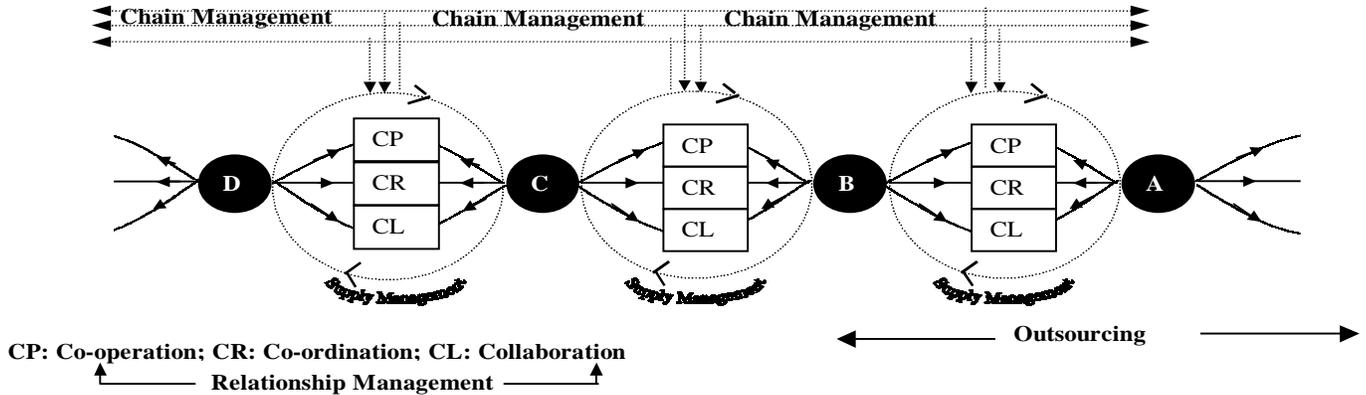


Figure 5: Conceptualisation of Generic Integrated Supply Chain Management Model

6. FUTURE WORK

- Establishing and extensively identifying the business processes to be executed under supply management and developing working principals to transfer the effect or influence of these business process upstream and down stream the chain through chain management to achieve synchronization.
- Theoretically investigate the factors affecting choice of partnership level and empirically test their influence on the selection of the partnership (cooperation, coordination, collaboration) level by any firm.
- Defining role and responsibilities to be undertaken by the organization in a certain partnership mode.
- Exploiting the use of Internet and E-commerce in supply chain management to enhance supply chain management implementation.
- Investigating the role of party that is dominant or hold vintage point (be it architect, client/contractor or designer) and determining how should they drive supply chain management through out from one end of supply chain to other end.
- Investigating potentials for third party to facilitate supply chain management activities in the supply chains.

7. CONCLUSIONS

Supply chain management, in nutshell, demands inter organization cross-functional integration. This characteristic of supply chain management may suitably address the segregation and fragmentation of construction industry. The concept of supply chain management has undergone a lot of confusions. Confusions arose when researchers/practitioners put their efforts forward to describe the strategic intent in purchasing or logistics activities and described these as supply chain management. After a decade long ambiguities in the supply chain management literature, a consensus may be said to occur recently, on the terminology of supply chain management to consider it as evolved form of both traditional purchasing and logistics functions together. We believe and agree that holistic notion that is grounded in the philosophy of supply chain management is not complete unless we combine both evolved forms of purchasing/procurement and logistics/transportation into supply chain management. Because of confusions that prevailed in the supply chain management research, a lack of robust supply chain management models exists. The time is ripe now for developing theoretical constructs for utilizing supply chain management in its true form. This paper is a part of such research effort and provides a generic conceptual framework to develop such theoretical constructs. We have identified that supply chain management includes five components; two essential components (supply management and chain management) and three driving components (outsourcing, relationship management and power management). We have provided brief conceptual description of these components. There is a need to theoretically advance all these components for implementing supply chain management to utilize supply chain management as a management tool that plans, monitors and controls various activities (purchasing and logistics) in a supply chain in an integrative way with a view to obtain waste elimination, increased efficiency and improved end customer satisfaction.

8. REFERENCES

- Arndt, J., (1983) "The political economy paradigm: foundation for theory building in marketing", *Journal of Marketing*, Vol. 47, pp44-54.
- Bowersox, D. J., and Closs, D. J (1996). *Logistical Management—The Integrated Supply Chain Process*, McGraw-Hill Companies, New York.
- Burt, D. (1984). *Proactive Procurement*, Prentice-Hall, Englewood Cliffs.
- Camp, R. C., and Colbert, D. N (1997). The Xerox Quest for Supply Chain Excellence, *Supply Chain Management Review*, (Spring), pp 82-91.
- Carlisle, J., and Parker, R., (1989). *Beyond negotiation. Redeeming customer supplier relationships*. Wiley, Chichester, UK.
- Cooper, M. C., Lambert, D. M., and Pagh, J. D. (1997). "Supply Chain Management: More Than a New Name for Logistics". *The International Journal of Logistics Management*, Vol 8 No 1, pp 1–13.
- Copacino, W. C (1997). *Supply Chain Management: The Basics and Beyond*”, St.Lucie Press, Boca Raton, Florida.
- Cox, A., and Thompson, I., (1997). "Fit for purpose' contractual relations: determining a theoretical framework for construction projects". *European Journal of Purchasing and Supply Management*, Vol 3 No 3, pp 127-135.
- Croom, S., Romana, P., and Giannakis, M., (2000). "Supply Chain Management: an analytical framework for critical literature review", *European Journal of Purchasing and Supply Management*, Vol 6, pp 67-83.
- Dale, B.G., Lascelles, D.M., and Lloyd, A. (1994). Supply chain management and development. In Dale, B.G. (Ed.), *Managing Quality*. Prentice-Hall, New York, pp. 292-315.
- Davis, T. (1993). "Effective Supply Chain Management". *Sloan Management Review*, Vol 34 No 4, pp 35–46.
- Dobler, Donald W., and Burt, David N., (1996). *Purchasing and Supply Management*, 6th Ed., McGraw Hill, Singapore.
- Dubois, A., and Gadde, L-E., (2000). "Supply Strategy and net work effects-purchasing behaviour in the construction industry", *European Journal of Purchasing and Supply Management*, Vol 6 , pp 207-215.
- Dyer, J., Cho, D., Chu, W., (1998). "Strategic supplier segmentation: the next 'best practice' in supply chain management." *California Management Review*, Vol 40 No 2, pp 57-76.
- Eccles, R., (1981). "Bureaucratic versus craft administration: the relationship of market structure to the construction firm", *Administrative Science*, Vol. 26, pp 449-469.
- Ellinger, A. E. (2000). "Improving marketing/logistics cross functional collaboration in the Supply Chain", *Industrial Marketing Management*, Vol. 29, pp 85-96.
- Ellram, L.M. (1991). "Supply chain management: the industrial organisation perspective", *International Journal of Physical Distribution and Logistics Management*, Vol. 21 No 1, pp 13-22.
- Gann, D., (1996). "Construction as a manufacturing process? Similarities and differences between industrialized housing and car production in Japan". *Construction Management and Economics*, Vol. 14, pp 437-450.
- Hakanson, Bill (1999) *Supply Chain Management: Where Today's Business Compete*, ASCET Vol 1, Montgomery research Inc.
- Hallen, L., Johanson, J., and Sayed-Mohamed, (1991). "Inter-firm adaptation in business relationships", *Journal of Marketing*, Vol 55, pp 29-37.
- Handfield, R. B., and Nichols, E. L., Jr. (1999). *Introduction to Supply Chain Management*. Prentice Hall, Upper Saddle River, New Jersey.
- Harwick, T., (1997). "Optimal decision-making for the supply chain". *APIC-The Performance Advantage*, Vol 7 No 1, pp 42-44.
- Hayes, R., and Abernathy, W., (1980). "Managing Our way to economic decline", *Harvard Business Review*, July-August, pp 67-77.
- Kornelius, L., and Wamelink, J.W.F., (1998). "The virtual corporation: learning from construction". *Supply Chain Management*, Vol. 3 No 4., pp 193-202.
- Kraljic, P. (1983). "Purchasing must become supply management", *Harvard Business Review*, September-October, pp. 109-17.
- Lambert D. M. and Cooper, M. C., (2000). "Issues in Supply Chain Management", *Industrial Marketing Management*, Vol 29, pp 65-83.
- Lambert, D. M., Cooper, M. C., and Pagh, J. D., (1998) "Supply Chain Management: Implementation Issues and Research Opportunities", *The International Journal of Logistics Management*, Vol 9 No 2, pp 1-19.
- Lamming, R.C., (1993). *Beyond Partnership: strategies for innovation and lean supply*. Prentice-Hall, Hemel Hempstead.
- Lee, H. L., Billington, C. (1992) "Managing Supply Chain Inventory: Pitfalls and Opportunities", *Sloan Management Review*, Vol. 33 No 3, 65–73.
- Lee, H. L., and Billington, C. (1995). "The Evolution of SCM Models and Practice at Hewlett-Packard", *Interfaces*, Vol 25 No 5, 42–63.
- Lee, H. L., and Billington, C., and Carter, B. (1993). "Hewlett-Packard Gains Control of Inventory and Service through Design for Localization", *Interfaces*, Vol 23 No 4, pp 1–11.
- Lonsdale, Chris (1999). "Effectively managing vertical supply relationships: a risk management model for outsourcing", *Supply Chain Management*, Vol 4 No 4, 176-183.
- Love, P.E.D., Li, H., and Mandal, P., (1999). "Rework: a symptom of a dysfunctional supply-chain". *European Journal of Purchasing and Supply Management*, Vol 5, pp1-11.
- Nassimbeni, G., (1998). "Network structures and co-ordination mechanisms: a taxonomy". *International Journal of Operations and Production Management*, Vol 18 No 6, pp 538-554.
- New, S.J. and Ramsay, J., (1995). Supply chains- corporate path to economic disaster? *Fourth International IPSERA Conference*, Birmingham.
- New, S.J., (1997). "The scope of supply chain management research". *Supply Chain Management*, Vol 2 No 1, pp 15-22.
- Nishiguchi, T., (1994). *Strategic Industrial Sourcing: The Japanese Advantage*. Oxford University Press, Oxford.
- Oliver, R. K., and Webber, M. D. (1992) Supply-Chain Management: Logistics Catches Up with Strategy. *Outlook* (1982); cit. Christopher, M. G.: *Logistics, The Strategic Issue*. Chapman and Hall, London.
- Ram, Ganeshan and Terry, P. Harrison, (1995) An Introduction to Supply Chain Management, http://silmaril.smeal.psu.edu/misc/supply_chain_intro.html, December 1, 1999.
- Sako, M., (1992). *Prices, Quality and Trust: Interfirm Relations in Britain and Japan*. Cambridge University Press, Cambridge.
- Saunders, M.J., (1995). "Chains, pipelines, networks and value stream: the role, nature and value of such metaphors in forming perceptions of the task of purchasing and supply management" *First Worldwide Research Symposium on Purchasing and Supply Chain Management*, Tempe, Arizona, pp. 476-485.
- Scharlacken, J. W. (1998). "The Seven Pillars of Global Supply Chain Planning" *Supply Chain Management Review*, Vol 2 No 1, pp 32-40.
- Shaw, Susan A., and Gibbs, Juliette, (1995). "Retailer-Supplier relationships and the evolution of the marketing: two foods industry case studies", *International Journal of Retail and Distribution Management*, Vol 23 No 7, pp 7-16.
- Spekman, R. E., Kamauff Jr., J. W. and Myhr, N., (1998) An empirical investigation into supply chain management: A perspective on partnerships, *International Journal of Physical Distribution and Logistics Management*, Vol 28 No 8, pp 630-650.
- Stevens, G. C (1989). "Integration of Supply Chain" *International Journal of Physical Distribution and Logistics Management*, Vol 19 No 8, 3–8.
- Tan, K.C., Kannan, V.R., and Handfield, R.B., (1998). "Supply chain management: supplier performance and firm performance". *International Journal of Purchasing and Material Management*, Vol 34 No 3, pp 2-9.
- Tan, K. C. (2001). "A framework of supply chain management literature", *European Journal of Purchasing and Supply Management*, Vol 7, 39-48.
- Thompson, I., Cox, A., and Anderson, L., (1998). "Contracting strategies for the project environment". *European Journal of Purchasing and Supply Management*, Vol 4, pp 31-41.
- Vrijhoef, R. and Koskela, L., (2000). "The four roles of supply chain management in construction", *European Journal of Purchasing and Supply Management*, Vol 6, pp 169-178.