What Better Defines Demand Chain Management: A Q-Sort Technique Based Perspective

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Abstract

It is an attempt to put the extant literature systematically forth for further academic inquiry into the emerging area of DCM. It being an emerging aspect lacks robust literature base, however, the author is making modest attempt to review the associated literature. The point of departure for the research emanates from the partially conflicting ideas about the concept of DCM and lack of empirical research in the field. The study is based on interpretive epistemology, inductive approach and uses content analysis to provide an overview of the existing academic literature on demand chain management by summarizing definitions and a few defining constructs based on the previous research findings in this area. The authors have summarized around 30 definitions along with corresponding defining constructs. The article bridges the gap in the existing demand chain management definitions and major general vis-àvis specific defining constructs. The research papers reviewed came from selected databases, which, however, limits the external validity or generalizability of the findings to the whole existing literature on demand chain management. The review of existing literature was done to reduce the time and efforts of present and future researchers in this area by providing a quick snapshot of the existing definitions and major defining constructs that comprises demand chain management. Further, Q-sort technique was used to seek the most appropriate definition of demand chain management and its underlying constructs. Finally, it sums up with the identification research problem and avenues for future research.

Keywords: Demand Chain Management, Marketing, Supply Chain, Literature Review, Q-Sort Technique

Introduction

Most economies of the world have a market orientation. Rapid technological innovation, especially, in information and communication technologies, have transformed the world market. All these proved to be the impetus to the corporate honchos to perform in highly competitive environment. The recent changes have had a significant impact upon customary ways of understanding business and managing competition. Traditional business approach has evolved from product-led marketing philosophy to 'customer centricity'.

Thus, present market scenario of high market turbulence is like a hundred-meter-race where there is a one-pointagenda is to 'be leaner and faster than others'. In the race to be more competitive, firms need to enhance their market responsiveness capabilities (Agrawal, 2010). For this purpose, area that is increasingly coming under focus is that of value chain management and its subsets – supply and demand chain management (*vide figure 1*). Supply and demand chain management should be used proactively to enhance market responsiveness.



Figure 1. Supply and Demand Chain

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In the opinion of Rayport and Sviokla (1995) the value chain is basically comprised of a series of value-adding activities that connect a company's supply side (raw materials, inbound logistics, and production processes) with its demand side (outbound logistics, marketing and sales). By analyzing the stages of a value chain, managers have been able to redesign their processes - both internal and external - to improve efficiency. It is maintained by Chase (2001) in this connection that value chain of any business has two recognizable parts, namely, supply chain and demand chain (vide figure 1). It has become an accepted model of how companies reach outside their organization to form partnerships with various supply and demand chain members in cost efficient way. It is well taken by Walters (2002) that a supply chain concerns assets, information and processes that provide supply whereas the demand chain concerns all assets, information and processes that define demand. A value chain is a welding of the two. Demand Chain Management (DCM), is a business strategy that involves the synchronization of demand and supply through customer and partner collaboration across multiple customer and supply chain channels (Woods et al., 2002). The value chain and its subsets altogether explain the four types of flows i.e., value flow, goods flow, cash flow, and information flow.

Evolution of the Concept

The concept of Demand Chain Management (DCM) is relatively newer and suggests a different standpoint to look at the chains (Ericsson, 2011). It emanates from value chain (Porter, 1985; 1998) and along with supply chain management it constitutes the complete value chain (Chase, 2001). Some studies indicates that these two constituents of the value chain are similar (Christopher, 1998) while some observe it as a different entity which moves begins with the end user and goes backward to the manufacturer and the OEM suppliers (Ericsson, 2011a; Walters & Rainbird, 2008; Walters, 2008; Selen & Soliman, 2002). In order to develop insight into the concept the review here covers a literature survey beginning with supply chain management as these concepts are highly intertwined.

Literature Survey

Scanning the evolution of the concept of demand/supply chain management it is observed that traditionally,

economic activity has been viewed as being comprised of basic or core activities of production, distribution and finance (Shaw 1912 loc. cit. Ericsson, 2011b). Distribution comprises of both the creation of demand through promotional effort and logistics to ensure availability of goods and services to the customers. Distribution was separated into two distinct sets of activities called demand creation and demand fulfilment. In other words it could also be termed as physical distribution and marketing. Some studies pinpoint that the distribution part of the four Ps of marketing covers supply chain aspect (Bucklin 1966; Bodron, 1965; McCarthy, 1964). The distances between the concepts of same origin increased over a period of time. This might be due to develop independent efficiency and effectiveness. However, recent studies showing the reunion of these in the DCM concept which some studies (Hilletofth & Hilmola, 2008) referred to as DSCM (Demand- Supply Chain Management). The evolution phases of the concept of supply and demand chain are depicted in figure 2 which shows the pre 1960 phase viewed demand chain as a distributions function which was the domain of marketing which was later replaced by value with the advent of Porter's (1985) value chain. It was further felt by the experts to be specific to the activities and it was renamed with logistics management followed by supply chain and demand chain. However, one thing that has been common throughout the evolution phases is concepts and philosophies kept broadening the scope of business chains. A brief literature on evolution of the DCM or DSCM concept beginning with logistics to demand chain is presented below;



Figure 2: Evolution of Supply Chain and Demand Chain Management

(Source: Deshmukh and Mohan, 2016)

Heskett et al. (1964) defined logistics/physical distribution as "the movement and handling of goods from the point of production to the point of consumption or use." This

might be viewed as a typical approach to the physical flow of goods and/or services during the 1960s.

The Council of Logistics Management (1986) defined LM in the following way: "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 pointof-origin to point-of-consumption for the purpose of conforming to customer requirements." This definition comprehensively touches all aspect, however, emphasises more on up to downstream flow with less market orientation.

Later Oliver and Webber (1982) propagated the term "supply chain management" for the first time. Later, it drew the attention of academicians in late 1990; the academic development began describing SCM from a theoretical standpoint in order to clarify the difference from more traditional approaches to managing the flow of materials and the associated flow of information (Ellram et al. 1990 and Cooper et al. 1997a).

In order to clarify the difference between the traditional concept of logistics management and the newborn SCM several studies came to forefront and an intense discussion regarding similarities and dissimilarities between LM and SCM was initiated. Cooper et al. (1997a) performed an extensive review of the literature and management practice and asked the question: "What exactly is supply chain management and how is it different from logistics management?" Cooper et al. compared the Council of Logistics Management definition of logistics with the definition of SCM developed by members of the International Center for Competitive Excellence in 1994: "Supply chain management is the integration of business processes from end user through original suppliers that provides products, services and information that add value for customers." This definition shows a clear shift from various flows to business processes adding value through product, services and information.

Several other definitions also emerged. For example, the Council of Supply Chain Management Professionals defined SCM as follows: "SCM encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all LM activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party service providers, and customers. In essence, Supply Chain Management integrates supply and demand management within and across companies" (Council of Supply Chain Management Professionals 2009). This definition has a management focus and it explicitly refers to partners and the integration of supply and demand.

Recently Stock and Boyer (2009) developed a consensus definition of SCM after performing a qualitative analysis of 173 unique definitions of the field. They defined SCM in the following way: "The management of a network of relationships within a firm and between interdependent organisations and business units consisting of material suppliers, purchasing, production facilities, logistics, marketing and related systems that facilitate the forward and reverse flow of materials, services, finances and information from the original producer to final customer, with the benefits of adding value, maximising profitability through efficiencies, and achieving customer satisfaction." In this definition, the network of relationships and interdependency is highlighted.

Cooper et al. (1997a) give an excellent review of the literature and they illustrate the confusion that exists. They conclude that even though the concept of SCM first appeared in 1982, the fundamental assumptions on which SCM hinges upon are significantly older. These assumptions include managing inter-organisational operations, which can be traced back to channels research (Bucklin 1966) and systems integration research (Forrester 1969) during the 1960s, and the more recent ideas of sharing information and exchange of inventory for information (La Londe 1984). The conclusion of Cooper et al. (1997a) was that "it is clear that there is a need for some level of coordination of activities and processes within and between organisations in the supply chain that extends beyond logistics. We believe that is what should be called SCM." They summarised some commonalities in the literature, but they explicitly pointed out that confusion still exists in terms of what SCM actually is:

"It evolves through several stages of increasing intraand inter-organisational integration and coordination; and, in its broadest sense and implementation, it spans the entire chain from initial source (supplier's supplier, etc.) to ultimate consumer (customer's customer, etc.). It potentially involves many independent organisations. Thus, managing intra- and inter-organisational relationships is of essential importance. It includes the bidirectional flow of products (materials and services) and information, the associated managerial and operational activities. It seeks to fulfil the goals of providing high customer value with an appropriate use of resources, and to build competitive chain advantages."

The gradually evolving integration is also discussed by Stevens (1989) in his four stage model of increasing integration from Stage A, complete functional independence to Stage D, inter-organisational integration embracing tier 1 suppliers and customers. According to Stevens, Stage D is more than just extending the scope of the chain alone. "It embodies a change from productorientation to customer-orientation, ensuring that the company is attuned to the customer's requirements, and a change in the chain from the adversarial attitude of conflict to one of mutual support and cooperation." Hewitt (1994) furthered Stevens' model by suggesting an emerging new fifth stage (Stage E) which is integrated intra-company and inter-company supply chain process management. "The objective of optimisation initiatives, in this stage, is total business process efficiency and effectiveness maximisation" (Cooper et al. 1997a).

From cited statements on SCM, it appears that more functions than logistics have to be integrated internally and across firm boundaries. There is definitely a need for better integration of internal operations. New product development is possibly the clearest example of this, but also marketing, manufacturing, and finance have to be included along internal alignment. In addition to these internal functions there is a need to include external organisations in the product development process in order to reduce the time-to-market on new product introductions. Both, supplier involvement is important, and customer and consumer involvement is necessary.

Cooper et al. (1997a) stated that ". . . to implement SCM, some level of coordination across organisational boundaries is needed. This includes integration of processes and functions within organisations and across the supply chain. A driving force behind SCM is the recognition that sub-optimisation occurs if each organisation in the supply chain attempts to optimise its own results rather than to integrate its goals and activities with other organisations to optimise the results of the chain. Organisational relationships tie firms to each other and may tie their success to the chain as a whole." This statement highlights the need to look at the chain from a holistic point of view and discard the traditional "focal company" approach. One central question is- how to integrate the supply chain? Answering this Cooper et al. (1997b) identify four possible means of managing the integration of a supply chain, namely dyadic, channel integrator, analytic optimisation, and keiretsu. A dyadic approach concentrates on one level up or one level down and is often a starting place for developing an integrated supply chain. The other three can go further up/or down the supply chain.

With reference to several authors, Cooper et al. (1997b) states that ". . . the importance of building and managing relationships among members of the supply chain has been addressed by many authors. An integrated supply chain of partners without common ownership must be managed in a different manner from that of a single monolithic bureaucracy. Different forms of relationships are appropriate and not all links in the supply chain need to be partnerships. SCM partnerships will likely involve more processes and functions than integrated logistics management partnerships."

The mentioning of different forms of relationships and management issues are especially important for the discussion of Demand Chain Management. A literature review highlights two significant changes (Cooper et al. 1997b). "First, today's widely acknowledged and implemented process-orientation of business work activities de-emphasises the functional structure within and between organisations. Second is the significant change in the perception of SCM as being more than just logistics. It can be the management of all business processes."

Mentzer (2001) defined supply chain management as "the systematic, strategic coordination of the traditional business function within a particular company and across businesses within the supply chain, for the purpose of improving long term performance of the individual companies and the supply chain as a whole." This definition separates the functions concerned keeping a holistic perspective of the company.

Croxton et al. (2001) stated that "Increasingly, SCM is being recognised as the management of key business processes across the network of organisations that comprise the supply chain. While many have recognised

the benefits of a process approach to manage the business and the supply chain, most are vague about what processes are to be considered, and what sub-processes and activities are contained in each process, and how the processes interact with each other and with the traditional functional silos."

The shift from functions to processes stresses the necessity of identifying and defining core inter-organisational processes. Hewitt (1994) found that executives identified up to fourteen business processes and Cooper et al. (1997a) presented seven processes.

Fisher (1997) presented a breakthrough study which was a stepping stone to further development is the area of supply chain and paved the way for new way of thinking in the supply chain literature. In this study he answered a question 'what is the right supply chain for your product?' He classified the products in two categories- functional and innovative and suggested two respective supply chain types i.e. efficient and responsive which Christopher & Towill (2000) referred to as 'lean' and 'agile' supply chain.

The characteristics of agile supply chain appear to be akin to what researcher in this area began calling 'Demand Chain Management'. "Agility" is needed in less predictable environments where demand is volatile and the requirement for variety is high while "lean works best in relatively predictable environment with high volume, low variety (Christopher & Towill, 2000). Sharma and Bhat (2012) defines agility is about ability of an enterprise to respond quickly and efficiently to a volatile marketplace. However, some studies incorporate the importance of virtual interface and define "agility as using market knowledge and a virtual corporation to exploit profitable opportunities in a volatile marketplace" (Naylor, 1999 ibid 2012).

These studies put together gave birth to new thinking in supply chain philosophy. In recent years the notion of DCM has emerged as another means of looking at chain activities (Ericsson, 2011b). Despite the fact that DCM is a relatively new concept, it has already been defined in many different ways. A distinction may be made between two views of DCM, one broader and one narrower. In a broader sense, Selen and Soliman (2002) have defined DCM as "a set of practices aimed at managing and coordinating the whole demand chain, starting from the end customer and working backward to raw material supplier." It requires turning the supply chain on its head, and taking the consumer as the starting point rather than its final destination. The view of the consumer as an integral part of the chain is perhaps the most important issue in the shift from SCM to DCM. This definition seems to have its base in what Holmstrom, Louhiluoto, Perttu and Vasara, Antti, (2000) defined "the concept of the customer's demand chain, which transfers demand from markets to suppliers, is significantly less familiar." Another study (Heikkilä, 2002) defines in similar line "a chain starting the specific customer needs and designing the chain to satisfy these needs instead of starting with the supplier/ manufacture and working forward."

De Treville et al. (2004) criticise these broader views because they imply that the term demand chain could effectively replace supply chain, a change in nomenclature which they see as undesirable. Hence, they propose a narrower definition of DCM. Based on the distinction between the efficient physical supply and the market mediation roles of supply chains proposed by Fisher (1997), De Treville et al. suggest restricting the term to "market mediation supply chains." In these responsive demand chains for products with innovative demand, supply chain efficiency is traded off for customer service. Also, De Treville et al. define demand chain as a supply chain that emphasises market mediation to a greater degree than its role of ensuring efficient physical supply of the product.

Selen and Soliman (2002) highlight the holistic view of the chain when DCM is defined as extending the view of operations from a single business unit or a company to the whole chain. Essentially, DCM is a set of practices aimed at managing and co-ordinating the whole demand chain, starting from the end customer and working backward to raw material suppliers.

Heikkilä (2002) adds that supply chain improvement should start from the customer end, and that the concept of SCM should be changed to DCM. DCM highlights the need for good customer-supplier relationships and reliable information flows as contributors to high efficiency.

The most recently introduced approach of DCM attempts to capture the proposed synergies between SCM and marketing by starting with the specific customer needs and designing the chain to satisfy these needs, instead of starting with the supplier/manufacturer and working forward (Juttner, Christopher, & Baker, 2007; Heikkila 2002; Jüttner, Godsell, & Christopher, 2006; Rainbird, 2004). Such integration seems mandatory in today's marketplace, where customers benefit from having real-time access to their accounts, making real-time changes in their customised product configuration and communicating their individual service requirements. Rainbird, (2004) suggest a framework clarifying the movement of supply chain vis-a-vis demand chain (Vide figure 3).



Figure 3: Supply Chain and Demand Chain

Source: Mark Rainbird (2005)

The evolution of the SCM concept, as described above, demonstrates the shift from focusing a single process flow of logistics to focusing on several functions and processes. Cooper et al. (1997a) summarise that "... from the above discussion, it seems clear that there is a need to expand and re-conceptualise the definition and understanding of SCM. The new vision of SCM embraces all business processes cutting across all organisations within the supply chain, from initial point of supply to the ultimate point of consumption." This statement shows that SCM is an all encompassing concept covering everything. The problem is that if the concept covers everything, its usefulness becomes questionable.

In all the different definitions of logistics, SCM and DCM, there is a striking lack of reference to the necessity of considering the chains from the point of view of how they are structured and organised, what type of relationships exist and the interdependence that occurs. This was one of the major issues in the marketing channel literature (Ericsson, 2011b). If the concepts of LM, SCM and DCM are discussed in terms of types of relationships, dependence and interdependence, a much clearer view of when and how they should be used emerges. The notion of business logistics evolved during the 1960s in order to fit the then existing environment. The marketing channel consisted of rather loosely connected companies working

autonomously. The focus was on efficient physical flows in rather short termed transactional relations.

During 1980s when economic slowdown captured the market there was a need for integration which goes beyond physical flows across company boundaries; and the need for SCM concept was felt. Competition gave impetus to a closer alignment between demand creation (historic domain of marketing) and fulfilment (domain of supply chain) processes.

According to Christopher (1992), "leading edge companies have realised that the real competition is not company against company, but rather supply chain against supply chain." There is a need for a more holistic approach to the marketing channel and focus on partnerships and interdependent relations. This is where DCM fits in. DCM is not a replacement of SCM, it is one very distinct set of relationships (partnerships) that fit into the broad concept of SCM or DSCM (Hilletofth & Hilmola, 2008; Huttunen et al. 2000, Korhonen et al. 1998, Williams et al. 2002). The advantage is that DCM, in this interpretation, is quite well defined and useful in practical applications.

In order to systemise and structure the approach to the SCM concept and provide a scientific and sound basis for development of the DCM concept as it is defined here, a rather thorough review of the marketing channel research is provided. (Ericsson, 2011b) maintains that the origin of the DCM concept from vertical marketing system (VMS) which is discussed at length in his study. There are some theories contributing to the development of the concepts which began with logistics and now discuss about the mass customization. The theories or approaches have come from systems dynamics, time compression, lean thinking, business process re-engineering, agility, mass customisation and the virtual organisation (respectively: Forrester, 1961; Stalk & Hout, 1990; Womack & Jones, 1996; Hammer, 1990; Kidd, 1994; The Economist, 2001, Davidow & Malone, 1992, loc. cit. Riccardo, Hines, Silvi & Bartolini, 2012).

Demand Chain Management

The marketing concept can be considered as the necessary foundation to the demand chain concept. The marketing approach advocated that companies should plan their production in the context of consumer wants and needs and not just manufacturing capability. This new philosophy recommended focusing on the customer. The marketing

orientation has radically shifted from hard-core sales to the customer centricity and also the supplier relationship.

The concept of "demand chain" effectively emerged in 1997 when Fisher considered the limits of purely cost/ efficiency-focused Supply Chain. It was further validated by Christopher (1998) and suggested that:

"It should be argued that it (Supply Chain Management) should be termed as "Demand Chain Management" to reflect the fact that chain should be driven by the market, not by suppliers....."

Since then, the demand chain concept has attracted tremendous attention but, as with the supply chain, no universally agreed definition has emerged. However, some researcher attempted to define it as a part of the supply chain and emphasize the market mediation function (Eschebacher and Knirsch et al. 2000, Treville and Hameri 2004), whereas other authors prefer to treat as separate chain that considers demand from market to suppliers (Huttnen et al 2000, Korhonen et al. 1998, Williams et al. 2002). Based on these arguments Langabeer and Rose (2001) propagated the relationship between the two (vide Table 1).

Describing demand chain Chase (2001) argues that the demand chain begins with your customer, and then funnels through any resellers, distributors and other business partners who help sell your company's products and services. The demand chain includes both direct and indirect sales forces. Another definition suggested by Chase (2001) is- demand chain is meant by your customer, your customer's customer, the network of direct and indirect marketing sales and service professional that provide you with the capability to get, keep, and grow profitable customer relationship better, faster, and bigger.

Table 1:	Supply	Chain and	Demand	Chain
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Supply Chain	Demand Chain
Efficiency focus	Effectiveness focus
Processes are focused at ex- ecution	Processes are focused on planning and delivering value
Cost is the key driver	Cash flow and profitability are the key drivers
Short term oriented, within the immediate and control- lable future	Long term oriented, within the next planning cycles

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Supply Chain	Demand Chain	
Typically the domain of tacti-	Typically the domain of mar-	
cal manufacturing and logis-	keting, sales and strategic op-	
tics personnel	erations managers	
Focuses on immediate re-	Focuses on long-term capa-	
sources and capacity con-	bilities, not short term con-	
straints	straints	
Historical focus on opera- tions planning and controls	Historical focus on demand management and supply chain alignment	

(Adapted from Langbeer and Rose, 2001)

In line with Langbeer and Rose (2001) Ming-Hon and Hsin (2007) (loc. cit. Rutsch et al., 2009) construe the main difference between demand chain management and supply chain management, as in a supply chain control procedures move from upstream to downstream whereas in demand chain management control is running from downstream to upstream (vide Table 1).

Moreover, Demand chain alignment integrates the demand creation (historic domain of marketing) and demand fulfilment processes (domain of supply chain management), to develop and to deliver products that convey superior customer value while deploying resources efficiently (Juttner, Godsell, Christopher, 2006). However, some researchers (Juttner, Christopher and Baker, 2007) see demand chain management as the integration between the marketing and the supply chain management. And other are of view that demand chain management is an information technology (IT) led strategic concept (Agrawal 2010) which enables firms and their resellers to respond to rapidly changing wants and conditions that affect demand (Caruso, 2003). According to Blackwell and Blackwell (1999), the essence of demand chain management is to define and understand customer demand on real time basis followed by rapid respond to it.

Methodology

Demand Chain Management is an emerging idea taking shape in supply chain and marketing literature, therefore, with some keyword search through various databases we could find a total of 205 relevant papers/ articles, of them 65 papers were picked on the basis of content analysis based on their relevance to the definitions and corresponding constructs of demand chain management. These selected papers were then critically analyzed to explore the constructs and definitions propounded by different scholars. The online databases that were accessed for this study were (1) Google Scholar, (2) Proquest, (3) Science Direct, (4) Emerald Full Text, (5) EBSCOhost, (6) InderScience and other online and digital bibliographical resources of Banaras Hindu University (BHU), Varanasi, IIM, Ahmadabad and Lucknow. The study follows mostly qualitative approach as it is more apt when the phenomenon of interest is new, dynamic or complex, relevant variables are not identified and extant theories are not available to explain the phenomenon (Creswell, 1998; Kotzab et al., 2005, Golcic et al., 2005).

In addition, Q-sort technique (Stephenson, 1960) was used to find out the appropriate definition of demand chain management and its underlying constructs. As opined by the scholars with construction Q-sorting we either build a theory or embody or epitomize theories (Kerlinger, 1978) and also the theoretical propositions are tested (Stephenson, 1960). In order to apply Q technique the researcher developed a Q sort questionnaire which contained the five research constructs including demand chain management. Each construct comprised of at least ten statements as qualifying proposed definitions identified through a thorough literature review. These Q-sort questionnaires have been distributed among 42 experts (both from academia and industry) for their valuable input. Of these 35 respondents returned the filled in questionnaire. The information so collected was then analyzed using MS-Excel 2007.

Further, to validate the results the researcher factor analyzed the data collected from another sample of 153 respondents mostly academicians. The detailed results of factor analysis are discussed in the findings and conclusion section.

Defining Demand Chain Management

As the concept of demand chain management is an emerging one, it needs clarity from definitional standpoint so that it helps the researcher coming out with an operational definition of the same. The Table 2 mentioned below shows how the term demand chain has been defined by various researchers.

S.N.	Author	Study Title	Definition of DCM
1	Vollman (1996)	Supply Chain Management	The idea of demand chain management is based on the princi- ple of using demand instead of supply as the factor integrating the information needs in the supply chain.
2	Vollmann & Cordon (1998)	Building successful customer supplier alliances	DCM starts with the customers working backward to the sup- pliers of the suppliers. The objective is to create synergies in the overall chain to achieve larger benefits that are possible by each entity in the chain acting independently.
3	Korhonen et al. (1998)	Demand chain management in a global enterprise-informa- tion management view	The key in demand chain management is the continuous flow of the demand information from customers and end users through distribution and manufacturing to sup- pliers. The shared objec- tive of the chain is fulfilling customer demand.
4	Blackwell, and Black- well (1999)	The century of consumer: Converting Supply Chains into Demand Chains	Demand chain represents a circular process that from consum- ers' mind to the market. It encompasses all the supply chain entities including manufacturer, distributors, retailers, and so on that may be involved in that process.
5	Holmstrom, et al (2000)	The other end of supply chain	The concept of the customer's demand chain, which transfers demand from markets to suppliers.
6	Vollman, et al., (2000)	Teaching supply chain man- agement to business execu- tives.	a practice that manages and coordinates the supply chain from end customers backwards to suppliers (p. 82).
7	Chase, (2001)	Beyond CRM: The critical path to successful demand chain management	It include your customers, your customers' customers, the net- work of direct and indirect marketing, sales, service profes- sionals that provide you with capability to get, keep, and grow profitable customer relations better, faster, and bigger.

Table 2: Defining Demand Chain Management

<i>S.N</i> .	Author	Study Title	Definition of DCM
8	Lee, and Whang. (2001)	Demand chain excellence: A tale of two retailers	Demand chain means having a good grasp of customer de- mands—a Table 2: Defining Demand Chain Management nd having a responsive system to meet those demands in a timely and cost-effective manner.
9	Shankar (2001)	Integrating Demand and Sup- ply chain management	DCM is an integrated value provider by developing simultane- ous excellence in SCM and CRM and by pursuing new value proposition in the demand –supply chain.
10	Heikkila, (2002)	From supply to demand chain management: efficiency and customer satisfaction	The chain starting with the specific customers needs and de- signing the chain to satisfy these needs, instead of starting with the supplier/ manufacturer and working forwards.
11	Williams, Maull, & El- lis (2002)	Demand chain management theory: constraints and devel- opment from global aerospace supply webs	The management of supply production systems designed to promote higher customer satisfaction levels through electronic commerce (EC) that facilitates physical flow and information transfer, both forwards and backwards between suppliers, man- ufacturers, and customers.
12	Selen and Soliman, (2002)	Operations in today's demand chain management framework	is a set of practices aimed at managing and co-ordinating the whole demand chain, starting from the end customer and work- ing backward to raw material suppliers (p. 667)
13	Lee (2002)	Demand Chain Optimization: Pitfalls and Key Principles	A demand chain is a network of trading partners that extends from manufacturers to end consumers. The partners exchange information, and finished goods flow through the network's physical infrastructure.
14	Agrawal et al., (2002)	Efficient Customer Response by Web based Demand Chain Management	The emphasis of demand chain is on optimization of distribu- tion-related functions of marketing and its coordination with other value addition processes in the value chain.
15	Rainbird, (2004)	Demand and Supply chains: The Value Catalyst	An understanding of current and future customer expectations, market characteristics, and of the available response alterna- tives to meet these through deployment of operational process- es.
16	Agrawal et al,. (2004)	Optimizing finished goods in- ventory across demand chain under uncertainty	Demand chain management is the process of managing the flow of materials and information across distributed business pro- cesses for the purpose of profitably responding to and satisfying market demand.
17	De Treville et al (2004)	From supply chain to demand chain: the role of lead time re- duction in improving demand chain performance	A demand chain is a supply chain that emphasizes market me- diation to a greater degree than its role of ensuring efficient physical supply of the product.
18	Langabeer and Rose (2001)		The complex web of business processes and activities that help firms understand, manage, and ultimately create consumer de- mand (loc.cit. Rainbird & Rainbird, 2005).
19	Jüttner, Godsell and Christopher (2006)	Demand chain alignment com- petence — delivering value through product life cycle management	the approach should neither be marketing nor supply chain- driven but requires an aligned process management approach, the term demand chain is proposed. The demand chain focuses on the alignment of marketing and supply chain management processes and takes a long-term, competence development view.
20	Canever (2006)	From Fork to Farm - Demand Chain Management in the Agro-Food Business: With Ap- plication to the Rio Grande do Sul Beef Business	DCM is a new paradigm in the business terrain, and it was defined in this study as: the business practice aimed at under- standing and managing the customer demand and at aligning all activities throughout the chain that simultaneously create both customer and enterprise values

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S.N.	Author	Study Title	Definition of DCM
21	Agrawal (2007)	Demand Chain Management: Issues and Initiatives in India	DCM is based on "sense and respond" philosophy that focuses on acquiring new capabilities required for quick response and offer maximum customer value in the dynamic market scenario.
22	Juttner et al, (2007)	Demand Chain Management- Integrating Marketing and Supply Chain Management	DCM as a macro-level process which includes all activities that companies undertake in their quest to create and deliver need- based customer value propositions.
23	Shaw et al, (2009)	Demand Chain Management: An integrative approach in au- tomotive retailing	It is the mirror image of the supply chain, and contains all the activities that result in demand being stimulated.
24	Liao, et al,(2009)	Mining demand chain knowl- edge of life insurance market for new product development	Extending the view of operations from a single business unit or a company to the whole chain. Essentially, demand chain man- agement focuses not only on generating drawing power from customers to purchase merchandises on the supply chain; but also on exploring satisfaction, participation, and involvement from customers in order for enterprises to understand customer needs and wants.
25	ETIG (2009)	Demand driven supply chain- A holistic approach	Demand-driven supply chain includes improved demand fore- casting, integrating forecasting and demand management, and, collaborative approach with profitability as prime objective.
26	Agrawal (2010)	Demand Chain Management	It involves capturing the demand related information by market sensing and followed by rapid respond to it. It follows sense- and-respond philosophy.
27	Ericsson, (2011)	Demand Chain Management- The Evolution	An integrated and aligned chain built on partnership and mutual interdependence aiming at creation of a unique competence to identify and satisfy customer perceived value, while DCM may be defined as the effort to create, retain and continuously de- velop a dynamically aligned demand chain.
28	Gartner (2011)	Demand Driven Value Chains	A system of technologies and processes supply that sense and respond to real time demand signals across a supply network of customers, suppliers and employees.
29	Hines and Bartolini, (2012)	Demand Chain Management : An integrative approach in au- tomotive retailing	An integrated approach aligning Process Based Lean Manage- ment, Strategic Cost Management, Marketing and Policy De- ployment which ultimately enables enhanced value addition.
30	Ericsson (2012)	Demand Chain Management- The Implementation	A subset of SCM that focuses on the specific approach needed to create supply chains based on strategic partnership and common goals and values.

After reviewing several definitions of demand chain management the researcher summarized and grouped in Table 3. Also, the key constructs from various definitions were identified and the definitions were grouped based on commonality. DCM implies the information sharing, level of integration/relationship, customer service, supply chain responsiveness/agility between retailer and its upstream suppliers which are taken as the constructs to be addressed in this study (vide Table 2).

Table 3. Key Research Constructs of Demand Chain Management

Research	Key Indicators	Scholars Definitions
Constructs		
Customer Service	Value Proposition	Canever(2006), Juttner, Uta, Christopher, Martin, and Baker, Susan (2007), Liao, Chen, & Tseng, (2009), Ericsson, D (2011), Agrawal, et al, (2002), Williams, Maull, & Ellis, (2002), Heikkila,(2002)
Responsiveness/ Agility	Sense and Re- spond Philosophy	Rainbird,(2004), Lee, & Seungjin, Whang. (2001), Blackwell, & Blackwell (1999), Agrawal, (2010), Agrawal, (2007), Gartner (2011), Shaw, Robert & Kotler,(2009)

Research	Key Indicators	Scholars Definitions	
Constructs			
Suppliers Rela- tionship Manage- ment	Collaboration/ Partnership/ Rela- tionship	Vollmann & Cordon, (1998), Blackwell, Roger & Blackwell (1999), Holmstrom, Louh- iluoto, & Vasara, , (2000), Vollmann, Cordon, Heikkila (2000), Chase, (2001), Shankar (2001), Selen, Soliman, (2002), Lee, (2002), ETIG (2009), Ericsson, (2011), Hines Bar- tolini, (2012), Ericsson, (2012)	
Information Management	Internal Coordina- tion	Jüttner, Godsell & Christopher (2006), Canever(2006), Langabeer and Rose (2001)	
	Information Man- agement	Vollman (1996), Vollmann & Cordon, (1998), Korhonen,, Huttnen, & Eloranta, (1998), De Treville, Shapiro & Hameri (2004)	

Application of Q-Sort Technique

This technique assumes that demand chain management is theoretically multidimensional concept. It has been variously defined by scholars and mentioned in the previous section. After an extant literature survey some key constructs from the definition have been identified and they are further used to validate their relevance with the demand chain management concept per se. These constructs are illustrated in Table 3. To begin with the major research construct demand chain management per se has been defined using Q-sort technique followed by the underlying key constructs such as supplier relationship management, information management, customer service leading to relationship, and supply chain agility or responsiveness.

The objective of the study is to illustrate whether the research construct (demand chain management) and its aforesaid four dimensions could be verified. Based on the studies of Rainbird (2004), Heikkila (2002), and Christopher (1998) the Q-sort comprises ten definitions and a total of 50 statements representing four dimensions were given to the respondents of industry vis-a-vis academic scholars. The respondents were then asked to rank the definitions under these dimensions on the scale of 1 to 10 where 1 is the most preferred definition and 10 is the least preferred one.

Sampling

Previous studies reveal that although it is possible to use Q-sort technique with one individual (Kerlinger, 1986), however, it is better, if there are as many subjects as possible as it could have some bias towards small sample sizes and single case studies (McKeown and Thomas, 1988). Following Brown (1986) the size between 30 to 50 is usually more than adequate for applying Q-sort method. Therefore, in the present study we selected 35 retail industry experts and academics as respondents. Based on the similarity and relevance the respondents made sorting with each group corresponding to a factor or dimension the statements were grouped.

Findings

The results of Q-sort technique presents the frequency of qualifying to non-qualifying statements for the sample. The outcome of Q-sort technique is a set of 25 statements with at least four consigned to each dimension as defined in Table 4 and 5. It could, therefore, be inferred that all the dimensions used in the study are valid. The Table 4 illustrates the total number of statements considered in the Q-sort questionnaire i.e., 50 of which 25 statements qualify as definition while rest were summarily rejected. In order to qualify for defining the constructs under consideration the criterion is that a statement must secure the consensus of 70 per cent or more samples. After analyzing the data so obtained it is evident that these constructs exists.

Table 4. The Overall Results from Q-sort Technique

Final Statistics	Number of items
Statements placed on dimensions	
Qualifying Statement (Item > 0.70)	25
Rejected Statements (Item < 0.70)	25
Total	50

The information given in the aforesaid tables can be interpreted in a sequential way taking each construct into account. To begin with demand chain management itself the expert respondents supported that DCM may be referred to as "a system of technologies and processes that sense and respond to real time demand signals across a supply network of customers, suppliers and employees." As a statement it secured highest consensus among all which gives an indication that it is more of a philosophy that encapsulates information based coordination among the supply chain partners. Whereas the second statement indicates the supplier relationship dimension followed by the information management aspect in third one.

Table 5:The Qualifying Statements for Demand
Chain Management

SN	Demand Chain Management	Frequency (%) n=35
1	A system of technologies and processes that sense and respond to real time demand signals across a supply net- work of customers, suppliers and employees.	0.93
2	An aligned chain built on partnership and mutual inter- dependence among the chain partners aiming at creation of unique competence to iden- tify and satisfy customer per- ceived value.	0.90
3	It is the continuous flow of the demand information from the customers and end us- ers through distribution and manufacturing firm to sup- pliers.	0.85
4	A practice of developing si- multaneous excellence in SCM and CRM with a view to provide new value proposi- tion to the end user.	0.80
5	It is the mirror image of the supply chain and contains all the activities that result in demand stimulation.	0.73
6	It emphasizes on optimization of distribution related functions of marketing and its coordination with other value adding processes of the value chain.	0.70

Table 5A.The Qualifying Statements of Supply
Chain Agility

SN	Demand Chain Management	Frequency (%) n=35
1	Agile supply chain combines demand side responsiveness and supply side disruption.	0.85
2	The ability to respond quick- ly to change in the marketing environment.	0.82
3	An operational strategy fo- cussed on inducing velocity and flexibility.	0.80
4	It requires a company (Re- tailer) to be dedicated in its response to the changing needs of the market (Time to Market).	0.75
5	An acquired strategic ability of supply chain to deploy and redeploy its resources effec- tively in response to changing conditions.	0.70
6	Ability and willingness to shorten lead times/ cycle time.	0.70

Table 5B: The Qualifying Statements ofInformation Management

SN	Information Management	Frequency (%) n=35
1	A process of managing the bi- directional flow of informa- tion across the supply chain.	0.86
2	It enables supply chain part- ners move up from transac- tional through collaboration mode to decision support sys- tem mode.	0.81
3	An art of aligning/ integrating the entire chain both internal- ly vis-à-vis externally.	0.76
4	A process of getting, sharing, analyzing and responding to demand information obtained through ICT tools and tech- niques.	0.72

Table 5C:The Qualifying Statements of CustomerService Management (CSM)

SN	Customer Service Management (CSM) leading to Relationship	Frequency (%) n=35
1	A proactive business strategy aimed at satisfying customers through val- ue creation and delivery and gaining competitive advantage by creating long term customer relationship.	0.80
2	A unifying factor for integrating marketing and logistics, and that the performance of marketing and logistics activities creates the cus- tomer service.	0.75
3	Services offered to customers by a company during pre-transaction, meanwhile transaction and post transaction.	0.73
4	Those functions within a business that have customer satisfaction as their responsibility and provide that satisfaction through the fulfilment of sales order demand and/or infor- mation need.	0.70

Table 5D:The Qualifying Statements of SupplierRelationship Management

SN	Supplier Relationship Management (SRM)	Frequency (%) n=35
1	SRM entails creating closer, more col- laborative relationship with key suppli- ers in order to uncover and realize new value and reduce risk.	0.92
2	A relationship strategy aimed at effi- ciency (i.e., cost reduction) and effec- tiveness (customer service).	0.90
3	A web of communication and trust that binds the channel partners for long term mutual gains.	0.85
4	These processes comprise the design collaboration, sourcing, negotiation, buying and supply collaboration pro- cesses.	0.83
5	An ability of getting, keeping, and growing long term collaborative relationship with suppliers.	0.70

Supply chain agility (*vide Table 5A*) being one of the key constructs can be defined with the combination of

responsiveness and disruption in demand and supply side respectively. The second statement reveals that it as an ability of an organization to respond quickly to change in marketing environment while the other says it is an operational strategy infusing flexibility. Another construct of information management (*vide Table 5B*) can be defined as bi-directional flow of information across SC, a decision support system, an internal vis-a-vis external integration.

Customer service management leading to relationship (vide Table 5C) dimension was described better as "a proactive business strategy aimed at satisfying customers through value creation and delivery and gaining competitive advantage by creating long term customer relationship." It indicates the focal firm's relationship with downstream customers which integrate the marketing and logistics to ensure better customer service. The last key constructs of DCM is supplier relationship management (SRM) (*vide Table 5D*) dimension which entails collaborative link with upstream key suppliers for attaining efficiency and effectiveness that ensures long term mutual gains.

A Principal Component Analysis (PCA) with varimax rotation of 25 of the 36 Likert scale questions from this survey questionnaire was conducted on data gathered from 153 participants. An examination of the Kaiser-Meyer Olkin measure of sampling adequacy suggested that the sample was factorable (KMO = .780).

The results of an orthogonal rotation of the solution are shown in Table 6. When loadings less than 0.50 were excluded, the analysis yielded five-factor solution (factor loadings =>.50).

A total of six items loaded onto Factor 1. It is clear from Table 6 that these six items or definitions, all relate to Demand Chain Management (DCM). This factor loads onto reported level of sense and respond system, supplier partnering, information management supply chain agility or responsiveness etc. This factor was labelled, "Demand Chain Management".

Six factors load onto the second factor which is related to the supply chain agility or responsiveness. This is related to a blend of demand side responsiveness and supply side disruption, ability to respond quickly to the changes in the marketing environment, a strategy entailing both velocity and flexibility, optimized time to market, and an ability to shorten lead time. This factor was labelled "Supply Chain Agility".

Table 6: Factor Analysis Output

SN	Components	DCM	SCA	IM	CSM	SRM
1	A sense and respond system.	.717	.153	.074	.210	018
2	An aligned partnership for better perceived customer value.	.650	.181	.223	.174	.092
3	A continuous two way flow of the demand information.	.648	075	.379	.058	130
4	A synergy of SCM and CRM	.611	.060	.407	.079	.141
5	A mirror image of the supply chain with demand stimulation mechanism.	.530	.080	.494	155	.179
6	A subset of value chain.	.512	.195	.100	.173	.100
7	Agile supply chain combines demand side responsiveness and supply side disruption.	.485	.635	078	.219	.364
8	The ability to respond quickly to change in the marketing environment.	.436	.624	073	.086	.016
9	An operational strategy focussed on inducing velocity and flexibility.	.134	.617	.129	.068	.065
10	Optimized time-to-market	.211	.522	.114	.351	080
11	An acquired strategic ability	.246	.517	.193	121	.394
12	Ability and willingness to shorten lead times/ cycle time.	.085	.505	.165	.226	.212
13	A process of managing the bi-directional	034	.067	.770	.285	.317
14	It enables supply chain partners move up from	.065	.227	.660	.008	.143
15	An art of aligning/ integrating the entire chain	.108	095	.590	.147	097
16	A process of getting, sharing, analyzing and responding	.240	.238	.530	084	.219
17	A proactive business strategy aimed at satisfying customers	.199	.201	.498	.742	261
18	A unifying factor for integrating marketing and logistics	.146	.137	.487	.660	.298
19	Services offered to customers by a company during pre-transaction, mean- while transaction and post transaction.	.151	.029	.201	.541	.037
20	Those functions within a business that have customer satisfaction	.124	.240	.100	.536	.153
21	SRM entails creating closer, more collaborative relationship	.243	.405	.414	.371	.703
22	A relationship strategy aimed at efficiency	.040	.373	116	.384	.701
23	A web of communication and trust that binds the channel partners for long term mutual gains.	.115	.081	009	.219	.611
24	These processes comprise the design collaboration	.266	.151	.164	.389	.504
25	An ability of getting, keeping, and growing long term	.168	075	.100	.063	.501
	Eigen values	6.977	1.983	1.389	1.178	1.054
	Percentage of Total Variance	27.906	7.933	5.554	4.712	4.216
	Number of Test Measures	6	6	4	4	5

The four items load onto Factor 3 relate to management of information across supply chain. It refers to the degree to which the supply chain partners share their proprietary business information which is necessary to meet the customer demand on time. This enables aligning all the partners in a chain. This factor was labelled "Information Management".

The four items that load onto Factor 4 identify how various aspects of customer service contribute to the DCM. This was labelled "Customer Service Management". It refers to the pre-transaction elements, transaction, and posttransaction elements that focuses on customer satisfaction.

The five items loaded for Factor 5 related to the strength of relationship among the supply chain partner. This is another key dimension of DCM. This was labelled, "Supplier Relationship Management".

Conclusion and Future Research

Several researches have been done till date focussing the emerging concept of demand chain management

(DCM) and its related aspects. Most of them have been conceptual and exploratory in nature which ended up with propositions to be converted into hypotheses, and need empirical testing. This called for a descriptive study which can integrate the constructs and variable studied by the researches hitherto. The aforesaid study was an attempt at touching various aspects of demand chain management and identifying its key constructs and thereby defining them properly for future research.

The purpose of this paper has been to investigate a consensus based operational definition of demand chain management and its key constructs through a literature survey followed by Q-sort technique. In order the validate the results of Q-Sort analysis which was pre-dominentsly qualitative the study applied exploratory factor analysis. The results of the analysis clearly revealed that the definition proposed in the literature defines the underlying construct. Also, it signifies that these core construcs that makes demand chain management are- Information Management, Supply Chain Agility, Customer Service Management, and Supplier Relationship Management. With the help of literature several contradicting definitions were found out which were summarized and grouped under various head. These heads were then identified as the defining constructs of DCM. With the help of Q-sort technique the definition of these constructs was attempted. Another purpose of applying Q-sort was to pre-validate the constructs. It being a scientific method enables in scale development. The goal of the Q-sort is to match the proposed statements with the appropriate constructs and contexts. By using the emerging concept of demand chain management, a scaled questionnaire could be used to check the reliability and validity of the dimensions and constructs. In this study the Q-sort help identifying the qualified statements for the constructs and dimensions. However, it should be noted that q-sort is just a preliminary scale development technique and not the complete process, and therefore, it should be viewed as a tool to improve internal consistency reliability in the overall scale development process.

Besides investigating the consensus based definition of the research construct (DCM) and the dimensions the paper outlines the use of Q-sort technique which may be used by the supply chain scholars in scale development especially for relatively new constructs so that the reliability and validity of the instrument may be ensured. It is more apt if scholars will use this method instead of just applying an

expert opinion or pilot questionnaire to probe validity of their final questionnaire.

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