LINKAGES BETWEEN INNOVATION, SERVICE AND NETWORK WITHIN SUPPLY CHAIN: A CRITICAL REVIEW

Jayant Kumar Panigrahi
School of Mechanical Engineering, KIIT University, Bhubaneswar, India

Sushanta Tripathy
School of Mechanical Engineering, KIIT University, Bhubaneswar, India

Biswajit Das
KIIT School of Management, KIIT University, Bhubaneswar, India

ABSTRACT

There is an emerging acknowledgment that value creation takes place in any organization that produces something, it becomes an input to a process within a business network. SCM researchers analyzed how value is created and productivity is enhanced in the organization. Innovation, Networks, Services are key topics interlinked to explore processes associated to service innovation within supply networks from a multidisciplinary perspective. Certain underpinnings for each topic offer a rationale for interlinking. Since Schumpeter’s works (1939, 1943), it has been said that innovation offers an opportunity for prosperity. Scholars demonstrated that networks play a critical role in innovation and knowledge transfer. Also the significant growth of services during the current century across globe is interpreted as a call to enhance.

This research paper is a critical review of innovation processes within a supply network, which is the subset of business networks interacting within the services sector. Specifically, this will contribute to eliciting how Innovation, Service and Network within a supply chain are key to promoting dynamic service innovation and benefits within the supply chain.

Keywords: Supply Chain, Value Creation, Innovation, Services, Networks

Cite this Article: Jayant Kumar Panigrahi, Sushanta Tripathy and Biswajit Das, Linkages between Innovation, Service and Network within Supply Chain: A critical review, International Journal of Mechanical Engineering and Technology 8(9), 2017, pp. 32–44.
http://www.iaeme.com/IJMET/issues.asp?JType=IJMET&VType=8&IType=9
1. INTRODUCTION:
Most SCM articles and textbooks focus on the source, flow and control of materials (Larson and Halldorsson, 2002), addressing internal flows (Harland, 1996) or searching for the possibility of synchronizing supply, demand and innovation processes (Cecere et al., 2004). These three broad perspectives are also mostly focused on the movement of goods and addressing services they are portrayed as intangible goods.

Figure -1 synthesizes findings by Stock et al. (2010), who hold the 166 definitions analyzed were unique. Although no other definition is proposed, Stock et al. (2010) consider the most frequently cited definition is that offered by the Council of Supply Chain Management Professionals (CSCMP) on its website: “Supply chain management encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management 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.”

![Figure 1](image1.png)

Source: Author’s development based on (Stock et al., 2010, p.34)

In spite of differences in the origin of SCM and its broad perspectives, it is clear that the focus was on goods rather than services.

2. LITERATURE REVIEW:
SCM academics have already pointed to research opportunities in studying the value creation process at network level. For instance, fifteen years ago, Lambert, Cooper and Pagh (1998), introduced the network structure as one of three key elements in a proposed SCM framework; but their argument still had a linear perspective from initial suppliers to end customers. Some years later, Harland, Jurong, Johnsen and Lamming (2004) proposed a conceptual model to understand supply networks. They built upon works from different fields, and synthesized literature related to nine networking activities; stressing that knowledge capture through inter-organizational learning is a key to innovation, their list of networking activities did not explicitly include innovation, a topic of particular interest in this research.

Marketing scholars addressed some research related to SCM in the late 1990s (Joshi, 1998), although focused on the imbalanced relationship between a powerful supplier and a buyer. Central to their argument was a holistic SCM view and the possibility of multiple points of contact between a supplier and a buyer. The emphasis has been on cost reduction;
although the relationships are leveraged, responsibility for delivering value is placed not at network level.

Networks have been identified as the closer representation for complex systems of entities interacting when doing business (Todeva, 2006, Battini et al., 2007); but in SCM, their study has been largely limited to linear chains (Kemppainen and Vepsäläinen, 2003), dyads (Chen and Paulraj, 2004) or in very few instances, to the network’s minimum unit, the triad (Choi and Wu, 2009a). The aforementioned efforts to increase productivity, efficiency and optimization, were handled by simplifying the supply network.

SCM works, especially during last century, focused on the chain rather than the network. Maybe as a natural development, new paths have been pursued since 21st century. One of these paths includes organization theory in supply chain research (Miles and Snow, 2007); another addresses both the network concept and relationships issues (Humphries et al., 2007, Ireland and Webb, 2007, Lazzarini et al., 2008, Choi and Wu, 2009b, Li and Choi, 2009, Villena et al., 2011).

As shown in Figure 1, Stock et al. (2010) stated that in 71% of the SCM definitions they used, “networks of relationships” (p.41) was a component of the activity sub-themes they identified. Among activities they mentioned are management and coordination of members. However, a limitation of their study is its linear focus on relationships, and the value added idea following a goods dominant logic. Over the past ten years, several studies have reflected interest in studying interactions among supply chain members at the network level.

This research focuses its attention, first, on Harland et al. (2004), who built on their previous work as a research team; and second, on papers related to social networks. Given the role people play under the social-constructionism paradigm used in this research, interactions among people in either a business network or a supply network may feature similarities to certain interactions taking place in a social network context.

Papers related to social networks highlight their dynamic nature, noting that “networks should be studied over time and not as stagnant structures” (Galaskiewicz, 2011, p.4). One such paper is focused on knowledge management (Capó-Vicedo et al., 2011), while is centred on types of social relationships (Galaskiewicz, 2011). However, Molina-Morales and Martínez-Fernández (2009) had already challenged that close and stable relationships can only have positive effects on the network, particularly on innovation processes.

In an effort to bring together supply chain management and social networks, Afrazeh and Zarinozv (2010) propose a framework in which knowledge sharing by human beings lies at the core of the process; they also hold that informal networks “played a critical role in getting important work done in organizations” (p.229).

SCM literature dealing with networks is still being developed. Acknowledgement is made of the importance of inter-organizational relationships, collaboration, cooperation, commitment, open sharing of information and coordination (Zylbersztajn and Farina, 1999, Hanf and Dautzenberg, 2006, Derrouiche et al., 2008), but the analysis remains predominantly linear. Studies have highlighted the importance of organizational processes (de Vries and Huismans, 2011) and their links to issues of collaboration and trust. Lusch (2011), noted that “a view is emerging that is refocusing SCM on partnerships, relationships, networks, value creation and value constellations” - a view that could serve as a potential trigger for cross work between SCM. The interactive network orientation is already recognized in marketing as a substitute for the predominant dyadic perspective (Vargo and Lusch, 2011).
3. STUDIES ON TRIADS:
Triads are defined as “subsets of three network actors and the possible ties among them” (Madhavan et al., 2004, p.918), noting that although triads are important in studying networks—because they are located between the dyad and are more complex—such structures have received little attention among SCM researchers. Choi et al. (2009a) went further, defining the triad as “the smallest unit of a network arrangement where it is possible to examine how a node affects another node and how a link affects another link” (p.263). They also note that although most of the work in SCM has been on dyads, the “dyads are inadequate in capturing the interactive nature inherent in a network” (p.265).

Given the issues raised in the above discussion of networks and triads, it follows that there is a need to better understand multiple links at multiple levels in SCM chains and networks, rather than just dyads or inter-firm relationships (Giunipero et al., 2008). However, it has been noted that firms are deliberately involved in delivering value by building both dyads and networks through strong alliances without leaving aside processes of vertical and horizontal integration (Giunipero et al., 2008).

SCM researchers have pointed to the importance of multidisciplinary approaches (New, 1997, Chen and Paulraj, 2004, Christopher et al., 2011). They identify the significant considerations; nonetheless, consider three limitations: first, most work by SCM academics have focused on goods, not services; second, in most instances the level of analysis has been the firm, rather than the network.

4. METHODOLOGY: USING LENSES IN THIS RESEARCH:
The lenses used to review literature from relevant academic fields: service innovation (SI), supply chain management (SCM) and service science (SS). The latter is the newest of the three fields; Chesbrough and Spohrer (2006) presented arguments for such a discipline and built on initiatives labeled Services Sciences Management and Engineering – SSME (Spohrer and Riecken, 2006). The origin of those initiatives has been “traced back to researchers at IBM and associated schools and centers” (Paton and McLaughlin, 2008, p.78). More recently, service science has been defined as “an interdisciplinary approach to study, improve, create, and innovate in service” (Maglio et al., 2010, p.1).

For most of the 20th century, innovation studies were focused on products rather than services (Tidd and Hull, 2010); indeed, Miles (2000) attributes services a ‘cinderella status’. Nonetheless, services have been studied for over half a century; first by marketing scholars (Levitt, 1972, Bateson, 1979, Shostack, 1982) and by the late 80s and 90s, in fields such as strategy, operations and general management (Chase and Garvin, 1989, Habib and Victor, 1991). Similarly, studies of business networks have almost paralleled those of services. Specifically, supply networks research that can be traced back to the mid-70s is focused on supplier-customer relationships (Håkansson et al., 2009); these works have been led by Sweden’s IMP group and, for the most part, limited to supply networks dealing with goods.

The three aforementioned topics—innovation, networks and services—can be interlinked to explore processes associated to service innovation within supply networks from a multidisciplinary perspective. Certain underpinnings for each topic offer a rationale for interlinking. First, since Schumpeter’s works (1939, 1943), it has been said that innovation offers an opportunity for prosperity during economic cycles. Second, scholars hold that networks play a critical role in innovation and knowledge transfer. And third, the noteworthy growth of services during the current century could be interpreted as a call to enhance.

These topics—innovation, networks and services—are used in this research as lenses to focus on, filter and differentiate information, phenomena and events. Specifically, these lenses
contribute to narrowing the scope of analysis drawn from disciplines such as strategy, knowledge management, economics and marketing. By narrowing the scope, research boundaries are laid out to understand a service innovation, thus shedding light on how things happen within a supply network; which is the research intent.

Viewed from a different angle, each lens produces a complementary perspective, a delimited and relevant literature to be explored, and a comprehensive understanding to be developed.

Figure 2 Research Lenses and Links.

Source: Author’s development from literature

The following subsections present a brief overview of each lens, the literature reviewed, highlighting innovation in value co-creation; networks role of interactions in the process; services on how and what is studied is a process rather than output

4.1. Innovation

Recent research works intended at understanding the innovation process in services (Edvardsson et al., 2007, Gallouj and Savona, 2009). Baregheh, Rowley and Sambrook (2009) collected as many as sixty definitions of innovation published from 1934, relating to several disciplines (business and management, innovation and entrepreneurship, and technology, science and engineering). One definition, interestingly enough proposed by a scholar researching services, was deemed particularly useful for this research (Baregheh et al., 2009, p.1334): “Innovation is the multi-stage process whereby organizations transform ideas into new/improved products, services or processes, in order to advance, compete and differentiate themselves successfully in their marketplace.”

Concurrently, Paswan, D’Souza and Zolfagharian (2009) developed a typology for services innovation that does not separate goods and services. Paswan et al.’s (2009) typology framework is used in this research as part of the proposed innovation lens.

A general definition such as that by Baregheh et al. (2009) can be applied to goods, services and process innovation, yet is still firm-centred. Given its focus on a supply network, service innovation is defined as an interactive (Gallouj and Djellal, 2010a) contextual process by means of which changes in market relations take place (Miles, 2005) and new business opportunities are successfully exploited (DTI, 2007, Paton and McLaughlin, 2008). This definition overcomes the debate on differences between goods and services, including possible differences between goods innovation and services innovation (Sundbo, 2007).
The innovation lens concept highlights the notion of newness and change presented by both Paton and McLaughlin (2008) and Baregheh et al. (2009), as well as the perspective of value co-creation introduced by Spohrer and Maglio (2008). In sum, under this lens perspectives from different disciplines converge, thus providing a clearer image that should help the researcher in service innovation analysis.

4.2. Networks

Scholars have explored interactions within networks (Jarillo, 1988). However, work at the supply network level from SCM researchers remains scarce (Autry and Griffis, 2008, Li and Choi, 2009, Giannakis, 2011a). For example, collaborative relationships, such as partnerships and strategic alliances, have been recognized as drivers of competitive advantage (Jarillo, 1988, Goerzen, 2007, Cheung et al., 2011), rather than as interactions to co-create value and distribute benefits within a business network, or within a supply network subset.

Scholars who consistently base their works on business networks include the aforementioned IMP group. Hakansson Ford, Gadde, Snehota and Waluszewski (2009) mention that when starting their research on business networks, in 1976, they chose relationship as the unit of analysis. What they find valid for the whole-the business network can be extended to a subset, a supply network.

Network is a term which for years has been used by many fields; employ the term to refer to “objects” connected to one another, allowing “elements” to “circulate” among these objects/entities. For instance, an early reference to a communications network, by Marconi’s Wireless Telegraph Company, to connect the British Empire using radio (G.F.S., 1920). More recently, the term social network has expanded its meaning to include virtual communities (Romm et al., 1997). How the term is used in this research must hence be clarified.

This research is focused on a subset of business networks, specifically a service supply network. Accordingly, when drawing on literature from such fields as ICT and social networking (Hassan, 2009) or citing certain services delivered through or supported by computer and communications networks not covered by this research, use of the term will be duly noted.

Gummesson and Polese (2009), building on previous works by Hakansson and Snehota (1995, 2006a, 2006b), stressed that “… nothing happens in isolation” (Barabási 2002 cited in Gummesson and Polese, 2009, p.337). Such an argument supports the idea that, any given field benefits by embracing a network approach; everyone (individuals and organizations) interacts with others within a network of relationships, regardless of what a network means to them. SCM scholars and researchers could only enrich the field by embracing a network perspective, as suggested by Choi and Wu (2009a), future contributions to SCM may go beyond the traditional linear and sequential process linked to the chain concept.

Business network definition that embraces features that complement the innovation and services lenses follows (Todeva, 2006, p.15): “Business networks are sets of repetitive transactions based on structural and relational formations with dynamic boundaries comprising interconnected elements (actors, resources and activities).”

This definition acknowledges that network analysis may entail levels of interactions among members of the business network and highlights the role of the interactions among those members. Another definition is: “A network consists of the tangible and intangible investments that comprise the connected relationships between more than two businesses” (Hakansson et al., 2009, p.236).
Hakansson et al. (2009, p.41) propose a model of the interaction process that includes time and space dimensions. They stress that in the midst of the interactions, heterogeneous resources can be exploited to create value; and that a resource may change by means of its use “and in the combination with others in an evolving resource constellation” (p.43).

In describing a business network, Håkansson et al. (2009) does not include the service domain; they start with what is observed and applied in manufacturing, extend it to services, and address what had been noted by Spohrer (2011), who argues that ecology better describes a service system, emphasizing “that populations of entities come and go”(p.200) or change over time.

For this research, a supply network is defined as a subset of a business network with blurred borders, because relationships go beyond a supplier(s) - buyer(s) direct interactions: a system in which interactions among supply network actors may take place at multiple levels and multiple dimensions; are dynamic in nature while developing, performing and delivering services; and where network actors may change their roles while interactions are still occurring. It highlights the process of value co-creation by more than two network actors, allowing value distribution across the whole network and beyond.

The lens uncovers research within large bodies of literature, including knowledge management and strategy (Dyer and Singh, 1998, Desouza et al., 2003, Inkpen and Tsang, 2005, Haas and Hansen, 2007)

4.3. Services

The word “services” is usually thought of as merely being the plural of “service”, but Lusch and Vargo (2006b, p.282) made a distinction between the two concepts: “the singular ‘service’ indicates a process of doing something for someone and the plural ‘services’ implies units of output” - a clarification that builds on the introduction of the service-dominant logic (Vargo and Lusch, 2004a).

Academics in marketing have discussed service, mostly establishing differences between goods and services, and transferring knowledge from the goods domain to the service domain (Levitt, 1972, Bateson, 1979, Bitner, 1992, Grönroos, 2000, Lovelock and Gummesson, 2004). In operations management (OM), a field related to SCM, academics have privileged the idea of a world divided between goods and services (Ellram, 1991, Hayes, 2002), presumably to encourage operational efficiencies (Corrêa et al., 2007). Within these two disciplines, the service concept has been portrayed largely in terms of its features (Edvardsson et al., 2005, Fitzsimmons and Fitzsimmons, 2006) or by comparisons vis-a-vis goods.

A definition for service accepted by specialists in the previous two fields is proposed by Grönroos (2000, p.46): “A service is a process consisting of a series of more or less intangible activities that normally, but not necessarily always, takes place in interactions between the customer and service employees and/or physical resources or goods and/or systems of the service provider, which are provided as solutions to customer problems.”

A key issue in the above definition relates to intangibility. As already noted, the Service Dominant Logic (SDL) debate (Vargo and Lusch, 2004a, p.2) defines “services as the application of specialized competences (knowledge and skills) through deeds, processes, and performances for the benefit of another entity or the entity itself”. Also, the set of assumptions proposed and labelled as the rental/access paradigm has been alluded to by Lovelock and Gummesson (2004). Moreover, Lovelock and Gummesson (2004) questioned general acceptance of the four “unique” services’ characteristics that were portrayed in marketing textbooks.
These works challenged accepted ideas and allowed the author to fully grasp the “service perspective” (Edvardsson et al., 2005), and designate services as a research lens. In this research, service is an interactive process which varies in complexity, co-creating value for the system as a whole, for those directly involved, or for others in or outside a supply network.

The services lens brings the processes angle to the research and opens the perspective of benefiting others (Maglio and Spohrer, 2008). Until recently, SCM academics paid little attention to services (Stock et al., 2010); when the concept has been addressed, following the prevailing Goods Dominant Logic (GDL) in the field, it has largely focused on services as intangible goods (Ellram et al., 2007, Li and Choi, 2009). On the other hand, both SCM and OM (Operation Management) researchers have thoroughly studied and modeled processes such as those in manufacturing, transportation, distribution and production. Their aim, nonetheless, when approaching these and other processes, has been to optimize, reduce costs, improve performance and obtain higher quality (Giannakis, 2011b). Although the study of processes is not new in the field, emphasising the service domain and value creation stands to enrich the OM and SCM fields.

In other fields, some research has been undertaken to find ways of transferring what has been developed for goods to the services arena (Tether, 2005, Hipp, 2010, Chesbrough, 2011). For instance, tools that were developed for mass-production environments have been applied to service companies that look to enhance their efficiency while satisfying customers (Bowen and Youngdahl, 1998). Unfortunately, this effort towards standardization fails to take advantage of the possibility of offering individual solutions. The researcher considers that by following this trend, businesses could become trapped in the mind-set of economies of scale, deterred from moving into the evolving world of mass-customization (Pine, 1992) and individual value solutions.

Figure 3 Author’s development from literature

Early literature search included works on suppliers’ development programs, as the researcher felt it might feature content on service innovations. A number of these studies pointed to the need to identify the key elements within the relationships that could be duplicated by other companies to foster value creation in which suppliers, customers and even competitors could participate. Studies examined address issues from organizational design to cluster analysis, and from long-term relationships to partnerships.
5. CONCLUSION:

After using the lenses to focus on relevant literature in order to identify gaps in current knowledge, the research was undertaken. Findings offer theoretical contributions framed by the Service Dominant Logic debate. Research contributions are directed at the SCM community in order to encourage a dialogue between SCM and SI academics, which may enhance a cross-disciplinary learning experience and trigger opportunities for further research on services.

The searching process apprised the researcher with differences in scope, level of development, and theoretical foundations among disciplines scanned, particularly when considering the literature in terms of the specific focus of this research: service innovation within supply networks.

In both SS and SI, the concepts covered are also in developing stage. The researcher considers that, to cover particular themes within each field, it helps the reader if the literature review is organized by field. Such themes are used in the analysis and embedded in the logic to identify gaps in the disciplines considered for this research.

Among challenges faced in developing this literature review were: first, combining three main fields of knowledge to find gaps in order to formulate a research question. Multidisciplinary approaches have been recognized as valuable (New, 1997); but most academic works in related fields are self-contained in a particular discipline. Second, despite the independence of each field, there was risk of finding duplicate ideas; hence it was crucial to avoid unnecessary repetitions in order to address the third challenge: identifying common ground among the disciplines studied.

While examining the literature, titles and abstracts were considered to identify those in which the researchers combine issues related to innovation, networks and services, and those in which different levels of analysis were explored: dyads, triads, chains and networks.

Therefore, there are gaps for future research when the unit of analysis in a supply network is the relationship rather that the focal firm. Nonetheless, the focal firm’s role has been seen as critical in the chain management process (Hanf and Dautzenberg, 2006); such a role could shed light upon characteristics of interactions within a network.

REFERENCES


Cheltenham, UK, Edward Elgar.


[74]  Tether, B. (2003) the sources and aims of innovation in services: variety between and within sectors. Economics of innovation and new technology, 12, 481.


Authors Biography
1. Jayant Kumar Panigrahi is a PhD Scholar of School of Mechanical Engineering, KIIT University, Bhubaneswar, India. An Education & Startup Consultant, Career Advisor and International Collaboration Facilitator and has authored few research articles. He has been working in the industry and academia for more than 27 years and has been working as a Consultant with Universities and Consultancies in New Delhi. Email: jaykp1969@gmail.com

2. Sushanta Tripathy, PhD (Industrial Engineering & Management, IIT, Kharagpur) is Professor in Industrial Engineering, Supply Chain Management and PPC and Program Head - PhD & Post Doc. Program at School of Mechanical Engineering, KIIT University, Bhubaneswar, India. He has authored 53 research articles, reviewed 6 books and 5 Ph.D.’s have been awarded under his guidance. Dr. Tripathy presented in various international & national conferences and actively involved in various funded research project. Email: sushant.tripathy@gmail.com

3. Biswajit Das, M.A. (Eng.), M.B.A., M.A. (Pub Admin.), PhD is a Professor in Marketing and Communication and Chairperson - FSR, at KIIT School of Management, KIIT University, Bhubaneswar, India He has 28 years of experience in teaching, authored 9 books, 164 research articles published and 16 PhD scholars awarded with degree and 7 under guidance. Dr. Das is board of studies member of many universities, visited abroad for academic assignments and is involved in major funded research project of ICSSR and other agencies. Email: biswajit@ksom.ac.in