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Service Supply Chain (SSC): A Systematic Literature Review (1999-2020)

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ABSTRACT

The purpose of this research is to do a systematic literature review on the field of "service supply chain" taking scholarly articles of top-rank journals from the year 1999 to 2020 making it a first-ever 20 years of comprehensive systematic literature review in the area of "service supply chain". The research aims to encapsulate the major contributions and themes/concepts in the SSC area and future research directions that could be further researched to advance the field. The research also seeks to review major theories supporting or associated with the SSC domain. The research is based on the methodology of SLR by taking an initial sample of 894 papers using relevant and suitable search keywords, filtering out the unrelated ones using proper criteria, scanning, and going through a large number of articles and finally doing a comprehensive analysis on the selected ones taken from Scopus database. The research will greatly help the professionals as it will not only act as a guideline to understand various concepts, but more importantly, they can take advantage of future research directions to take the industry far ahead in strategizing the area of service supply chain management.

Keywords: *performance, service, service industry, service supply chain, supply chain, systematic literature review*

1. INTRODUCTION

Cutthroat competition has provided a thrust to the service supply chain managers to focus deeper into the processes and opportunities involved in the service supply chain management that ultimately leads to the value creation for the customers. The ingrained involvement of the customers in managing service supply chains results in the dire need of understanding the chain. The research by Price Waterhouse Coopers has found out that tremendous optimizing prospects are present in the service supply chain process management ("Price Water House Coopers," 2014) that ultimately has contributed to a swing of emphasis from manufacturing supply chains to the management of Service Supply Chains (Baltacioglu *et al*., 2007; Sampson & Spring, 2012a). Accordingly, supply chain management researchers have started to strive to get aware of how supply chain management of services can be well planned and managed (Giannakis, 2011a). The idea of service supply chains has its strong link with services operations management (Sampson, 2012) and it concentrates on the power of production-based supply chain management frameworks when used in service-based environments (Baltacioglu *et al*., 2007). Scarce research has been conducted on developing conceptual understanding into the configuration and arrangement of service supply chains. It is thus of considerable significance for academia and industry managers to realize the way in which service supply chains formation takes place, along with the rationale behind it and the process of coordination.

Recently, one of the similar types of research was conducted by (Nagariya *et al*., 2020); the study lacked comprehensiveness and ignored a number of areas e.g., service supply chain performance measurement and its connection with service performance measurement strategy development. A number of gaps were missing in this regard that are covered in this study. Other areas are reverse services supply chains and service supply chain knowledge management that are not covered in the study by (Nagariya *et al*., 2020). Another such study was conducted in the domain of services supply chain management that didn't cover the method related gaps as well as gaps related to demand types of services supply chain (Choudhury *et al*., 2020). This study also ignored the impact of latest IT technologies i.e., Artificial Intelligence, Internet of Things, Business Analytics, Big Data Analytics and Machine Learning etc on the domain of services supply chains (Choudhury *et al*., 2020). A lot of authors have discussed

various sectors in the service supply chain where scarcity of research has been found, for instance, banking sector, education sector and healthcare sector, and most of the given performance measurement-based frameworks are not customized and configured to particular service-based industries (Qorri *et al*., 2018). It has also been pointed out in the recent literature of service operations that there have been associated challenges existing in interpreting analytics into performance metrics in service-based supply chains (Field *et al*., 2018).

This purpose of this manuscript is to review and analyze the academic literature and identify main themes or concepts in service supply chain along with the future research direction or gaps that could be further researched to advance the field. The overall focus will therefore be on the below mentioned questions:

RQ1. *What are the major contributions and themes in the last two decades of research in service supply chain domain?*
RQ2. *What are the management theories supporting SSCM domain? Which authors used these management theories in their SSCM research?*
RQ3. *What are the future research directions or gaps in the area of service supply chains that are required to be addressed?*
RQ4. *What does the key take away and action plan for professionals from service industry in the light of future research directions and key themes in service supply chain area?*

After introduction section, the authors have planned the manuscript as follows. Section 2 will describe the research methodology of systematic literature review and show the data statistics. Section 3 will discuss the results i.e., key themes and concepts related to the area of service supply chain in the past two decades along with the major contributions from SSCM authors. This section will also encapsulate the management theories supporting SSCM domain along with the authors that used these management theories in the SSCM domain followed by outlining future research directions and a comprehensive guideline for industry professionals on how they may address SSCM challenges by better managing the SSCM function. Section 4 concludes the overall research.

2. RESEARCH METHODOLOGY AND DATA STATISTICS

Literature review is "a systematic, explicit and reproducible method to investigate, assess and understand the existing-related discipline" (Seuring & Müller, 2008; Winter & Knemeyer, 2013). This method is the leading contributor and input to research advancement and is deliberated "to provide a historical perspective of the respective research area and an in-depth account for independent research endeavors" (Mentzer & Kahn, 1995). Another research also emphasizes that literature reviews generally focus on two main goals: first is to sum up total research in a particular field through the identification of multiple patterns, themes, and issues; secondly, they help to discover the theoretical knowledge of the field (Meredith, 1993), and thereby may support in the development or advancement of theory (Harland *et al*., 2006).

Systematic literature review (SLR) is a relatively newer form of reviewing the literature in which the goal is to conduct a comprehensive research synthesis of the knowledge to date with regards to a particular field by following a replicable, logical, and clear research procedure (Rousseau *et al*., 2008; Tranfield *et al*., 2003). The authors have adopted the method of systematic literature review proposed by (Tranfield *et al*., 2003). They emphasized that by application of certain rules of the systematic review methodology in management studies may reduce partiality by clearly mentioning the values and assumptions behind a review. SLR is commonly applied in the domains of business, management, and organization sciences, although it is rooted in the domain of medical sciences (Denyer & Tranfield, 2009). As the SLR is a replicable and transparent method, it may be used as an audit trail, in case if the researchers are trying to find out main contributions to a specific field. Even though SLR needs a huge amount of time and effort, the outcome has proven to be efficient, trustworthy and seen as a "fundamental scientific activity" (Mulrow, 1994).

At first stage, the authors decided about the study goals and objectives after going through a basic level understanding of the knowledge body related to service supply chain used in the past studies. It was decided to select Scopus database as a source. Elsevier publishing mainly manages the Scopus and is regarded as the leading abstract and citation database in the science, medicine, technology, social sciences and arts and humanities areas. Scopus covers over 36,377 active titles from more than 7000 publishers, of which 34,346 are peer-reviewed. Scopus is the most wide-ranging database having lots of highly regarded journals in the domain of supply chain management and therefore, by far, regarded as a dependable source (Wilding *et al*., 2012).

In the second stage, we conducted a methodical review of the material in the finally selected manuscripts (Thornhill *et al*., 2009). Then, we identified the main concepts, decided on the keywords to be used in search strings and ultimately used the data extraction method recommended by (Tranfield *et al*., 2003); one of the researchers went through the manuscripts individually and manually and finally made comparisons of their observations followed by reconciliation. It is also recommended by Tranfield *et al*. (2003) to test the theoretical strength of the manuscripts, so we studied the articles to pinpoint and collect all the theories supporting the literature on service supply chain.

3.1 Search Results

Applying "title, abstract and keywords" query in the Scopus repository, the authors chose the subsequent subject specific terms and keywords, "service supply chain", "services supply chain", "service sector supply chain", "service-based supply chain" and "service-oriented supply chain", with OR as an operator in between these keywords, to spot publications written in English from 1999-2020. The preliminary hit showed 894 articles that comprised of journal articles, conference proceedings, conference papers, books, book chapters, book series, editorials, notes, short

surveys, and trade publications. After that we filtered only those manuscripts that were articles from journals either published or in press and written in English language only. The query resulted in 460 journal articles. We, then, confined the articles to keywords related to supply chain only and excluded articles related to "game theory", "mathematical models", "genetic algorithm", "computer simulation", "LSI circuits", "numerical models", "asymmetric information", "cloud computing", "customer order decoupling point", "information asymmetry", "integer programming", "algorithm", "computer based manufacturing", "fairness concerns", "fuzzy delphi method", "system dynamics", "call centre", "centralized decision making", "computational theory", "cruise ships", "decision modelling", "e-government", "emission control", "energy efficiency", "entropy", "fighter aircraft" and "fuzzy analytic hierarchy process". This resulted in 335 journal articles that were finally restricted to 290 by choosing only those articles that mentioned supply chain related subjects with an exclusion of articles related to areas such as "chemical engineering", "material science", "earth and planetary sciences", "physics and astronomy", "neuroscience", "pharmacology" "medicine", "chemistry", "biochemistry" and "immunology".

In the next phase, after going through the filtration process of reading abstracts and the keywords mentioned, irrelevant articles were eliminated that were either not primarily related to the services supply chain domain or were focused on servitization domain i.e., services chains of the manufacturing sector. The final number comes out to be 185. Going through the preliminary review of the journals and all finally selected manuscripts, the researchers decided to only take in journals that fulfil the five conditions. The conditions were:

i) the respective journal's impact factor as available in the 2019 Clarivate Analytics - Thomson Reuters JCR OR
ii) 2019 SC Imago Journal Rank (SJR) that is a gauge of scientific weight which includes both the number of citations received by a journal and the significance or respect of the journals OR
iii) In addition to that, if the journals were in the 2019 of Australian Business Deans' Council (ABDC) list of journal rankings OR
iv) Academic Journal Guide (AJG) 2018 by the Association of Business Schools, they were also taken.
v) Lastly, we also took those journals that didn't qualify for any of the above four conditions but had the word "service" in the name of the journal.

Hence, we took only the journals with Impact Factor (JCR) or SJR > 0.5, or those ranked and included in the ABDC having any rank or AJG lists having any rank. In addition to this, the authors also included those journals that were left and were either supply chain journals or related to the service industry. The name of the journal in that case had to have either "supply chain" in the title name or "service" in the title name. Finally, the whole filtration process resulted in 185 articles from 100 journals. The last and final step was addition of 16 more articles taken from the bibliography of various "call for paper" related to services supply chain in the top journals. Although a few calls included a number of papers from the domain of servitization but the authors didn't take those articles due to the scope of the research. Hence, the number comes out to be 205 (**Table 4** – see Appendix) journal articles that were used for the final research.

3.2 Data Statistics

Using descriptive analytics, few graphs were made. The first graph is shown in **figure 1** that depicts the year wise number of articles in the last two decades in the domain of services supply chain. It can be clearly observed there has been an exponentially increasing trend on publishing articles in the domain of service supply chain. Although there have been ups and downs of the publishing frequency in these two decades, there is an upward trend of studies over the years given the growing interest in the service supply chain area. The last two years 2019 and 2020 have been most productive indicating that researchers have realized the importance of this field.

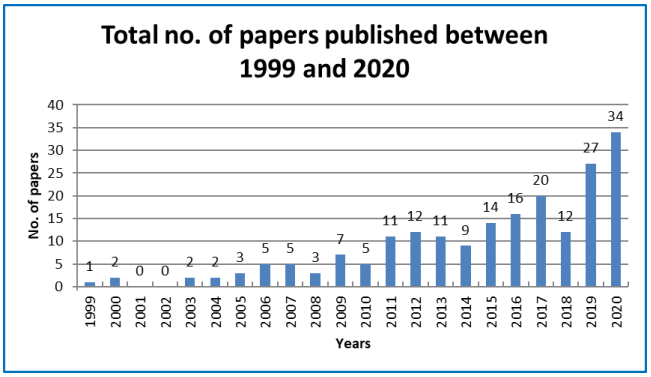

Figure 1 Year Wise No. of Papers on "Service Supply Chain" Area Published in Last Two Decades

Further to that, in **figure 2**, we studied the relationship between the number of articles and their respective journal in which these articles were published. We tried to be found out the most contributing journal list in the area of service supply chain. The top three contributor journals in the domain were Supply Chain Management: An International Journal with 13 publications; Journal of Supply Chain Management with 10 publications and International Journal of Operations and Production Management with 9. There were 21 other international titles having published more than 3 articles at least. It can be observed that the articles are mostly published in operations, supply chain and logistics related journals. Some are published in marketing related journals, few in the IS / ERP related journals and the rest of the articles were published in engineering and business-related journals.

We also checked the contribution level in respect of various publishers and observed that Emerald Group Publishing Ltd. has contributed the most to the service supply chain domain with a massive 69 articles in the past two decades. The second most contributing publisher was Elsevier Ltd. with 29 articles i.e., almost less than half of Emerald's number. Other main contributions were made by Taylor and Francis Ltd. and Wiley-Blackwell with 21 articles each, Inderscience Publishers and Springer published 15 in the past two decades. Rests of the publishers have quite a low contribution to the field. Further details can be seen in the **figure 3** below.

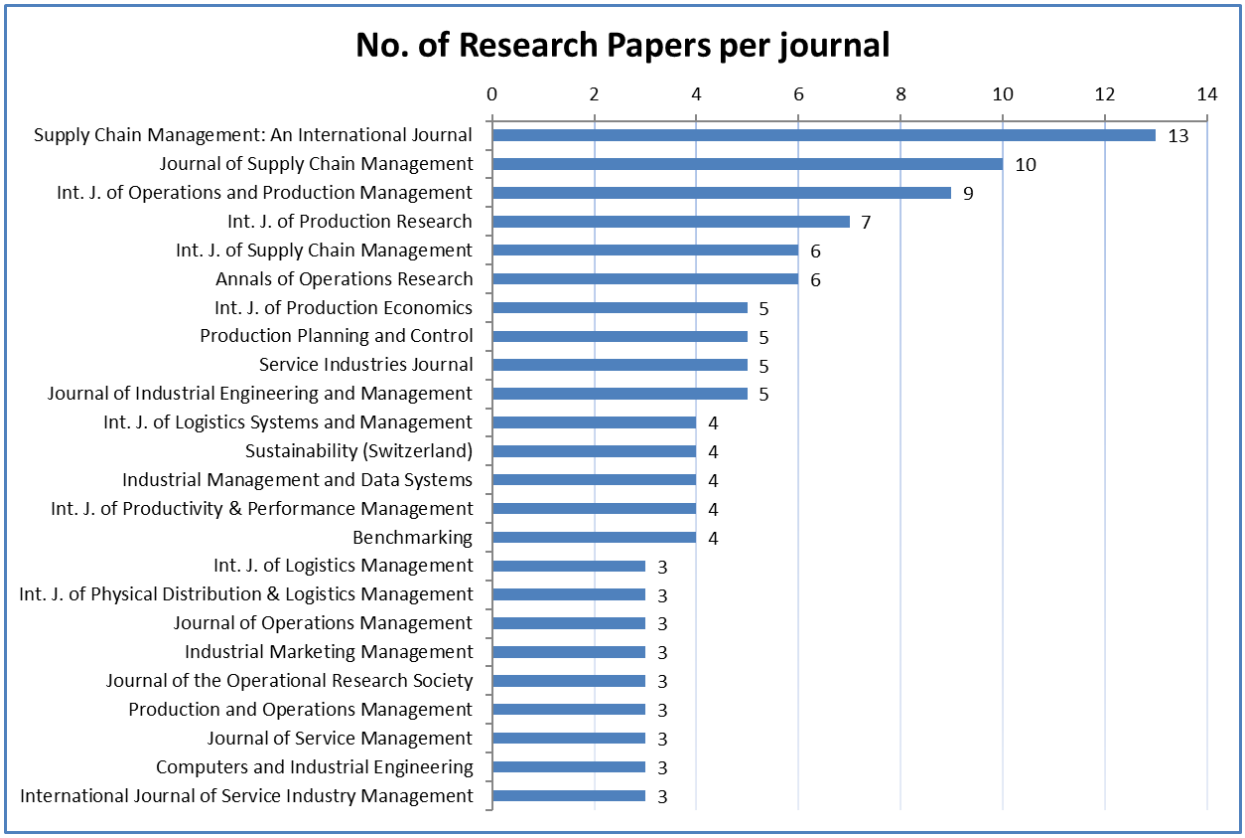

Figure 2 Journal wise research paper contributions

Most cited publications in the last two decades were also pointed out in **figure 4**. The article "Service design for experience-centric services" by Zomerdijk and Voss has been the most cited article from Journal of Service Research with 432 citations in total. Second most cited article is "Foundations and implications of a proposed Unified Services Theory" by Sampson and Froehle published in Production and Operations Management Journal with 419 citations. "Understanding and managing the services supply chain" by Ellram has been the third most cited article with 386 citations. There are about 12 more articles having more than 100 citations overall.

Production and Operations Management turns out to be the most cited journal with 934 citations in the last two decades followed by Journal of Supply Chain Management 719 and Journal of Service Research 433 citations overall. **Figure 5** shows the top 10 most cited journal list. Wiley being the topmost cited publisher with 1550 citations overall followed by Emerald with 1289 and Elsevier with 877 overall citations mentioned in the **figure 6.**

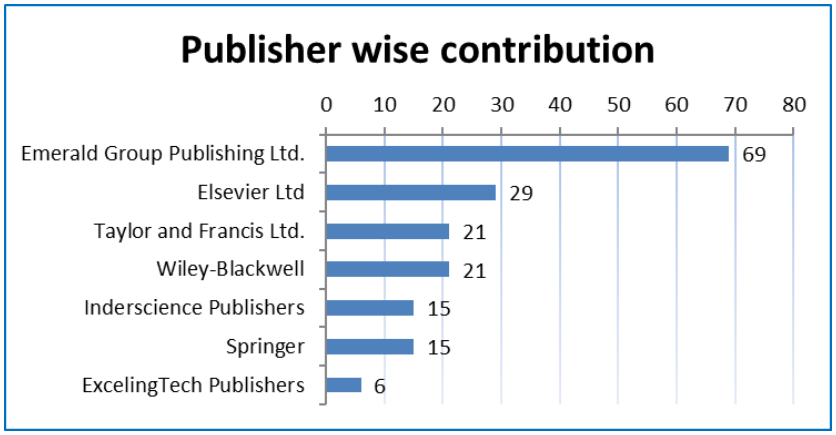

Figure 3 Publisher wise research paper contributions

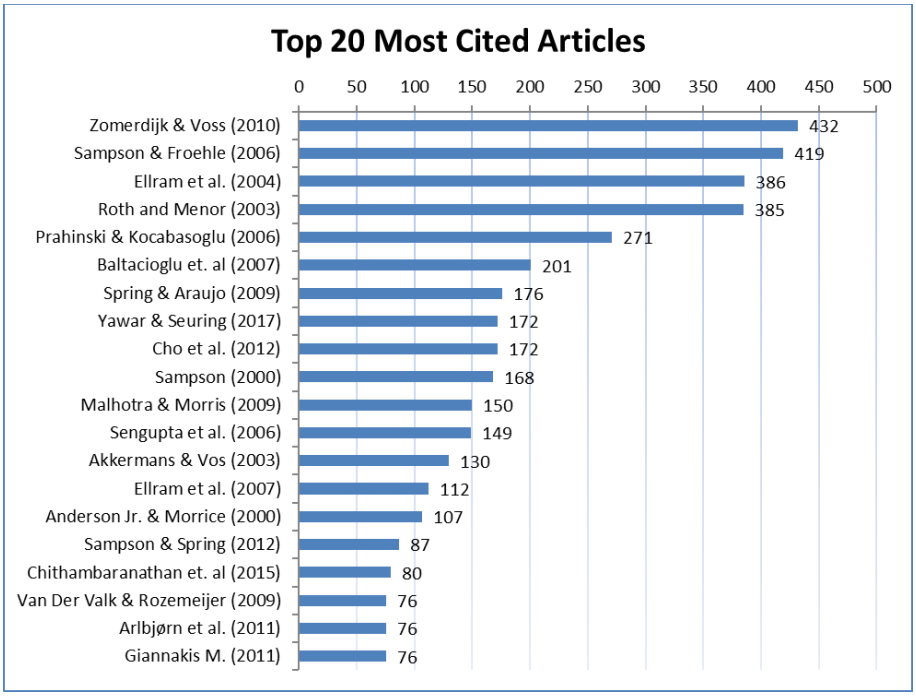

Figure 4 Top 20 most cited articles of "Services Supply Chain" domain

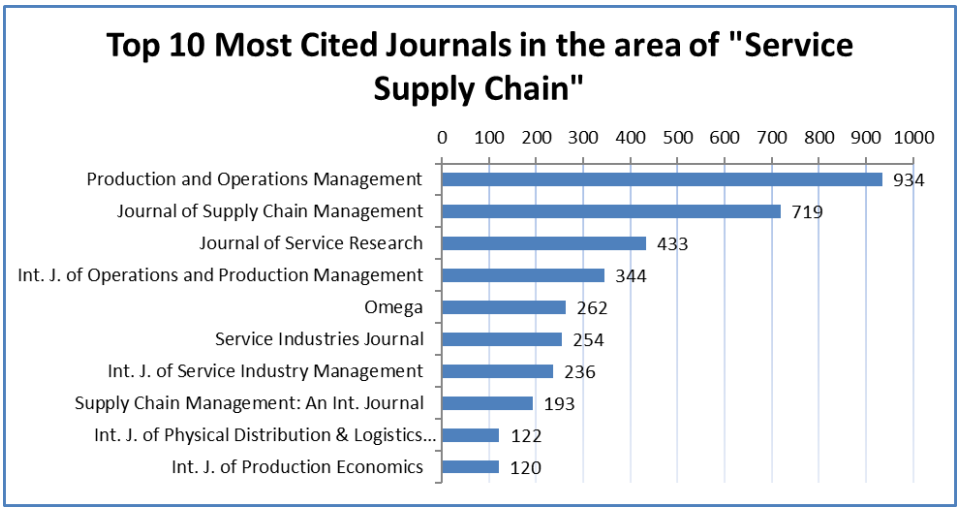

Figure 5 Top 10 most cited journals

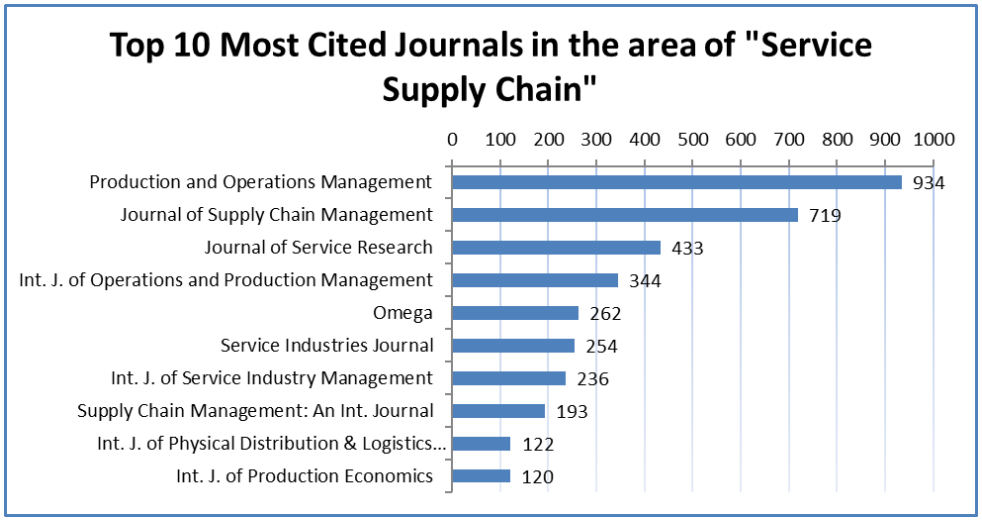

Figure 6 Top 8 most cited publishers

3. DISCUSSION

Major contributions and a no. of themes were identified while examining and reviewing the finally selected articles. We will be discussing all the themes and the contributions in this section in detail one by one followed by the future research directions.

3.1 Major Contributions in Terms of Defining the Field of SSCM

Nevertheless, a distinction between manufacturing and services must be made to provide a stage for discussing the supply chain within the service industry. Defining the nature, design and operation of service supply chain domain has been a tough ask and many authors have contributed to the last two decades. According to Sampson (2000), services are basically the products that are intangible in nature which might be hard to store, services are also created and utilized in tandem now when order is raised and not before. Moreover, when the customer's order is generated, and the service organization is not able to create the service then they might be unable to fulfil the order. In contrast of tangible products, majority of services are regularly available for offering and will not be exhausted when sold. Furthermore, to strictly recognize and assess the role of all the pertinent suppliers in the upstream is difficult both in theory and practice, given the participation of customers across the delivery process. It was further highlighted about the duality of producing and consuming services which is specific to service-oriented businesses. Services are also labour concentrated actions and very much reliant on administration of the workforce and knowledge capable employees. In line with this proposition, it is important to note that customers do not only sit downstream of the service supply chain but also handle most of the inputs in upstream portion of the supply chain. Summarizing, "a service supply chain is a bidirectional system consisting of a customer, a service provider, and an initial service producer". Some more conceptual contributions in the form of definitions are given in the below mentioned **table 1**.

Table 1 A compilation of service supply chain definitions from past two decades

References	Service Supply Chain Definitions
Sampson (2000)	"A service supply chain is a bidirectional system consisting of a customer, a service provider, and an initial service producer".
Kathawala & Abdou (2003)	"The supply chain management for service industry is the ability of the company / firm to get closer to the customer by improving its supply chain channels. The service supply chains will include responsiveness, efficiency and controlling".
Ellram et al. (2004)	"Supply chain management for service sector is the management of information, processes, capacity, service performance and funds from the earliest supplier to the ultimate customer".
Sengupta et al. (2006)	"In service supply chains, human labor forms a significant component of the value delivery process and while, physical handling of a product leads to standardized and centralized procedures and controls in manufacturing supply chains, in services this is not entirely possible as many of the decisions are taken locally and the variation and uncertainties in outputs are higher because of the human involvement. In addition, the focus of efficiencies in service supply chains is on management of capacity, flexibility of resources, information flows, service performance and cash flow management".
Baltacioglu et al. (2007)	"The Service Supply Chain is the network of suppliers, service providers, consumers and other supporting units that performs the functions of transaction of resources required to produce services; transformation of these resources into supporting and core services; and the delivery of these services to customers".
Giannakis (2011a)	"Service Supply Chain incorporates the role of the people, technology, shared information, as well as the customer input in the design, production and delivery processes. The role of service provider, the suppliers of the other services or resources needed for the design and delivery of these services along with the service clients all working together to co-produce value in the integrated value chains or networks. The way the value is added across the service supply chain is very different from manufacturing companies".
Arlbjørn et al. (2011)	"A service supply chain is a wide-ranging concept that covers businesses dealing with things such as the supply of spare parts, third-party provider, finance, insurance, retail, and governmental services".

Table 2 A compilation of service supply chain definitions from past two decades (Con't)

Breidbach et al. (2015)	"Service supply chains are one distinct component of a larger value network. As such, a single service supply chain represents an institutionalized configuration of one or multiple service providers engaging with one or multiple service customers for a common purpose".
Zhang *et al.* (2016)	"A complex and customized value added network structure for customers coordinated by a unified integration service business aiming at achieving customer success and the maximization of the whole supply chain value".

3.2 Major Themes within the Scope of SSCM

Following 12 themes have been identified by the authors within the scope of SSC articles selected in this SLR study:

(i) Focus on Service Supply Chain Nature

Sampson (2000) explains the concept of bi-directional supply chains that means that customer do not play the role of the downstream member of the supply chain, instead they provide a lot of the input of the supply side. These inputs are their minds, bodies, information, or belongings that the customers possess when the order is being generated by them; and they also flow in reverse direction. These two-way service supply chains are generally short. The focal firm does not purchase the inputs of the service supply chains that are provided by the customers; and the service supply chain customers can also evaluate the overall value of the service being offered as they operate from both sides of the chain. All of this will form the nature of the service supply chain domain i.e., the concepts, service design, service development, service processes and service recovery. A number of descriptions have also been provided by other authors, e.g., one of the studies examines the design of experience-centric services, particularly the design of their context (Zomerdijk & Voss, 2010). Lewis *et al*. (2004) explores theoretical and practical aspects (i.e., resources allocated, activities undertaken, actors/decisions involved) of corporate 'parenting' in the development of international service networks. An interesting article authored by Karadayi-Usta & Serdar-Asan (2020) suggests a conceptual model of medical tourism service supply chain with a focus on service recovery process. Another article emphasizes on the importance of Logistics Service Providers i.e., LSPs and enhancing its integration competency (Shaiq *et al*., 2020). Cold Logistics is also identified as another area of SSC where the design of the supply chain has been analyzed in a developing country perspective in one of the studies (Abu Hassan *et al*., 2021). Many other studies have also contributed to the field of service supply chain design and development of concepts in various ways (Anderson Jr *et al*., 2005; Giannakis, 2011a; Lusch *et al*., 2007; Peinkofer *et al*., 2019; Sampson, 2012; Sampson & Froehle, 2006; Sampson & Spring, 2012a, 2012b; Seepma *et al*., 2020; Vargo & Lusch, 2004; Yildirim *et al*., 2018a).

(ii) Focus on applying latest IT and related technologies

Technology has not only affected manufacturing supply chains positively but also has significant effect on the services supply chains. Many authors have published their manuscripts focusing on the application of latest IT and related technologies, namely, business analytics, block chain and big data analytics etc. These technological advancements do have the potential to facilitate service sector to optimize their supply chains. The benefits of all of these advancements are immense ranging from time saving, enhancing the reliability, saving of cost, and increased customer satisfaction. One of the studies analyzed the service supply chain issues associated with cloud computing (Cheng *et al*., 2011); while another study examined the effects of Big Data analytics, data security and service supply chain innovation capabilities on services supply chain performance (Fernando *et al*., 2018). Karamchandani *et al*. (2020) analyzed the perception of Enterprise Block chain among practitioners in service industry. An exploratory case study was conducted on designing the requirements of Block chain technology in the consulting firm (Sivula *et al*., 2021). Challenges related to Internet of things in SCM were also observed in an Australian retail organization in early Industry 4.0 context (de Vass *et al*., 2021). Another research studied the challenges associated with big data analytics (BDA) in service supply chains in the UAE (Khan, 2019). Few more studies on the use of latest IT and related technologies are (Li *et al*., 2020; Pournader *et al*., 2019).

(iii) Focus on policy, strategy, and performance framework development within SSC sectors

A very important theme that the authors have relied on is developing policies, guidelines, and frameworks within SSC sector. Various studies have been performed in this regard. One of the earliest frameworks on service supply chain were proposed by Ellram *et al*. (2004); here the authors develop a supply chain framework appropriate for a service supply chain by comparing and contrasting the applicability of three product-based manufacturing models. Baltacioglu *et al*. (2007) develops a new model for service supply chains and applies it to the healthcare industry. Another framework was proposed within management consulting firm (Giannakis, 2011b). All the above-mentioned frameworks and strategic development guidelines have linked all sorts of relevant flows i.e., information, cash, and knowledge flows with the other operations of the service supply chains i.e., plan, source, adapt, deliver, and return. A few more service supply chain frameworks have been proposed by quite a few authors, (Cho *et al*., 2012; Giannakis, 2011a; Lusch *et al*., 2007; Meijboom *et al*., 2011a; Ramish *et al*., 2017; Schiffling & Piecyk, 2014; Ukko *et al*., 2020).

(iv) Social and environmental sustainability within the sectors of SSCs

The topic of sustainability and triple bottom line has been the recent focus on not only manufacturing sector but also service sector. All service-related sectors are aiming to enhance not only the economic sustainability but also the social and environmental too. Within the studies of service supply chain literature, the authors have stressed on the need to integrate social and environmental requirements into the service processes. Focusing on water-based disasters, a study was conducted to measure agility in humanitarian response operations (John, 2021). One of the studies focused on service co-production, resource efficiency and environmental sustainability within the scope of a US hospital (Zhang *et al*., 2012). Few more studies related to environmental sustainability are (Chithambaranathan *et al*., 2015; Kronenberg, 2014; Wolfson *et al*., 2013; Zhang *et al*., 2012). Hussain *et al*. (2019b) for example developed a framework for the identification, categorization, and prioritization of social sustainability barriers in health-care supply chains. Sakhuja & Jain (2019) analyzed the structure of a service supply chain using social network analysis approach. Similarly, many studies in SSCM have focused on social sustainability and social aspects of service supply chains, namely, Liu *et al*. (2019) and Yawar & Seuring (2017).

(v) Focus on developing performance measurement and management processes

A lot of research in the area of service supply chain management is also regarding the examination of performance measurement processes. Performance measurement and performance management is very vital for the overall monitoring for services as well as manufacturing supply chains. One of the studies by Ukko et al. (2020) explores the essential types of relational mechanisms and the factors determining the relational mechanisms of performance measurement in digital service supply chains. A landmark study discusses and encapsulates the measures and metrics based on the strategic, tactical, and operational level performance in a service supply chain (Cho *et al*., 2012). Similar effort was done in a couple of other studies but with different sectors (Liu *et al*., 2017; Lo, 2016; Schiffling & Piecyk, 2014; Zhang *et al*., 2012); applied in logistics service supply chain, multiple service sectors, humanitarian logistics sector and hospitality industry respectively. Most of these studies proposed and developed performance indicators or measures for the purpose of monitoring the service supply chains.

(vi) Focus on application and extension of theories associated with SSC domain

A large number of authors have tried to strengthen or broaden the theoretical ground of the service supply chain domain. The authors have either applied management theory / theories on service supply chain phenomenon or have made efforts to further extend the theory. A separate section is mentioned in this manuscript in this regard. As much as 21 different theories have been mentioned that are applied in this domain with multiple phenomena and perspectives.

(vii) Focus on relationship management within upstream & downstream echelons of the SSCs

Collaborating with the upstream and downstream stakeholders always brings benefits and this is also evident from multiple studies. These studies have either studied the supplier relations or the customer relations and their consequent effects on the integrated service enterprise. One of the studies empirically tested the relationship between supplier relations and satisfaction with overall supplier performance in a services context at a process level of analysis (Field & Meile, 2008). The research results suggest not only the importance of improving overall supplier relations, but also the benefits of building partnerships within the service supply chain through co-operation and long-term commitment in order to increase satisfaction with overall supplier performance. Another study examines how the behavioral and psychological determinants contribute to the sharing of explicit and tacit knowledge between buyer and supplier in a service context (Yazici, 2013). And many more studies like these (Chithambaranathan *et al*., 2015; Liu *et al*., 2020; Sampson, 2000).

(viii) Focus on demand management processes in SSC sectors

Just like manufacturing supply chains, the service supply chain also needs to balance their demand with supply carefully. There is a strong need to analyze the patterns of demand and its consequent variations to manage the service supply chain better. A study by Liu *et al*. (2017) studies the influence of the demand–supply environment on the capacity scheduling performance of the logistics service supply chain. The study found that there is a positive correlation between the customized levels of demand and the scheduling cost of logistics service integrators but a negative correlation between the customized levels of demand and the scheduling flexibility. One more research establishes a two-stage order allocation model considering demand updating and the FLSPs' fairness preferences (Liu *et al*., 2018). Samani & Hosseini-Motlagh (2019) addresses an enhanced perspective incorporating a two-phase pre-emptive policy by which the disruption risk is diminished through a hybrid technique using the fuzzy analytic hierarchy process and grey rational analysis for determining supplementary blood facilities, to cooperate in production process and decrease interruptions.

(ix) Integration of KM concepts and tools for technology adoption in SSCM

Like manufacturing, the service supply chains need to set up close links with their upstream and downstream stakeholders for the purpose of integration, transmission and sharing of knowledge practices. With an element of intangibility, it becomes difficult to manage the knowledge flows and setting up the overall knowledge ecosystem. Multiple authors have emphasized on the importance of knowledge flows and the knowledge systems for optimizing the overall service supply chains (Jalilvand *et al*., 2019; Uusipaavalniemi & Juga, 2009; Yazici, 2013). These studies have been conducted in hospitality and healthcare sectors.

(x) How to manage Reverse Service Supply Chains effectively

Reverse services supply chain management is relatively a new area in SSCM domain. In year 2016, a number of studies were published related to the reverse SSCs out of which one study by The et al. (2016) aimed to clarify the characteristics of forward and the corresponding reverse supply chains of different services. The study identified four main clusters of service supply chains having different characteristics according to the degree of input standardization and the degree of output tangibility. Few studies were conducted in healthcare sector e.g. Kumar *et al*. (2020); few in public service sector e.g. Kumar *et al*. (2016b); while many other focused on developing ways to manage reverse services supply chains in an effective manner (Kumar *et al*., 2016a; Prahinski & Kocabasoglu, 2006; Selviaridis *et al*., 2016; Yuan *et al*., 2016). One of the studies emphasized on developing a framework of sustainable reverse logistics based on RFID (Usama & Ramish, 2020).

(xi) Focus on analyzing Risks within SSC sectors

A number of studies have also been conducted with the focus on analyzing the risk within SSC sectors. A study conducted explored how the purchase of services was managed within the organization, the risks associated with current services purchasing practices, and how to improve the professional management of services purchases (Ellram *et al*., 2007). Other articles analyzing the risk within SSC sectors are Liu *et al*. (2015), Liu *et al*. (2018), Rasolofo-Distler & Distler (2018), Samani & Hosseini-Motlagh (2019) and Wang *et al*. (2019).

(xii) Region and Sector specific cross-cultural studies

A large number of articles are focused on specific service sectors or geographical regions. Majority of these articles are related to healthcare, telecom, logistics, public sector, tourism, banking, defense, Retailing, IT, and high-tech sector's; while scarce material is available related to education, consulting, entertainment, advertisement, financial services, real estate, insurance, postal services, police, and judiciary. Ellram *et al*. (2007) stressed on the need to conduct multiple studies related to education sector. The following articles are based on the sector specific studies: Avlonitis & Hsuan (2017), Baltacioglu *et al*. (2007), Boon-itt *et al*. (2017), Choudhury *et al*. (2020), Field & Meile (2008), Govindan *et al*. (2020), Harrison & Waite (2005), Hussain *et al*. (2019a), Jalilvand *et al*. (2019), Lu *et al*. (2010), Michaelides & Kehoe (2006), Mirghafoori *et al*. (2018), Nouri *et a*l. (2019), Purnomo *et al*. (2020), Selviaridis *et al*. (2016), Sengupta *et al*. (2006), Wang *et al*. (2020), and Yang (2016). Hospitality sector was also studied to explore the impact of innovativeness of hospitality service operations on customer satisfaction (Truong *et al*., 2020). Other studies (Altuntas Vural, 2017; Hussain *et al*., 2019a; Karamchandani *et al*., 2020; Wang *et al*., 2020; Yuen & Thai, 2017), are based on certain regions.

The above-mentioned section shows the canvas of all of the 12 pulled out themes in the domain of SSC. All of these studies have been conducted with multiple and diverse perspectives outlining that service supply chain is a complex, broad and multi-dimensional domain. Still, this domain is in the emerging phase and many other themes would pop up in the near future. The authors expect that the themes that are expected to be observed in the near future are supply chain finance for service sector, not for profit services supply chains, calculating ROI for training programs for services supply chains, services supply chain 4.0 and carbon neutral service supply chains.

3.3 Management Theories Supporting SSCM

The second research question was "what are the management theories supporting SSCM domain? And which authors used these management theories in their SSCM research? The formation, processes and behavior of service supply chains has been supported by various organizational and management theories. After carefully reviewing more than 200 selected articles, we have identified 21 theories that relate to the concept of service supply chain domain. The **Table 2** mentions the name of the author/s who proposed these theories, and the last column mentions the names of those authors who used these theories in their respective articles in one way or another.

All of the theories are giving multiple perspectives to the field of SSC. For example, if we focus from the perspective of supplier-customer relationship that also exists in service supply chains then agency theory is highly relevant (Eisenhardt, 1989; Jensen & Meckling, 1976). On the other side, in the transaction cost theory, the main objective for the customers is to make a trade-off between the benefit achieved by the suppliers during the transaction and the cost incurred during the transaction, if they want to progress (Williamson, 1979, 1981). S-D logic theory argues that service is the basic foundation of transactions in all sorts of economies, not only service economies. S-D logic makes a claim that the customers never purchase a product or a service, instead, the "activities render services and things render services". Similarly, a number of theories provide multitude of perspectives to the field of service supply chain (Lusch, 2011; Lusch *et al*., 2007; Lusch *et al*., 2010).

A large number of authors have also tried to extend the work of the authors who proposed these theories. Ultimately, a lot of work has been contributed making service supply chain a widely researched domain now.

Table 2 A Compilation of Management Theories Supporting SSCM With Their Authors and the Proponents

No.	Theories related to SSCM along with author/s who proposed	SSCM authors who used these theories
1	Agency Theory (Eisenhardt, 1989; Jensen & Meckling, 1976)	(Ellram *et al*., 2004; Yildirim *et al*., 2018b)
2	Contingency Theory (Fiedler, 1964)	(Lo, 2016; Yuen & Van Thai, 2017)

Table 2 A Compilation of Management Theories Supporting SSCM With Their Authors and the Proponents (Con't)

3	Complex Network Theory (Moreno & Jennings, 1938)	(Ma *et al.*, 2020)
4	Cumulative Prospect Theory (Kahneman & Tversky, 1979; Tversky & Kahneman, 1992)	(Liu *et al.*, 2014; W. Liu *et al.*, 2013)
5	Differential Game Theory (Isaacs, 1969; Starr, 1969; Subbotin, 1984)	(Safari & Babakhani, 2015)
6	Equity Theory (Adams, 1963)	(Yildirim *et al*., 2018a)
7	Game Theory (Morgenstern & Von Neumann, 1953)	(Andritsos & Tang, 2014)
8	Grey System Theory (Deng, 1988, 1989, 2002)	(Chithambaranathan *et al*., 2015)
9	Institutional Theory (Meyer & Rowan, 1977)	(DiMaggio & Powell, 1983; Hirsch, 1975; Kumar *et al*., 2016a; Kumar *et al*., 2016b; Lai *et al*., 2006)
10	Performance Frontiers Theory (Schmenner & Swink, 1998)	(Zhang *et al*., 2012)
11	Relational View (Dyer & Singh, 1998)	(Fernando *et al*., 2018)
12	Resource based Theory (Barney, 1991)	(Carr *et al*., 2012a, 2012b; Govindan *et al*., 2020)
13	Resource Dependence Theory (Salancik & Pfeffer, 1978)	(Selviaridis *et al*., 2016)
14	Resource Orchestration Theory (Barney, 1991; H. Liu *et al*., 2016; Sirmon *et al*., 2007; Sirmon *et al*., 2011; Teece *et al*., 1997)	(B. Wang *et al*., 2018)
15	Service-Dominant Logic Theory (Lusch, 2011; Lusch *et al*., 2007; Lusch *et al*., 2010)	(Prasetyanti & Simatupang, 2015)
16	Service Management Theory (Edvardsson, 1997; Edvardsson & Olsson, 1996; Grönroos, 1998, 2007; Mayer *et al*., 2003; Shostack, 1984)	(Sampson & Froehle, 2006)
17	Social Exchange Theory (Homans, 1958)	(Carr *et al*., 2012a, 2012b; Khan *et al*., 2018)
18	Stakeholder Theory (Donaldson & Preston, 1995; Freeman, 1984; Mitchell *et al*., 1997)	(Genovese *et al*., 2013; Govindan *et al*., 2020; Schiffling & Piecyk, 2014)
19	Strategic Management Theory (Drucker, 1954)	(Carr *et al*., 2012b)
20	Transaction Cost Theory (Williamson, 1979, 1981)	(Choi *et al*., 2016)
21	Unified Service Theory (Sampson & Froehle, 2006)	(Maull *et al*., 2014; Sampson & Spring, 2012a)

3.4 Future Research Directions and Opportunities in the Area of SSCM

Based on the third question, "what are the future research directions or gaps in the area of service supply chains that are required to be addressed?" The authors have developed another table that is consisting of two columns. The first column is indicating the research gap sub-dimension and the second column mentions the future study opportunities in that sub-dimension. Hence, according to the table, a number of sector specific studies have proposed to use the same models / phenomenon / practice in other sectors. Here is it important to note that one of the sectors that are under researched in the domain of SSCM is public sector (Harvey, 2016; Seepma *et al*., 2021; Wang *et al*., 2020). Also, there are a few more e.g., defence sector, education sector, real estate, entertainment, police department, judiciary, and advertisement (Hussain *et al*., 2019a; Nouri *et al*., 2020; Purnomo *et al*., 2020). The authors couldn't either find articles with applications in above mentioned sectors or very few articles were in the lot (Ellram *et al*., 2004; Lo, 2016; Yuen & Thai, 2017). It was also identified during the skimming and scanning process that most studies were conducted in developed countries and very few in developing or underdeveloped countries (Karamchandani *et al*., 2020; Lo, 2016; Yuen & Thai, 2017). The gap certainly exists in conducting cross cultural studies with the focus on SSCM (Karamchandani *et al*., 2020; Lo, 2016; Yuen & Thai, 2017). Some method-based gaps suggested to conduct similar studies with increased sample sizes (Aitken *et al*., 2016) or usage of other methods like mixed method (Nagariya *et al*., 2020), surveys (Prahinski & Kocabasoglu, 2006), focus group or Delphi method (Altuntas Vural, 2017). It was also suggested to conduct more longitudinal studies (Jalilvand *et al*., 2019; Wang *et al*., 2020) and the ones with varied unit of analyses (Breidbach *et al*., 2015; He *et al*., 2016).

Another dimension where the gap exists is the performance measurement and performance management of SSCM domain (Cho *et al*., 2012; Choudhury *et al*., 2020; Nagariya *et al*., 2020; Prasetyanti & Simatupang, 2015; Sampson, 2000; Sampson & Froehle, 2006; Seepma *et al*., 2021; Yildirim *et al*., 2018b); and in the policy making and strategy development regarding performance measurement (Meijboom *et al*., 2011a; Ramish *et al*., 2017; Ukko *et al*., 2020). It is highlighted to come up with more and more SSCM performance metrics and frameworks that are also sector specific (Cho *et al*., 2012). The need to identify various performance-based trade-offs other than cost efficiency and customer service (Zhang *et al*., 2012); and developing policy guidelines for various service sectors (Guven-Uslu *et al*., 2014). The need has also been identified related to framework testing and developing operational frameworks and finding best practices in the domain of SSCM (Schiffling & Piecyk, 2014). A very

promising area of opportunities is to explore the integration of technological research within SSC architecture e.g., use of Business Analytics (Cheng *et al*., 2011); and how to better utilize new technologies within the realm of SSC for strategically repositioning to grow towards SSC 4.0 (Carr *et al*., 2012a). Various points in the supply chain have been identified by multiple authors at which use of technology may be applied, e.g., feedback mechanism (Lo, 2016); customer input (Sampson & Froehle, 2006); all supplier related coordination in real time (Sampson *et al*., 2015); all sorts of collaboration mechanisms and the knowledge-based approaches across the span of supply chain (Fernando *et al*., 2018; Komulainen *et al*., 2018; Sheng *et al*., 1999).

Defining the roles of service in diverse service sectors within the functions of plan, source, adapt, deliver, return, and enable has also been identified as an area of opportunity (Youngdahl & Loomba, 2000; Yuen & Thai, 2017). Gaps have also been identified in the upstream and downstream parts of the service supply chain (Voss *et al*., 2005; Yawar & Seuring, 2017); e.g., analysis of the stakeholders and their roles (Sheng *et al*., 1999); exploring methods for mass partnering (Sampson, 2000); multi-echelon application; connection of customer orientation with market orientation, multiple-echelon evaluation (Wei-hua *et al*., 2011) and service provider customer relationship (Choudhury *et al*., 2020). Some of the future study opportunities are in the domain of supply-demand balance, e.g., studying the service bullwhip effect (Akkermans & Voss, 2013); studying the market dynamics from the service supply chain perspective (Nagariya *et al*., 2020). Also, it is stressed to develop optimal and robust strategies for SSCM in uncertain scenarios (Anderson Jr *et al*., 2005). Reverse service supply chain has been pointed out as a big area for conducting future research (Nagariya *et al*., 2020). As far as education sector is concerned, it is recommended that universities should teach SSCM course in the degree program (Ellram *et al*., 2007); and also, to develop a SSC performance measurement mechanism within the same sector (Niranjan & Weaver, 2011).

Sustainability is another dimension to be explored in SSC domain, especially there is a need to investigate further the sub-domain of socially sustainable SSCs e.g., labor issues, employee relationship etc. (Yawar & Seuring, 2017); and to probe the dynamics of corporate social responsibility (Liu *et al*., 2019); also, it has been identified to further examine environment friendly practices in the domain of SSC (Choudhury *et al*., 2020).

From the quantitative perspective, there is always a need to identify new constructs in order to develop multiple quantitative models. Same need has been identified in SSC domain e.g., it is highlighted that new e-business antecedents could be considered in future studies (Bigné *et al*., 2008). There is a need to further develop the constructs "cost efficient" and "service efficient" (Stentoft Arlbjørn *et al*., 2011). In addition to this, competition related, and institution related constructs may be further explored (Baltacioglu *et al*., 2007; Ju *et al*., 2020; Karamchandani *et al*., 2020). Many other factors, such as LSSC (logistics SSC) agility, adaptability, and network complexity, integration with IT adoption that affect resilience, can be examined in future research as new constructs (Ju *et al*., 2020; Karamchandani *et al*., 2020; Lo, 2016). One of the gaps identified in a study is to use SSC performance as an independent variable in more studies (Yildirim *et al*., 2018b). In addition to this, the authors expect that the themes that are expected to be further explored in the near future are supply chain finance for service sector, not for profit services supply chains, calculating ROI for training programs for services supply chains, services supply chain 4.0, and carbon neutral service supply chains.

3.5 Key Take Away and Action Plan for Service Industry Professionals

The key takes away and action plan for service industry professionals are mentioned in the following **table 3**, in the last column in the light of future research directions and SSC themes. These action plan points have been suggested by the authors with a purpose to make full utilization of the future study opportunities. These action plan points are very useful for the industry professionals.

Regarding sector specific opportunities, service Professionals from sectors with scarce research i.e., education, consulting, entertainment, advertisement, financial services, real estate, insurance, postal services, police, and judiciary to provide more support to the academia for conducting more and more research in the domain of SSCM. This could be achieved through the application of applied research projects within these sectors. Similarly, service Professionals from countries with scarce research i.e., developing and underdeveloped ones to provide more support to the academia for conducting more research in the domain of SSCM. Service Professionals to provide more support in conducting cross cultural and cross-country research. Future research should also consider African countries, eastern European countries, gulf countries, countries from sub-continent and few countries from far east e.g., Indonesia, Philippines, Vietnam, Laos etc. Support is also expected from service professionals for extended research projects with increased sample size from their respective sectors. Professionals should keep an eye on the on-going research in the domain of SSCM so that SSC phenomenon could be better understood. Professionals should be given technical trainings on the understanding of various research processes.

There is an action required by the service professionals to develop different types of tools, methods, or formulae to better measure the customer inputs and other performance related measures. Service professionals should also develop a database of all performance related issues and allow the academicians to further probe the phenomenon. Cross industry and cross organization best practices for ways and means to SSC integration should be shared with each other. Professional organizations in service sector should work in collaboration for developing an ideal sector specific strategic / operational framework. Cross industry and cross organization performance measurement collaboration mechanism should be shared with each other. The service industry where the new technological advancements have been in place should share their experiences with each other so that the overall industry grows faster towards technological adaptation. Industry should make an effort to make use of latest technologies to measure the customer inputs; supplier

related coordination; record keeping; information sharing in real time; developing collaboration mechanisms and knowledge-based approaches for the purpose of better technological adoption.

Multiple cross stakeholder projects should be started to study the connection of customer orientation with market orientation and service provider customer relationship. Sector specific multiple echelon evaluation mechanisms should also be developed. Service professional teams should sit together in focus groups to discuss the dynamics of various concepts and constructs like cost efficiency, service efficiency, agility, adaptability, network complexity, integration with IT adoption and resilience and share this knowledge with the academicians so that better insights could be observed. Service industry professionals should put their efforts to enhance the social and environmental sustainability aspects other than economic sustainability by developing strategic and operations frameworks to enhance the social as well as environmental sustainability. Various best practices from social and environmental sustainability should be shared within the industries for the purpose of knowledge sharing. Service industry experts should join hands with academicians to develop the course service supply chain and teach them in collaboration in various universities. Service professional teams from not-for-profit organizations and should also align their processes from SSCM perspective. Cross industry and cross organization best practices for SSC 4.0 should be shared with each other. Teams from service Industry and academia should join hands in calculating the ROI for training programs in the domain of SSC. Top management should realize the need of in-depth study and application of the concepts of supply chain finance within the domain of service sector.

Table 3 Action Plan or Key Take Away for SSC Professionals

Research Gaps	Future Study Opportunities	Action Plan for Professionals from SSC sector
Sector specific gaps	a. To investigate the phenomenon or practice in the study related with SSC in other sectors (Hussain *et al*., 2019a; Nouri *et al*., 2020; Purnomo *et al*., 2020). b. Conducting more studies within public sector (Harvey, 2016; Seepma *et al*., 2021; Wang *et al*., 2020). c. Conducting studies that are more generalizable (Ellram *et al*., 2004; Lo, 2016; Yuen & Thai, 2017).	• Service Professionals from sectors with scarce research i.e., education, consulting, entertainment, advertisement, financial services, real estate, insurance, postal services, police and judiciary to provide more support to the academia for conducting more and more research in the domain of SSCM.
Region related gaps	a. Framework could be tested in other countries (Karamchandani *et al*., 2020; Lo, 2016; Yuen & Thai, 2017). b. Application in Asian and African countries (Karamchandani *et al*., 2020; Lo, 2016; Yuen & Thai, 2017). c. Cross cultural comparison for framework testing (Karamchandani *et al*., 2020; Lo, 2016; Yuen & Thai, 2017). d. Application in less developed countries (Karamchandani *et al*., 2020; Lo, 2016; Yuen & Thai, 2017).	• Service Professionals from countries with scarce research i.e., developing and underdeveloped ones to provide more support to the academia for conducting more research in the domain of SSCM. • Service Professionals to provide more support in conducting cross cultural and cross-country research.
Method related gaps	a. To conduct longitudinal studies (Jalilvand *et al*., 2019; Wang *et al*., 2020). b. Increasing the sample size (Aitken *et al*., 2016). c. Use of alternate research method e.g. survey for the purpose of theory testing (Prahinski & Kocabasoglu, 2006). d. Applying mixed method strategy or focus group or delphi method (Altuntas Vural, 2017) on the same phenomenon or practice (Nagariya *et al*., 2020). e. Change of unit of analysis (Breidbach *et al*., 2015; He *et al*., 2016).	• Support is expected from service professionals to extend their support for extended research projects with increased sample size from their respective sectors. • Professionals should keep an eye on the on-going research in the domain of SSCM so that SSC phenomenon could be better understood. • Professionals should be given technical trainings on the understanding of various research processes.

Table 3 Action Plan or Key Take Away for SSC Professionals (Con't)

Performance Measurement related gaps	a. How to measure customer input? (Sampson & Froehle, 2006). b. How to measure performance in other service sectors (Cho *et al*., 2012). c. Ideal performance measures for other service sectors (Cho *et al*., 2012). d. identifying performance tradeoffs other than customer service and cost efficiency (Zhang *et al*., 2012). e. Policy guidelines on some performance management issues (Guven-Uslu *et al*., 2014). f. Performance measurement of service based supply chain (Prasetyanti & Simatupang, 2015). g. SSC performance as an independent variable (Yildirim *et al*., 2018b). h. Performance levels to be measured (Seepma *et al*., 2021).	• There is an action required by the service professionals to develop different types of tools, methods formulae to better measure the customer inputs and other performance related measures. • Service professionals should develop a database of all performance related issue and allow the academicians to further probe the phenomenon.
Policy making, Strategy development, Framework development related gaps	a. Continuous integration best practices (Meijboom *et al*., 2011a). b. Ideal framework for other sectors e.g. services (Cho *et al*., 2012). c. Framework testing (Schiffling & Piecyk, 2014). d. Operational framework for service sector (Ramish *et al*., 2017). e. Exploring mechanisms that enhance collaboration in performance measurement and wider supply chain management (Ukko *et al*., 2020). f. Pillars of future framework are cross functional teams (Meijboom *et al*., 2011a).	• Cross industry and cross organization best practices for ways and means to SSC integration should be shared with each other. • Professional organizations in service sector should work in collaboration for developing an ideal sector specific strategic / operational framework. • Cross industry and cross organization performance measurement collaboration mechanism should be shared with each other.
SSC design related gaps	a. Defining service roles for different industries within plan, source, adapt, make, deliver and return domains (Youngdahl & Loomba, 2000; Yuen & Thai, 2017).	• Top management in service industry should make cross functional teams to study the depth of service roles within plan, source, adapt, deliver, return, and enable domains
Latest technologies related gaps e.g., use of Business Analytics to grow towards SSC 4.0	a. To explore the integration of technological research within SSC architecture (Cheng *et al*., 2011). b. How to better utilize new technologies within the realm of SSC for strategically repositioning (Carr *et al*., 2012a). c. To study the feedback mechanism in SSC domain using alternate technologies (Lo, 2016). d. How to measure customer input through the use of latest technologies? (Sampson & Froehle, 2006). e. To explore the use of technology for supplier initiated coordination in SSC domain (Sampson *et al*., 2015). f. To develop online health record repositories (Sampson *et al*., 2015). g. How SSC networks share information in real time using big data analytics (Fernando *et al*., 2018). h. To develop the collaboration mechanisms for SSC e.g. banks with technology providers (Komulainen *et al*., 2018). i. To explore the knowledge based approaches in SSC domain for technology adoption (Sheng *et al*., 1999).	• The service industry where the new technological advancements have been in place should share their experiences with each other so that the overall industry grows faster towards technological adaptation. • Industry should make an effort to make use of latest technologies to measure the customer inputs; supplier related coordination; record keeping; information sharing in real time; developing collaboration mechanisms and knowledge-based approaches for the purpose of better technological adoption.

Table 3 Action Plan or Key Take Away for SSC Professionals (Con't)

SSC knowledge management related gaps	a. Knowledge based approaches for technology adoption (Sheng *et al*., 1999).	• Cross industry and cross organization best practices for knowledge-based approaches should be shared with each other and developed further.
Upstream and downstream SSC gaps	a. Analysis of their stakeholders and their roles (Sheng *et al*., 1999). b. Exploring methods for mass partnering (Sampson, 2000). c. Multi-echelon application (Wei-hua *et al*., 2011). d. Connection of customer orientation with market orientation (Voss *et al*., 2005). e. Multiple-echelon evaluation (Yawar & Seuring, 2017). f. Service provider customer relationship (Choudhury *et al*., 2020).	• Multiple cross stakeholder projects should be started to study the connection of customer orientation with market orientation and service provider customer relationship. • Sector specific multiple echelon evaluation mechanisms should be developed.
Demand related gaps	a. Determining optimal and robust strategies for SSCM in uncertain situation (Anderson Jr *et al*., 2005). b. Service bullwhip effect need to be explored (Akkermans & Voss, 2013). c. Market dynamics (Nagariya *et al*., 2020).	• Industry cross functional teams should be given the task to further explore the dynamics of the service bullwhip effect and determine the optimal and robust strategies for SSCM in uncertain situation.
Gaps related to new Constructs	a. New e-business antecedents could be considered (Bigné *et al*., 2008). b. Develop the constructs "cost efficient" and "service efficient" (Stentoft Arlbjørn *et al*., 2011). c. Competition related and institution related constructs may be further explored (Baltacioglu *et al*., 2007; Ju *et al*., 2020; Karamchandani *et al*., 2020) d. Many other factors, such as LSSC (logistics SSC) agility, adaptability, and network complexity, integration with IT adoption, which affect resilience, can be examined in future research (Ju *et al*., 2020; Karamchandani *et al*., 2020; Lo, 2016). e. SSC performance as an independent variable (Yildirim *et al*., 2018b).	• Service professional teams should sit together in focus groups to discuss the dynamics of various concepts and constructs like cost efficiency, service efficiency, agility, adaptability, network complexity, integration with IT adoption and resilience and share this knowledge with the academicians so that better insights could be observed.
Sustainability related gaps	a. To investigate further the sub-domain of socially sustainable SSCs e.g. labor issues, employee relationship etc. (Yawar & Seuring, 2017). b. To investigate the dynamics of corporate social responsibility within SSC context (Liu *et al*., 2019). c. To further investigate environment friendly practices in the domain of SSC (Choudhury *et al*., 2020).	• Service industry professionals should put their efforts to enhance the social and environmental sustainability aspects other than economic sustainability by developing strategic and operations frameworks to enhance the social as well as environmental sustainability. • Various best practices from social and environmental sustainability should be shared within the industries for the purpose of knowledge sharing
Reverse services supply chain related gaps	a. Designing various frameworks for reverse services supply chains (Nagariya *et al*., 2020).	• There is a need to develop strategic and operations frameworks for reverse SSCs. Cross functional teams from industry should work on this task to further optimize their respective industry's reverse flows.

Table 3 Action Plan or Key Take Away for SSC Professionals (Con't)

Academia related gaps	a. Universities should teach services supply chain management course in the degree program (Ellram *et al*., 2007). b. Education sector SSC performance measurement should be conducted (Niranjan & Weaver, 2011).	• Service industry experts should join hands with academicians to develop the course service supply chain and teach them in collaboration in various universities.
Miscellaneous possible gaps suggested by authors	a. Exploring the phenomenon of SSC management in not-for-profit SSCs b. Exploring the application and best practices of SSC 4.0 c. Calculating ROI for training programs in SSCs? d. Application of supply chain finance in SSCs e. Application of SSC management in humanitarian supply chains / disaster supply chains	• Service professional teams from not-for-profit organizations and should also align their processes from SSCM perspective. • Cross industry and cross organization best practices for SSC 4.0 should be shared with each other. • Teams from service Industry and academia should join hands in calculating the ROI for training programs in the domain of SSC. • Top management should realize the need of in-depth study and application of the concepts of supply chain finance within the domain of service sector.

4. CONCLUSION

After reviewing the SSC domain through descriptive analytics, identifying major contributions and themes, supporting theories and future research directions, it is revealed that despite its two-decade long history of SSC domain there is still a significant gap in multiple sub-domains of SSC. It is also reminded that service sector has a huge potential by looking at it from the supply chain management perspective. A number of themes have emerged in the last few years allowing the researchers to further advance the field. We have also checked if the supporting theories used are adequate in defining the field and understanding various phenomena of SSC. Although the research in SSC domain is gradually on the rise, we have pointed out several future research directions, which are worthy of further research as well as contribution to the area. These include understanding SSC nature; use of latest IT technologies in SSC sectors; performance measurement and performance management; sustainability in service sector; reverse SSC, analysing demand management; integration or relationship management of upstream and downstream echelon partners; supporting theories; knowledge-based approaches; risk management and region or sector specific studies. As Yawar & Seuring (2017) highlight, the social sustainability concerns are one exciting area but is hard to deal with. In addition to this, awareness regarding the environmental sustainability issues is also on the rise. The action plan and key take away mentioned will act as managerial implications and would help the industry professionals to understand and implement the SSC processes in an optimal manner.

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APPENDIX 1: JOURNALS SELECTED FOR SYSTEMATIC LITERATURE REVIEW

Table 1 Journals Selected for Systematic Literature Review

Sr. No.	Journal Title	No. of papers	SCIMAGO Journal Rank		CLARIVATE ANALYTICS JCR-Thomson Reuters	AJG	ABDC
			2019		2019	2018	2019
			I.F	Quartile	Impact factor	Rank	Rank
1	Supply Chain Management: An International Journal	13	1.68	Q1	4.725	3	A
2	Journal of Supply Chain Management	10	3.98	Q1	6.842	3	A
3	Int. J. of Operations and Production Management	9	2.19	Q1	4.619	4	A
4	Int. J. of Production Research	7	1.78	Q1	4.577	3	A
5	Annals of Operations Research	6	1.12	Q1	2.583	3	A
6	Int. J. of Supply Chain Management	6	0.19	Q3	0	.	.
7	Int. J. of Production Economics	5	2.38	Q1	5.134	3	A
8	Journal of Industrial Engineering and Management	5	0.5	Q2	0	1	.
9	Production Planning and Control	5	1.39	Q1	3.605	3	A
10	Service Industries Journal	5	0.63	Q2	2.381	2	B
11	Int. J. of Logistics Systems and Management	4	0.37	Q2	0	.	.
12	Sustainability	4	0.58	Q2	2.576	.	.
13	Benchmarking	4	0.55	Q2	0	1	B
14	Industrial Management and Data Systems	4	1.39	Q1	3.329	2	A
15	Int. J. of Productivity and Performance Management	4	0.58	Q1	0	1	B

16	Int. J. of Logistics Management	3	1.06	Q1	3.325	1	A
17	Int. J. of Physical Distribution & Logistics Management	3	2.75	Q1	4.744	2	A
18	Computers and Industrial Engineering	3	1.47	Q1	4.135	2	A
19	Industrial Marketing Management	3	2.08	Q1	4.695	3	A*
20	Journal of Service Management	3	1.71	Q1	4.662	2	A
21	Journal of the Operational Research Society	3	0.95	Q1	2.175	3	A
22	Production and Operations Management	3	2.84	Q1	2.59	4	A*
23	Int. J. of Service Industry Management	3	0	0	0	.	.
24	Journal of Operations Management	3	3.96	Q1	4.673	4*	A*
25	Journal of Enterprise Information Management	2	0.8	Q1	2.659	2	A
26	Omega	2	2.58	Q1	5.324	3	A
27	Decision Sciences	2	1.33	Q1	2.014	3	A*
28	IEEE Transactions on Engineering Management	2	1.07	Q1	2.784	3	A
29	Int. J. of Information Management	2	2.88	Q1	8.21	2	A*
30	Int. J. of Logistics Research and Applications	2	0.87	Q1	0	1	.
31	Int. J. of Services, Technology and Management	2	0.13	Q3	0	.	.
32	Journal of Business and Industrial Marketing	2	0.69	Q1	2.497	2	A
33	Journal of Humanitarian Logistics and Supply Chain Management	2	0.89	Q1	0	1	C
34	Journal of Modelling in Management	2	0.57	Q2	0	.	.
35	Journal of Purchasing and Supply Management	2	1.47	Q1	4.64	2	A
36	Journal of Service Theory and Practice	2	1	Q1	3.512	1	A
37	Service Business	2	0.75	Q1	2.169	.	B
38	Sustainability Accounting, Management and Policy Journal	2	0.67	Q1	0	2	B
39	Transportation Research Part E: Logistics & Transportation Review	2	2.3	Q1	4.69	3	A*
40	Journal of Service Research	2	3.37	Q1	6.382	4	A*
41	Journal of Services Marketing	2	1.07	Q1	3.195	2	A
42	Int. J. of Enterprise Network Management	1	0.13	Q4	0	1	B
43	Int. J. of Services and Operations Management	1	0.29	Q2	0	1	.
44	Int. J. of Services, Economics and Management	1	0.2	Q4	0	.	.
45	Interfaces	1	0.61	Q2	0.775	2	.
46	China Journal of Accounting Studies	1	0.14	Q4	0	1	B
47	Electronic Commerce Research	1	0.65	Q1	2.507	.	A
48	Energy Strategy Reviews	1	1.34	Q1	3.895	.	.
49	Enterprise Information Systems	1	0.51	Q2	2.145	2	A
50	Environmental Management	1	0.92	Q1	2.561	2	C

51	European Management Journal	1	1.31	Q1	2.369	2	B
52	Facilities	1	0.4	Q1	0	1	B
53	Georgetown Law Journal	1	1.03	Q1	3.26	.	.
54	Global Economy Journal	1	0.2	Q3	0	1	B
55	Human Resource Management	1	1.64	Q1	2.476	4	A*
56	IEEE Intelligent Systems	1	1.54	Q1	3.21	.	.
57	IEEE Systems Journal	1	0.98	Q1	3.987	.	.
58	IEEE Transactions on Knowledge and Data Engineering	1	1.78	Q1	4.935	.	.
59	Int. J. of Contemporary Hospitality Management	1	2.2	Q1	5.667	3	A
60	Int. J. of Industrial Engineering Computations	1	0.98	Q1	0	.	.
61	Int. J. of Integrated Supply Management	1	0.39	Q2	0	.	.
62	Int. J. of Risk Assessment and Management	1	0.15	Q4	0	.	C
63	Int. J. of Shipping and Transport Logistics	1	0.5	Q2	0.914	1	.
64	Int. J. of Business Performance and Supply Chain Modelling	1	0.28	Q3	.	.	.
65	Int. J. of Information Technology and Decision Making	1	0.53	Q1	.	.	C
66	Journal for Global Business Advancement	1	0.21	Q3	0	1	.
67	Journal of Business Logistics	1	2.34	Q1	4.697	2	A
68	Journal of Cleaner Production	1	1.89	Q1	7.246	2	A
69	Journal of Electronic Commerce Research	1	0.67	Q1	1.875	1	B
70	Journal of Facilities Management	1	0.33	Q2	0	.	C
71	Journal of Information Systems Education	1	0.34	Q2	0	1	B
72	Journal of Islamic Marketing	1	0.37	Q3	0	.	B
73	Knowledge and Process Management	1	0.33	Q3	0	1	B
74	Management (Croatia)	1	0.19	Q3	.	.	B
75	Management Decision	1	0.86	Q1	2.723	2	B
76	Marine Policy	1	1.3	Q1	3.228	2	A
77	Maritime Economics and Logistics	1	0.81	Q1	1.703	1	B
78	Marketing Intelligence and Planning	1	0.62	Q2	2.164	1	A
79	Measuring Business Excellence	1	0.3	Q2	0	1	B
80	Meditari Accountancy Research	1	0.95	Q2	0	1	A
81	Organization Development Journal	1	0.11	Q4	0	1	C
82	Procedia Manufacturing	1	0.52	Q2	.	.	.
83	SAGE Open	1	0.32	Q2	0.715	.	.
84	South African Journal of Industrial Engineering	1	0.25	Q3	0.488	.	.
85	Sustainable Development	1	1	Q1	4.082	.	C
86	System Dynamics Review	1	0.48	Q2	1.879	2	A

87	Tourism Review	1	0.77	Q1	2.908	1	B
88	Transportation Research Part B: Methodological	1	2.9	Q1	4.796	4	A*
89	Uncertain Supply Chain Management	1	0.42	Q2	.	.	.
90	British Journal of Management	1	1.52	Q1	3.023	4	A
91	California Management Review	1	2.77	Q1	3.909	3	A
92	Int. J. of Business and Systems Research	1	0.37	Q2	.	1	.
93	Journal of Business Ethics	1	1.97	Q1	4.141	3	A
94	Journal of Management Studies	1	4.61	Q1	4.888	4	A*

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Abu Bakar A. Hamid has chosen academic as his profession in 1992, from a lecturer and later rise to a Professor of Marketing and Supply Chain Management. He holds a BBA and an MBA from Northrop University (USA) and PhD from University of Derby (UK, 2003) and now attached with PUTRA Business School Malaysia. He has demonstrated an excellent record of teaching and supervision for more than 30 years in the academic field, both undergraduate and postgraduate levels. Above all, his achievement in graduating more than 45 PhD candidates proves his ability, capability, and passion in postgraduate and 21 Post-Doctoral Research Fellowship supervisions. He has shown excellent records of impactful research and publications which directly has strengthened his expertise in the area of his interest. He managed to secure several competitive national grants and consultant for various projects and later profoundly published in more than 300 articles in competitive international journals, proceedings, books, and book chapters. Such commitment is truly an academician landmark. From the accolades, his academic recognition and leadership demonstrate the level of professorship. His notable contributions are recognized locally and internationally, as proven by the multiple invitations he had received as visiting professor, invited speaker, reviewer, and board of editor in journals, external assessor, and internal and external examiner. With such caliber, he has much to contribute to any academic institutions worldwide and was pronounced "The Best Supply Chain Professor" by The Golden Tigers 2019.

Devika Nadarajah served in the IT and telecommunications industry for over 10 years in the capacity of an internal as well as an external consultant in the areas of process management, process improvement, business process re-engineering, KPI development and tracking for the purpose of driving change. After embarking on her PhD, Devika made a career transition to the academia. She obtained her doctoral degree in Business Process Management (Quality Management) from University Malaya. She has a master's degree in Quality and Productivity Improvement and bachelor's degree in Statistics from University Kebangsaan Malaysia.