STUDY OF LEAN PRACTICES IN ENABLING SUPPLY CHAIN AGILITY: A LITERATURE REVIEW

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ABSTRACT

Today, there are many new technologies & optimization techniques are under development in Supply Chain Management, Lean has emerged as a very important & interesting field for the researchers as there is a very huge possibility in this area to work. Find different tools and strategies for the optimization of the supply chain by eliminating waste as well as reducing cost for the fulfillment of customer needs. But for improving any supply chain's responsiveness, which can be also termed as agility, very less work has been done so far and if we want to find an strategy which clubs both lean and agility somehow, then the supply chain performance can be improved both ways, efficiency as well as responsiveness. According to the authors, this is the first review paper that explores in detail lean practices in enhancing the supply chain and identifies latest emerging trend specially in enabling supply chain agility. The paper comprises a systematic & comprehensive review of articles on lean practices. Its role in supply chain agility enhancement using structured content analysis, and publications on lean, agile, and leagile strategies in automobile sector as well as in service industries published during the period 2005–2020.The classification of the reviewed article is done based on the basis of some characteristics as well as the contextual issues of the articles. Finally, future scope mentioned that there are several publications on lean but less on agile strategies, whereas only few articles exists on 'leagile' paradigm. The findings will help all the interested stakeholders like educationists, researchers, industrialist etc. to understand various work done so far in optimizing the supply chain especially by the latest tools like lean implementation, agility & the leagility at any decoupling point of the supply chain. It will also help exploring the possibilities of the role of lean in enabling the supply chain agility.

Keywords: Supply chain management, Literature review, Lean supply chain, Agility in supply chain, Leagile supply chain

INTRODUCTION

The Supply chain can be defined as a long chain of business entities starting from the supplier, manufacturer, dealer, wholesaler, retailer until the end user termed as customer, which are all involved in the flow of products & services in upstream and downstream, but also the flow of related information & finance (Beamon 1998; Lambert et al. 1998; Mentzer et al. 2001). The key function of the Supply Chain Management attributes the optimization of the delivery of goods & services as well as the contribution for the flow of information from supplier to customer & in reverse way too. With the help of the strategic coordination of the systemic flows internally & externally in the complete supply chain, with the aim of improving the satisfaction of customers by reducing costs, the competitive advantage could be easily achieved (Cooper & Ellram 1993; Cooper et al. 1997; Mentzer et al. 2001).An efficient supply chain will help companies more competitive and profitable. Today information is a very key factor

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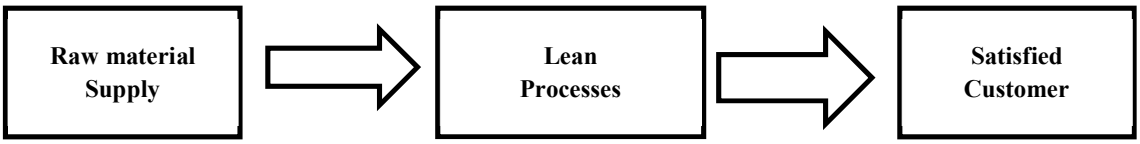
essential for optimizing the supply chain decisions because it provides the needed global scope. Latest technologies along with different management tools like CRM, SRM &ERP, clubbed with the techniques like RFID &auto ID are must in present scenario to be used for improving the overall performance of any Supply Chain Management.

Today, the optimizations of the supply chain network have become the utmost important and buzz word for all the stakeholders. As this is directly concerned with huge amount saving along with satisfying customers with varying demand. This is only possible when we search for different strategies as optimization tools in the supply chain as per the nature of the product as well as the type of organization. During the last few decades a vast number of companies have adopted both lean and agile strategies to gain competitive advantage over market by reducing cost as well as improving customer service. Lean philosophy particularly focuses on elimination of various forms of waste. Activities that are consuming resources but not generating any redeeming value to the customers are the various types of wastes which should be eliminated as per the lean concept (Womack and Jones 1996). (Womack, Jones, and Roos1990) in the book "The Machine That Changed the World" introduced the principles of lean production to the business world. This book gave the basic concept of sequencing the various operations which are found in the automobile industry. It also elaborated the capturing of the spectacular differences in various approaches and ensuring the best performances among the world's primary automakers.

Lean thinking means to diminishing the expenses and bringing down waste however much as could reasonably be expected. Lean is about more output with less input. The configurations of lean supply are shown in Figure 1.

FIGURE 1:
CONFIGURATION OF LEAN SUPPLY



The lean concept in a supply chain is referred to the implementation of the waste removal across the complete supply chain. Many researchers agree that various types of benefits like reduction in the production cost, improvement in product quality, quick& timely delivery of goods& flexibility in supply chain which are very much expected in any supply chain network, are only possible with the help of various lean principles, practices as well as techniques for implementing in the entire supply chain. In the reviewed articles, the fact is discovered that much work has been done in automobile sector, while in the service sector less attention from researchers has been given in the field of lean application. Whereas the concept of agility emphasizes flexibility, as well as responsiveness to the rapidly changing market demand environment (Christopher and Towill 2002). The agile companies are the one that uses the market knowledge and the information to exploit the profits opportunities (Naylor, Naim, and Berry 1999). Agility greatly focuses on a "wait-and-see" approach for demand, instead of relying upon the speculative philosophy of what might be demanded, or location and the quantity of the demand, but not responding to any product delivery until the clear demand is

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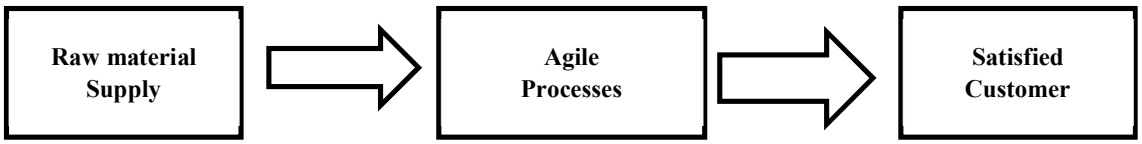
known. Planning of in the supply chain completely is the very key to provide the agile responsiveness. The configurations of agile supply are shown in Figure 2.

FIGURE 2:
CONFIGURATION OF AGILE SUPPLY



Leagile is the concept introduced by combining lean and agile strategies throughout the supply chain. Both the strategies are separated by a decoupling point as shown in Figure 2, and is also termed as postponement strategy which could be explained as the isolation of products at the closest point to the final end user underlying the fact that the goods are produced based on the demand rather than on forecast. It's now very important for not only automobile sector but for many manufacturing companies to identify this decoupling point and enhance their supply chain by focusing on various enablers. This will contribute towards improving the performance of supply chain as well as the satisfaction of the customers in both directions; efficient cost as well as responsive supply chain. The configurations of leagile supply are shown in Figure 3.

FIGURE 3:
CONFIGURATION OF LEAGILE SUPPLY

Today the word Leagile has become the buzz word in context of supply chain management, as the Lean means efficient, whereas the Agility means responsiveness. Though to achieve both lean and agility in any supply chain is a very tough task, and it also depends upon the type of organization to achieve either of them to a proper degree of extend. But yet an organization has to compromise or working at some trade-off between both lean and agility.

LITERATURE REVIEW

It is practically observed that the implementation of lean leads to the improvement of efficiency, whereas enhancement of agility leads to improvement towards responsiveness in any supply chain. But either of the strategy alone is not sufficient if one wants to have an overall improvement in the supply chain, so leagile supply chain can be more effective for the sustainability of any supply chain if its enablers are focused. Leagile strategy in supply chain is the involvement of both lean and agile strategies which was developed by Naylor et al. (1999). Organizations are facing a cut throat competition for the sustainability of their product in the market and facing a great challenge in enhancing their supply chain network. In globalization era, organizations or firms manage customer responsiveness and flexibility of

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supply chain in a cost-effective manner to satisfy customer's demands. Thus, lean and agile strategies play a very important role in enhancing the whole supply chain network. Information plays an important role in the visibility of demand and timely sharing of information, reduces the complexity in controlling the supply chain processes (Harrison and Van Hoek, 2005). The information systems should communicate exact and accurate information in the supply chain model to maintain agility that is beneficial for all the stakeholders. To satisfy customer demand perfectly lean and agility can be integrated effectively and efficiently in any supply chain (Fadaki et al., 2019). Quality management acts as an umbrella protector, because of its involvement in all activities, process, and design. Juran (1998) studied that quality management is one of the most important basic pillar for the implementation of lean strategy in the manufacturing process. Agility in the supply chain will leads to the enhancement of responsiveness of the supply chain. Yusuf et al. (2004) noticed that agile strategy is required to improve the capability of the lean supply chain so that I could quickly respond to the customers' varying needs and demand, thus improving the effectiveness of the supply chain. Agility in supply chain also maintains a safety stock such as enabling it to respond to the uncertain environment and so considered as responsive supply chain (Qi et al., 2009). Agility approach recovers the supply chain network design against the disturbance in an efficient manner. Lin (2004) noticed in his study that market orientation effectively affects supply chain network agility. Market orientation acts as a facilitator to quickly respond to market changes by efficiently identifying and satisfying the varying customer demand.

The agile supply chain strategy can be termed as flexible because of its dynamic nature, and respond to customers' ever-changing needs in a competitive world (Sharifi and Zhang, 2001; Gunasekaran et al., 2008). Agility strategy empowers the network design of supply chain to respond very fast to short-term and long-term variations in customer demand, and facilitate the organizations/firm to handle the uncertain demands in the world (Lee, 2004). The leagile supply chain approach effectively control resources and flexibilities in an uncertain market environment. Implementing lean and agile strategies simultaneously enables organizations/firms to minimize cost, maintain more flexibility, improve quality, and responsive to customer demand while maintaining the sustainability in the supply chain process. Integration of lean with agile approach is considered to be primary capabilities in minimizing supply chain risk (Christopher & Lee, 2004). If the supply chain is transparent, then the responsible consumers will definitely pay more for the products (Salonen & Åhlberg, 2013).

Supplier partnership linked directly with the suppliers, improving planning and continuous improvement programs (Gunasekaran et al., 2001). Lean – agile supply chain strategy also encompasses all the process from product design to the product selling, product design should be flexible to response changing market demand. Relationship configuration, visibility of information and dynamics of structures are the enablers of the agile supply chain (Baramichai et al., 2007). The agility practices in the supply chain process ensures effective response and able to minimize disruption, and also adaptable in variable (changing) customer demand in a reliable manner. Postponement strategy in the lean supply chain is the practices involvement in forward moving of one or more activities like making, sourcing, procuring and delivering (Li et al., 2006; Van Hoek, 1999).

A strategy of agile supply chain facilitates the network design of supply chain to respond very fast to short-term and long-term variations in varying market demand and enabling the organizations to handle the uncertain demands in the global era (Lee, 2004). The leagile supply chain approach effectively control resources and flexibilities in an uncertain market environment. Implementing both lean and agile strategies at the same time enables

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firms to minimize cost, flexibility, improve quality, and response to market demand while maintaining sustainability in the supply chain process. Integration of lean with agile approach is considered to be the primary capabilities in minimizing the risk in supply chain (Christopher & Lee, 2004).

Market orientation acts as a facilitator to quickly respond to market changes by efficiently identifying the requirement of customer. Quality management acts as an umbrella protector, because of its involvement in all activities, process, and design. Lin (2004) noticed in his study that market orientation effectively affects supply chain network agility. Juran (1998) studied that quality management in the manufacturing process works as a basic pillar for the implementation of lean strategy. Agile supply chain strategy enhances the responsiveness of the supply chain. Yusuf et al. (2004) noticed that agility is required to improve the lean supply chain ability to respond faster towards the needs and demand of customer and thus improve the effectiveness of the supply chain. An agile supply chain strategy also maintains a safety stock in order to enable it to respond to the uncertain environment and consider as responsive supply chain (Qi et al., 2009).

Agility approach recovers the supply chain network design against the disturbance in an efficient manner. Information plays an important role in the visibility of demand and timely sharing of information, reduces the complexity in controlling the supply chain processes (Harrison and Van Hoek, 2005). The information systems should communicate exact and accurate information in the supply chain model to maintain agility that is beneficial for all the stakeholders. To satisfy customer demand perfectly lean and agility can be integrated efficiently in any supply chain (Fadaki et al., 2019).

Lean-agile supply chain strategy also encompasses all the process from product design to the product selling. Product design should be flexible to response changing market demand. Some of the explored enablers of the agile supply chain are Relationship configuration, Dynamics of structures, and the visibility of information (Baramichai et al., 2007). The description of the lean enablers identified by extensive literature review as well as the expert opinion is shown in Table 1.

TABLE 1
LEAN ENABLERS WITH DESCRIPTION AND LITERATURE SUPPORT

Lean Enablers	Literature support	Description
Top management commitment	Marodin and Sauriin (2013; Jasti and Kodali (2015); Netland (2015)	It's responsible for the implementation of the operation strategy in the organization & to provide training to the employees & essential infrastructure
Inventory management	Expert opinion; Haq and Boddu (2015)	The core function is to provide exactly the right quality & right quantity of raw material, delivery at right time, right place, and also at the right cost.
Quality improvement	Expert opinion; Haq and Boddu (2015)	Quality improvement is a continual process needed at every stage for the complete customer satisfaction
Long term planning	Netland (2015); Marodin and Sauriin (2013)	Very important function of higher management helpful for determining the overall strategic decisions

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Customer relationship management	Expert opinion; Jasti and Kodali (2015)	Very crucial enabler which focuses on relation building with potential customers for long term future benefits
Supplier management	Expert opinion; Jasti and Kodali (2015)	The supplier selection & conflict management are the crucial functions depending on supplier management
Logistic management	Expert opinion; Jasti and Kodali (2015)	It is one of the important pillar responsible for transportation issues & optimization
Performance measurement	Netland (2015); KaziArif-Uz-Zaman, A.M.M. NazmulAhsan (2014);	This strategy helps in monitoring & control and finally improving the efficiency of the organization.
Information Technology	Jasti and Kodali (2015)	Information technology is utmost important today to keep watch on information flow across the entire supply chain network
Total quality management	Tortorella et al. (2017);Tortorella et al. (2018)	It is the responsibility of organization to foster the friendly work culture therefore implementation of TQM will enable the involvement of every employee in the organization.
Value chain management	Tortorella et al. (2017); Tortorella et al. (2018)	Value chain management is the very key for the optimization of all business activities as well as for maximizing profit.
Marketing management	Soni and Kodali (2016)	This strategy deals with the selection of the exact market and positioning of the product
HR training & education	Marodin and Sauriin (2013); Netland (2015); Haq and Boddu (2015)	Training and education is one of the integral part of any organization for building necessary skills in the employee for future growth
Total productive maintenance	Kumar et al., (2008); Papadopoulos (2011)	It is a type of maintenance process which contributes in improving the performance of product quality and optimize the machine availability time
Lead time Reduction	Mustaffa& Potter (2009), Nachtmann& Pohl (2009); Papadopoulos (2011)	For the improvement of the efficiency of any organization reduction in lead time plays an important part as an enabler
Production Automation	Haq and Boddu (2015); Expert opinion	Production automation helps in mass manufacturing, improved quality & safety measures, reducing down times, enhancing the productivity
Employee participation &empowerment	Marodin and Sauriin (2013); Netland (2015)	Employee participation and empowerment improves leadership quality in employees &their ability to participate in the decision making
Efficient replenishment	Tortorella et al. (2017); Tortorella et al. (2018)	Replenishment is one of an important enabler which depends upon the point of

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		sale information and the consumer demand in market
Reward and recognition	Marodin and Sauriin (2013) Netland (2015)	Reward and recognition are imperative to enhance the performance of the employees in an organization
Knowledge and information management	Haq and Boddu (2015); Expert opinion	It is the strategy which involves the knowledge of intellectuals & their innovative ideas to promote development
Continuous improvement	Marodin and Sauriin (2013); Netland (2015); Jasti and Kodali (2015)	Also termed as Kaizen which initiates & responsible for maintain the success rate & control the failure rate within the specified range
Standardization of work	Tortorella et al. (2017); Tortorella et al. (2018);	It refers to the optimization of the machine shop & shop floor operational procedures for standardization
Coordination & Collaboration among SC	Tortorella et al. (2017);Tortorella et al. (2018);	This is very essential for achieving benefits completely including suppliers, competitors and all the stakeholders of the supply chain

. The agility practices in the supply chain ensures effective response and able to minimize disruption, and also adaptable in variable (changing) customer demand in a reliable manner. The description of the agility factors identified by extensive literature review as well as the expert opinion is shown in Table 2.

TABLE 2
AGILITY FACTORS WITH DESCRIPTION AND LITERATURE SUPPORT

Factors affecting agility in LSC	Literature support	Description
Customer responsiveness	Harrison and Van Hoek, 2005; Jia et al., 2014; Dubey and Gunasekaran, 2015	It is an imperative element and should be achieved in support of agility. Customer responsiveness may be enhanced of like product to customers, if organizations explore the customers' needs as quickly as possible.
Supplier partnership	Li et al., 2006; Qrunfleh and Tarafdar, 2013	Supplier partnership significantly affects the operational capabilities of organizations in the supply process operations.
Information sharing	Harrison and Van Hoek, 2005; Kisperska-Moron and Haan, 2011	It is the connectivity between all the supply chain elements for sharing the accurate information and able to disperse among its entire element.
Quality management	Wang et al., 2004; Fernandes et al.,	It deals with the Quality performance among all the activities starting from raw materials till delivery of finished product

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	2017;Ahmed and Huma 2021	within the organization as well as considers sales after service of the product.
Design strategy (product)	Vonderembse et al., 2006; Carvalho et al., 2011	Design of products to meet individual customer needs and demand for immediate response and provide agility in supply network.
Structure dynamics	Baramichai et al. 2007.	This strategy is very useful for providing end-to-end information visibility. It also focuses on event-driven activities.
Inventory strategy	Vonderembse et al., 2006; Carvalho et al ., 2011	Strategic planning in the organizations should consider inventory strategy that makes decisions in response to customer demands.
Deviation from Leagility	Fadaki et al., 2019	Deviation from leagility is an index which should always be in control within the specified range
Process integration	Kisperska-Moron and Haan, 2011	Organizations optimize the lean supply chain activities through process integration which can be achieved by integration of information systems.
Market orientation	Ahmed and Huma 2021; Wang and Wei, 2005; Tseng and Liao, 2015.	Market orientation enables organizations to generate market knowledge considering consumers demand, needs, and expectation to satisfy customers.
Postponement strategy	Van Hoek, 1999; Lee, 2004; Qrunfleh and Tarafdar,2013	It is the supply chain's ability to respond fast towards the varying demand of the customers. It also acts as a mediator between lean & agility

According to the literature review authors found that there has not been any published study provides literature review of lean practices in enabling supply chain agility. In this context, this paper is the first paper that explained literature review based on lean supply chain enablers and agility factors. This paper help new researcher to understand lean problems of supply chain management as well as motivate researcher to work in this direction represents the major contributions of this paper.

This section provides literature review which is based on lean supply chain enablers and agility factors. The remainder sections of the paper are also well organized. Next section elaborates the methodology discussion and research potential based on the paper published in last few years on lean supply chain enablers and agility factors. Conclusion and future scope are mentioned in the last section.

METHODOLOGY DISCUSSION & RESEARCH POTENTIAL

Appropriate search terms were applied &the basic as well as advanced search options were used for the document search of relevant literature on the topic. The primary key words

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like 'lean', 'agile', and 'leagile' were used for searching articles reviews along with associated secondary key words such as 'automobile' and 'service' along corresponding to the years 2005 through 2020 (up to February 18, 2021).Various combinations of these key words were used like 'automobile' AND 'lean'; 'automobile' AND 'agile'; 'automobile' AND 'leagile' etc.

The systematic review was conducted based on various articles published over the last fifteen years of duration. The methodology used here focuses in obtaining the results which are capable of addressing the progression of development in lean, agile & leagile supply chains. Another purpose of the paper is also to analyze the world progress of literature on this emerging field, therefore for the bibliographic study we selected only journals as the reason behind is that the book chapter, conference proceeding, or any other sources are not having any quantifiable unified metric of measurement. Web of Science database is considered as one of the most important source of information for bibliometric analyses in the sciences which is published by Thomson Reuters and (Chen et al 2014). But in terms of information coverage the SCOPUS is the largest bibliometric database as compared with the Web of Science (Akmal et al 2018). Also, its comprehensive indexing is very high of 22,794 peer-reviewed journals, as compared to 14,498 journals from the Web of Science (Filser et al 2017; Machin-Mastromatteo et al 2017), therefore SCOPUS is finally chosen for the data retrieving process of the study.

The term "lean supply chain" & "agile supply chain" were searched by the "ARTICLE TITLE, ABSTRACT AND KEYWORD" in the SCOPUS for finding the papers analyzed in the study, the. A total of database of 1286 Articles, Review papers, Conferences, Book Chapter were extracted. Soon after, some papers consisting of the similar searched term in abstract and keyword, are deleted from the analysis applying the filters as also considering that some papers may be duplicated, and they may be indexed in two databases,. Through a detailed reading process, all the articles were double-checked in the final step of the filtration process and to ensure that all of the articles which are included were relevant & fulfilling the primary or secondary objective of this research study within the scope of inter-relationship among lean and agility.

Finally, 168 papers were extracted for final study after eliminating the Review papers, Conference papers and Book Chapters. Also eliminating the papers on manufacturing and only focusing on the papers of supply chain management was taken care. Bibliometric research was carried out to verify the journals that constitute the main forum for discussion of research, evolution of research published in journal of great impact, main topics discussed, approaches and technical procedures of the operations management and fields. Most used for developing the papers, most productive countries in relation to quantity of published papers, collaboration among countries in order to present the most relevant for propagating the knowledge, and impact factor of the main papers.

Figure 4 indicate pie chart that shows the percentage of papers based on industrial scenario considered papers on automobile/manufacturing sector and papers on service sector in supply chain management.

FIGURE 4:
PERCENTAGE OF PAPERS BASED ON INDUSTRIAL SCENARIO

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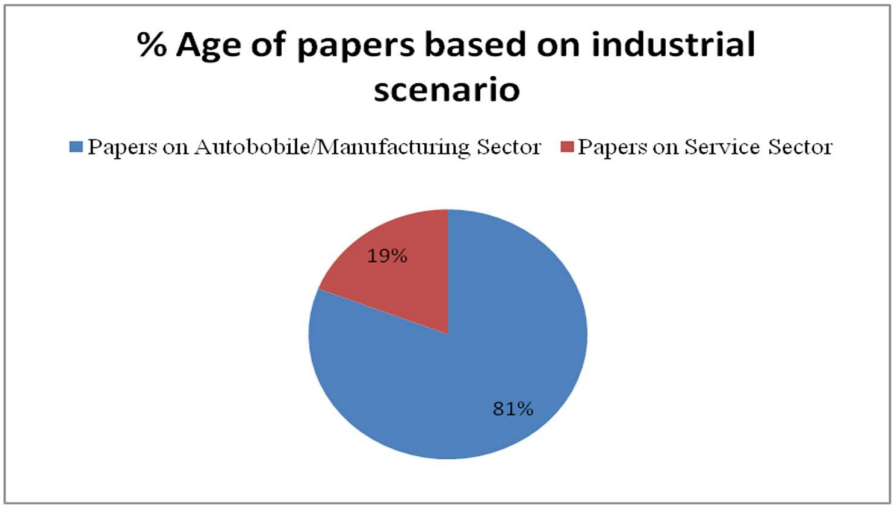

Figure 5 indicate pie chart that shows the percentage of papers of different category considered papers on lean, papers on agile and papers on leagile factor in supply chain management.

FIGURE 5:
PERCENTAGE OF PAPERS OF DIFFERENT CATEGORY

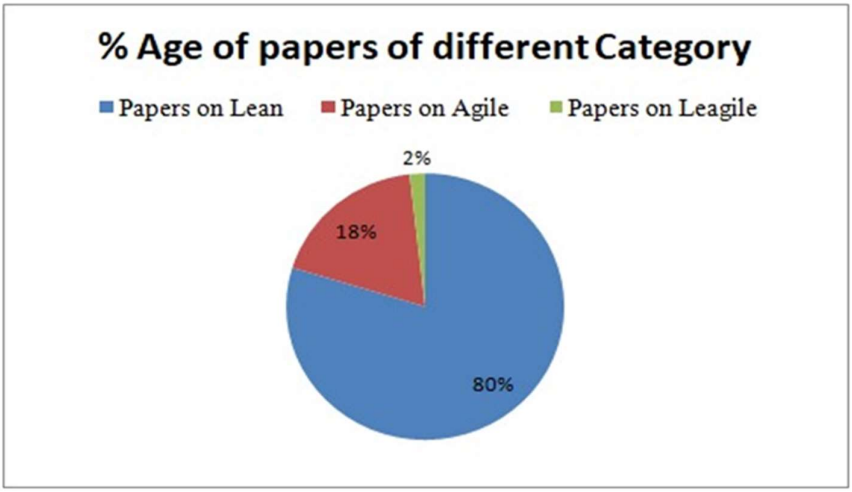

Figure 6 indicate number of researches that used lean supply chain enablers in SCM, where different lean supply enablers mentioned in X direction and number of paper considered lean supply chain enablers mentioned in Y direction.

FIGURE 6:
NUMBER OF RESEARCHES THAT USED LEAN ENABLERS IN SUPPLY CHAIN MANAGEMENT

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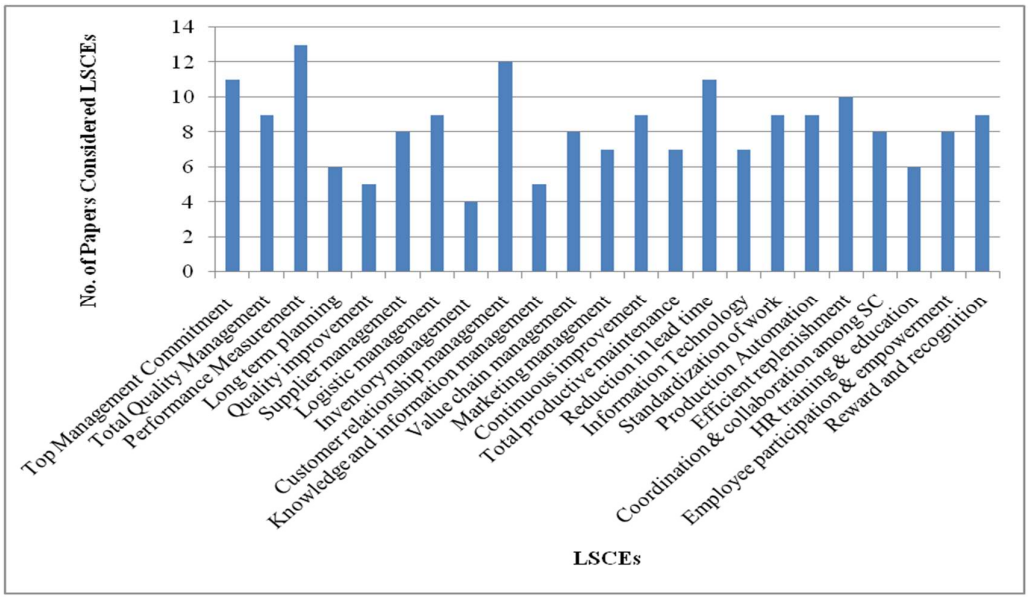
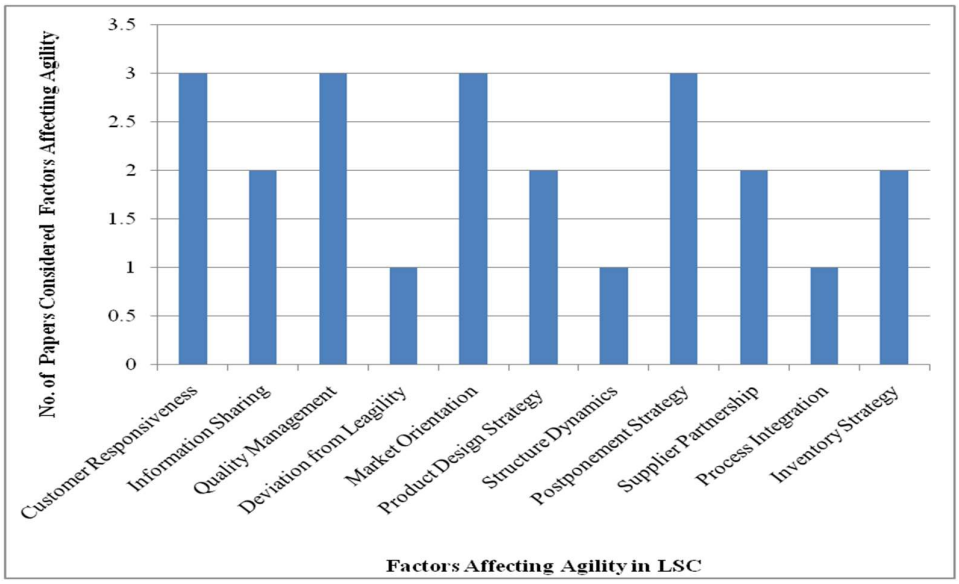


Figure 7 indicate number of research paper considered agility factor in supply chain management, where factor affecting agility mentioned in X direction and number of paper considered factor affecting agility mentioned in Y direction. Figure indicates that three papers considered customer responsiveness as agility factor in his research.

FIGURE 7:
NUMBER OF RESEARCHES THAT USED AGILITY IN LEAN SUPPLY CHAIN MANAGEMENT



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CONCLUSIONS & FUTURE SCOPE

If According to the authors research on supply chain management are growing very rapidly in last few years and these research more focus on big industries those are manufacturing large volume and large size products. So optimization in SCM plays a crucial role and major research area of the new researchers. As per the conclusion form extensive literature review it is concluded that much research has been done in the field of Automobile & manufacturing sectors and that too connected with the lean, whereas the service sector is have a great potential to be explored yet for the researchers in future. Authors mentioned in the paper the different lean enablers and agility concept that are not being exposed yet that's why could be research gap for the future researcher work. It has been observed that much research has been done in the lean optimizing techniques of supply chain, less on the agility of the supply chain, but very few or say negligible research on the latest emerging term leagile in supply chain management. This gives an indication that there is a huge research potential in this sector, which should be explored by the educationist, researcher & industrialist for grabbing the opportunity of future scope, as well as profits by optimizing their supply chain focusing on various leagile enablers. This should be done in any organization at a particular decoupling point, which depends on the organization type, product type, market type, as well as many more factors.

In future, more number of leagile enablers could be identified by the findings of different researchers and their interrelationships can be validated by applying different decision-making tools and approaches. By the help of this review, many new researchers considered latest methods such as Interpretative structural modeling (ISM) as well as MICMAC technique to develop the structural interrelationship among various lean enablers and agile factors. This could give more exact results about the implications of the research outputs obtained. This will help to identify the gap between the theoretical research outputs with the actual results.

REFERENCES

Ahmed, W., & Huma, S. (2021). Impact of lean and agile strategies on supply chain risk management. *Total Quality Management & Business Excellence*, *32*(1-2), 33-56.

Akmal, A., Podgorodnichenko, N., Greatbanks, R., & Everett, A. M. (2018). Bibliometric analysis of production planning and control (1990–2016). *Production Planning & Control*, *29*(4), 333-351.

Baramichai, M., Zimmers Jr, E. W., & Marangos, C. (2007). Agile supply chain transformation matrix: a QFD-based tool for improving enterprise agility. *International Journal of Value Chain Management*, *1*(3), 281-303.

Baramichai, M., Zimmers, E.W. Jr and Marangos, C.A. (2007). Agile supply chain transformation matrix: an integrated tool for creating an agile enterprise. Supply Chain Management: An International Journal, 12(5), 334-348.

Carvalho, H., Duarte, S., & Machado, V. C. (2011). Lean, agile, resilient and green: divergencies and synergies. *International Journal of Lean Six Sigma*.

Chen, H., Yang, Y., Yang, Y., Jiang, W., & Zhou, J. (2014). A bibliometric investigation of life cycle assessment research in the web of science databases. *The International Journal of Life Cycle Assessment*, *19*(10), 1674-1685.

Christopher, M., & Lee, H. (2004). Mitigating supply chain risk through improved confidence. International Journal of Physical Distribution & Logistics Management, 34(5), 388–396.

Christopher, M., & R Towill, D. (2002). Developing market specific supply chain strategies. *The international journal of logistics management*, *13*(1), 1-14.

Dubey, R. and Gunasekaran, A., (2015). Agile manufacturing: framework and its empirical validation. The *International Journal of Advanced Manufacturing Technology*, 76(9-12), 2147-2157.

Dubey, R., Gunasekaran, A., & Ali, S. S. (2015). Exploring the relationship between leadership, operational practices, institutional pressures and environmental performance: A framework for green supply chain. *International Journal of Production Economics*, *160*, 120-132.

Citation Information: Sharma, H., Sohani, N., & Yadav, A. (2021). Study of Lean Practices in Enabling Supply Chain Agility: A Literature Review. *Journal of Management Information and Decision Sciences*, *24*(S3), 1–14.

Fadaki, M., Rahman, S., & Chan, C. (2020). Leagile supply chain: design drivers and business performance implications. *International Journal of Production Research*, *58*(18), 5601-5623.

Fadaki, M., Rahman, S., & Chan, C. (2019). Quantifying the degree of supply chain leagility and assessing its impact on firm performance. *Asia Pacific Journal of Marketing and Logistics*.

Fernandes, A. C., Sampaio, P., Sameiro, M., & Truong, H. Q. (2017). Supply chain management and quality management integration: A conceptual model proposal. *International Journal of Quality & Reliability Management*, 34(1), 53–67.

Filser, L. D., da Silva, F. F., & de Oliveira, O. J. (2017). State of research and future research tendencies in lean healthcare: a bibliometric analysis. *Scientometrics*, *112*(2), 799-816.

Gunasekaran, A., Lai, K. H., & Cheng, T. E. (2008). Responsive supply chain: a competitive strategy in a networked economy. *Omega*, *36*(4), 549-564.

Gunasekaran, A., Patel, C. and Tirtiroglu, E. (2001), Performance measures and metrics in a supply chain environment, *International Journal of Operations & Production Management*, 21(1/2), 71-87.

Harrison, A., & van Hoek, R. (2005). Logistics Management and Strategy, FT Prentice-Hall.

Harrison, A., & Van Hoek, R. (2005). Logistics Management and Strategy–2nd edition Gosport.

Harrison, A., & Van Hoek, R. I. (2008). *Logistics management and strategy: competing through the supply chain*. Pearson Education

Harrison, A., van Hoek, R., (2005). *Logistics Management and Strategy*. Harlow, Prentice Hall/Financial Times.

Jia, H. M., Yu, K. C., & Zhang, J. C. (2014). A study on leagile supply chain model and performance evaluation system based on lean agile theory. In *Applied Mechanics and Materials* (Vol. 635, pp. 1771-1775). Trans Tech Publications Ltd.

Juran, J. M. (1998*). Juran s quality handbook*. Singapore: McGRAW-HILL.

Juran, J. M., & De Feo, J. A. (2010). *Juran's quality handbook: the complete guide to performance excellence*. McGraw-Hill Education.

Kisperska-Moron, D., & De Haan, J. (2011). Improving supply chain performance to satisfy final customers:"Leagile" experiences of a polish distributor. *International Journal of Production Economics*, *133*(1), 127-134.

Lee, H. L. (2004). The triple-A supply chain. *Harvard business review*, *82*(10), 102-113.

Li, S., Ragu-Nathan, B., Ragu-Nathan, T.S. and Rao, S.S. (2006), "The impact of supply chain management practices on competitive advantage and organizational performance", Omega, Vol. 34 No. 2, pp. 107-124.

Lin, B. W. (2004). Original equipment manufacturers (OEM) manufacturing strategy for network innovation agility: the case of Taiwanese manufacturing networks. *International Journal of Production Research*, *42*(5), 943-957.

Machin-Mastromatteo, J. D., Tarango, J., & Medina-Yllescas, E. (2017). Latin American triple-A journals 1: A quality roadmap from the quality indicators and journals' presence in Web of Science and Scopus. *Information development*, *33*(4), 436-441.

Naylor, J. B., Naim, M. M., & Berry, D. (1999). Leagility: Integrating the lean and agile manufacturing paradigms in the total supply chain. *International Journal of production economics*, *62*(1-2), 107-118.

Qi, Y., Boyer, K. K., & Zhao, X. (2009). Supply chain strategy, product characteristics, and performance impact: evidence from Chinese manufacturers. Decision Sciences, 40(4), 667-695.

Qrunfleh, S., & Tarafdar, M. (2013). Lean and agile supply chain strategies and supply chain responsiveness: the role of strategic supplier partnership and postponement. *Supply Chain Management: An International Journal*.

Salonen, A. O., & Åhlberg, M. (2013). Towards sustainable society: from materialism to post-materialism. *International Journal of Sustainable Society, 5(4),* 374-393.

Sharifi, H., & Zhang, Z. (2001). Agile manufacturing in practice: Application of a methodology. *International Journal of Operations & Production Management*, 21(5/6), 772–794.

Tseng, P. H., & Liao, C. H. (2015). Supply chain integration, information technology, market orientation and firm performance in container shipping firms. *The International Journal of Logistics Management*, 26(1), 82–106.

Van Hoek, R.I. (1999), Postponement and the reconfiguration challenge for food supply chains. *Supply Chain Management: An International Journal*, 4(1), 18-34.

Vonderembse, M. A., Uppal, M., Huang, S. H., & Dismukes, J. P. (2006). Designing supply chains: Towards theory development. *International Journal of production economics*, *100*(2), 223-238.

Wang, E. T., & Wei, H. L. (2005). The importance of market orientation, learning orientation, and quality orientation capabilities in TQM: An example from Taiwanese software industry. *Total Quality Management & Business Excellence*, 16(10), 1161–1177.

Wang, G., Huang, S. H., &Dismukes, J. P. (2004). Product-driven supply chain selection using integrated multi-criteria decision-making methodology. *International Journal of Production Economics*, 91(1), 1–15.

Citation Information: Sharma, H., Sohani, N., & Yadav, A. (2021). Study of Lean Practices in Enabling Supply Chain Agility: A Literature Review. *Journal of Management Information and Decision Sciences*, *24*(S3), 1–14.

Womack, J. P., & Jones, D. T. (1996). Beyond Toyota: How to root out waste and pursue perfection. *Harvard business review*, *74*(5), 140-151.

Womack, J. P., Jones, D. T., & Roos, D. (2007). *The machine that changed the world: The story of lean production--Toyota's secret weapon in the global car wars that is now revolutionizing world industry*. Simon and Schuster.

Wu, K. J., Liao, C. J., Tseng, M. L., & Chiu, A. S. (2015). Exploring decisive factors in green supply chain practices under uncertainty. *International Journal of Production Economics*, *159*, 147-157.

Yusuf, Y., Gunasekaran, A., & Abthorpe, M. S. (2004). Enterprise information systems project implementation: A case study of ERP in Rolls-Royce. *International journal of production economics*, *87*(3), 251-266.

Yusuf, Y.Y., Gunasekaran, A., Adeleye, E.O. and Sivayoganathan, K. (2004). Agile supply chain capabilities: determinants of competitive objectives. *European Journal of Operational Research*, 159(2), 379-3920.

Citation Information: Sharma, H., Sohani, N., & Yadav, A. (2021). Study of Lean Practices in Enabling Supply Chain Agility: A Literature Review. *Journal of Management Information and Decision Sciences*, *24*(S3), 1–14.