

A Knowledge Transfer Model to Implement Lean Practices for Apparel Industry based Multi-stakeholder 3PLs

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Abstract

Warehousing plays an important role in the logistics sector in order to facilitate economic and business benefits for both parties including customer and the service provider. 3PL (third-party logistics) service providers are specialized in providing end-to-end logistics solutions including warehousing, transportation and distribution to their multi-stakeholders in various sectors (Apparel, FMCG). Lean knowledge transferring process from 3PLs to their apparel based multi-stakeholders is a kind of challenging process for both parties due to several factors. The way of transferring and receiving knowledge is directly affected by the success of any business. In this research, a framework is developed on the perspective of 3PLs by examining the factors that affect effective knowledge transferring on lean practices for their clients. Based on these, the model which consists of relevant factors named extent of lean practices, capabilities of the source and the recipient and the relationship between them are providing a clear roadmap to the service provider and their stakeholders. The proposed model will help the 3PL service provider to identify critical success factors for sharing the knowledge of lean practices effectively. Also, it facilitates the successful collaboration with the multi-stakeholders and finally it helps to improve the overall warehouse operational performance.

Keywords

Knowledge Transferring, Lean Practices, Warehousing Operations, 3PL Service Providers

1.Introduction

Warehousing is one of the most important parts in a supply chain which bridges the production flow of a product until the delivery to its end-users. Warehouse operations are a fundamental part of any business and it can provide many advantages through effective warehouse management. Optimizing warehouse resources, reducing cost and material handling, improving warehouse efficiency are some of them. 3PLs (third-party service providers) provide a large variety of services to their clients including warehousing, transportation, inventory management, value-added services, consulting, shipping, distribution and so on. Hence, 3PLs act a major role in the industry to access win-win situation to them as well as their clients. The way of handling warehousing processes is varying according to the types of goods in the warehouse. As an example, methods that are used to the apparel sector products have different characteristics when compared to the FMCG (Fast Moving Consumer Goods). By identifying those similarities and differences, a business can improve its operational efficiency.

However, many companies have to bear high warehousing costs due to many inefficiencies of the processes. Existence of many non-value-added activities is the major reason for those inefficiencies. Therefore, the requirement of lean practices arises to eliminate those non-value-added activities in order to gain a competitive advantage to the business. Lean is about creating the most value to the customers while minimizing resources, time, energy and effort. It has a set of tools and techniques to improve the processes. The ultimate goal of implementing lean in 3PL companies is to provide perfect value to their clients through managing their processes effectively.

Successful lean implementation is basically dependent on the concept of “waste,” which refers to the non-value adding activities in a particular system. Waste can be defined as anything other than the minimum activities and materials

necessary to perform a particular process. There are seven types of wastes called Transportation, Inventory, Motion, Waiting, Overprocessing, Overproduction, and Defects. Warehouse efficiency can be improved by eliminating or altering the processes which generate those wastes.

The ultimate goal of every business is to satisfy their clients while building a good relationship with them. Sharing knowledge, experiences and values is one of the most important and useful methods to enhance the collaboration with their clients. Knowledge transfer is defined as the act of moving knowledge from one entity to another in an optimal and reliable manner (Bond et al., 2008). So that the receiver is affected by the experience of the source (Argote et al., 2000; Easterby-Smith et al., 2008; Volkoff et al., 2004). That way, sharing and receiving knowledge is directly affected by the success of the business. Knowledge transfer can be happened before, during and after any process. Looking at knowledge on company perspective, it is very important to have a good knowledge transferring process to deal with their stakeholders.

Any company can outsource their logistics services to a 3PL company. Though there is a broad expansion of 3PLs globally, still it is a new industry to the Sri Lankan context. Many multi-national companies are willing to collaborate with several 3PLs by outsourcing their operations due to several advantages. They always try to reduce their warehousing costs by gaining excellent service from their service providers. In this case, as a service-oriented business, 3PL service providers can share their operational, technical, and other information with their stakeholders to facilitate the best service. Lean knowledge sharing is one of the best practices which can experiment for 3PLs to improve their warehousing performance. Through this process, stakeholders of 3PLs who are acting as knowledge recipients can identify factors which are needed for effective knowledge transfer process and also can share their knowledge with 3PLs. Sometimes, stakeholders need to adapt lean culture, but service providers fail to do that. Therefore, the requirement of an appropriate model has arisen in the warehousing context.

The development of a knowledge transferring model on Lean practices is significantly important to identify the factors which are reasoned for sharing knowledge with their stakeholders effectively. 3PL service providers can generate a significant value of revenue by adapting to a lean culture. Hence, they can efficiently transfer that knowledge to their clients to keep a win-win situation in both parties.

2. Methodology

The purpose of the literature review is to identify the current studies that link factors affecting effective knowledge transferring and Lean practices that are used in warehouse operations. This systematic review of literature is based on the content analysis to collect knowledge on Lean practices, knowledge transferring and warehouse operations. Initially, the relevant articles were collected based on key words searching available in well-known research databases such as Scopus, Emerald Insight, Google Scholar etc. “Knowledge Transferring models”, “Knowledge Sharing”, “Knowledge Theories”, “Lean Practices”, “Warehouse Operations”, “Lean Knowledge Sharing” are some of the key words which have included in the criteria. This searching process was critical to sort out relevant articles due to the massive availability of research articles on knowledge sharing and Lean practices. 58 articles were selected in the initial stage and after thorough analyzing, 43 articles have been chosen based on the content and relevancy of the research. Finally based on the contribution to the research, thirty articles have accounted. The basic selection process is shown in Figure 1.

Based on the findings from the systematic literature review, factors that are affecting for effective knowledge sharing and lean practices were identified. Then the content analysis was done, and the conceptual model was developed to analyze those factors.

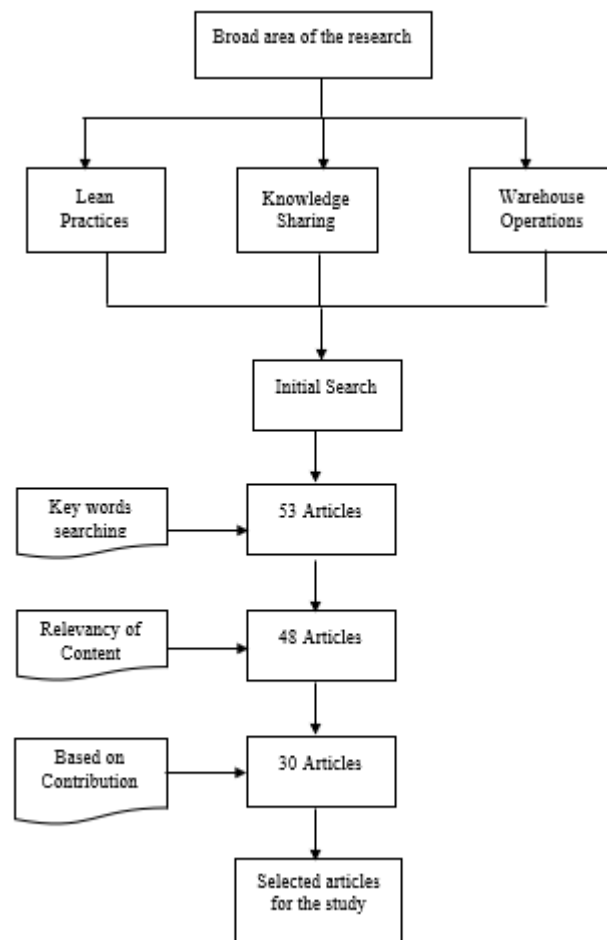


Figure 1: Process of Systematic Review of Literature

3. Systematic Review of Literature

3.1 Knowledge Transferring

Knowledge transfer is defined as the act of moving knowledge from one entity to another in an optimal and reliable manner (Bond et al., 2008). So that the receiver is affected by the experience of the source (Argote et al., 2000; Easterby-Smith et al., 2008; Volkoff et al., 2004). Knowledge transfer can be happened before, during and after any process.

According to the literature, there are three types of theories used to explain knowledge sharing. Theory of Planned Behavior (TPB) is used to model individual behavior. It means that the study seeks factors that cause for one-person act in a particular way, while others in a differently. Then managers can predict and manage them properly. Theory of Reasoned Action (TRA) helps to decide what knowledge to share, how to share it and with whom. It assumes people are rational and they make use of all information they have available. Social cognitive Theory (SCT) explains that knowledge sharing frames social interaction and individual motivations drive interactions between individuals including knowledge sharing events. (Richards B.,2014)

According to the various researchers, there are many knowledge transferring classifications. Myers and Cheung (2008) who categorise knowledge sharing into three distinct categories. The first is called “information sharing” and encompasses product-level information with customers and suppliers in the value chain. The second category is referred to as “joint sense-making” and this type of knowledge transfer occurs when cross-functional teams collaborate to solve organizational problems, pay attention to strategic issues pertaining to the firm and other key issues. “Knowledge integration” is the third category and is related to developing relation-specific memories yielding a common solution for problems benefiting all the stakeholders in the supply chain. (Myers and Cheung, 2008).

There are different forms of knowledge called explicit and tacit knowledge. Explicit knowledge is a formalised structured form of knowledge that can be more easily communicated, shared and stored (Sanchez, 1997). Tacit knowledge, on the other hand, is defined as complex, developed and embedded knowledge internalised by the knower, or otherwise in the collective organizational memory (Nantti et al., 2006). Formal and informal is another form of knowledge transfer.

In-literature, different knowledge transferring models which have developed for various contexts can be found. Narteh, (2008) has developed a conceptual framework including factors affecting for knowledge transferring in developed-developing country interfirm collaborations. The model is linked with four aspects named knowledge source, pre-conditions, relationship factors and knowledge process. Further, it is described as the main factors of each aspect thoroughly. As an example, Partner selection, intercultural fit, method of knowledge transfer, trust, interaction, business readiness are the points cause to build a good relationship.

Another knowledge translation framework is developed by Jacobson et al. (2003) to understand user context. It is mentioned that, the framework consists of five domains: the user group, the issue, the research, the knowledge translation relationship, and dissemination strategies. The framework is consisting questions for each domain. The questions facilitate the researcher what he or she already knows about the user group and the knowledge translation project, of identifying what still is unknown. (Jacobson et al.,2003)

Pasaribu et al (2017) have developed another conceptual model of knowledge transfer in a start-up business in order to solve knowledge workers turnover. The study found that the main phases of knowledge transition model are based on awareness, acquisition, transformation, association, application and knowledge externalization/feedback. Moreover, the conceptual model has developed to provide clear image on user requirement using the profile, scheduling, module, learning evaluation, and reporting.

Another framework for transferring knowledge into action has developed by Ward et al. (2009). It is mentioned that the five common components of the knowledge transfer process named problem identification and communication; knowledge/research development and selection; analysis of context; knowledge transfer activities or interventions; and knowledge/research utilization. The framework has developed by integrating those five components. Moreover, there are three types of knowledge transfer processes; a linear process; a cyclical process; and a dynamic multidirectional process.

Many articles mentioned the SECI-model to emphasize the difference between tacit and explicit knowledge. In brief, Socialisation is the conversion from tacit to tacit knowledge. Externalisation, focuses on the articulation of knowledge. To get tacit knowledge, which is hard to codify, into explicit knowledge which can be codified. Furthermore, the combination mode, which is the combination of explicit knowledge, is perhaps the most comprehensible mode. And finally, internalisation, where explicit knowledge is internalised or made tacit in an individual. (Lindlöf, 2013).

Although there are many knowledge-sharing models have already developed, still, there is a lack of sharing lean knowledge with multi-stakeholders. By referring those models, the final conceptual model was developed to share lean knowledge between 3PL service providers, and their apparel based multi-stakeholders.

3.2 Lean Practices

Lean is an understanding of an interrelated system of soft and hard practices (Shah and Ward,2007). According to the Dansen et al. (2017), hard practices refer to lean technical and analytical tools (e.g. setup time reduction, kanban, statistical process control, cellular layout), while soft practices concern people and relationships (e.g. , small group problem solving, employee training, team building and coaching).

According to the Womack and Jones (2008), understanding Lean starts with the analysis of waste in a system and the elimination of this waste. The elimination of waste aims at an optimized use of available resources (Anand and Kodali, 2009; Villarreal et al., 2016), and creation of high-quality goods and services at the minimum cost. (Kumar et al., 2013; Aamer, 2018).

The importance of Lean concepts and their ultimate aim of eliminating waste for warehouse operations have been discussed by several scholars (Garcia, 2003; Hines et al., 2004; Kumar et al., 2006; Gu et al., 2010; Bozer, 2012; Gagliardi et al., 2012; Sharma and Shah, 2015). Bozer (2012) stated that the most pertinent issues experienced by warehouses in general are known as the seven wastes, and have related these wastes to the five Lean principles (Value, Value Stream, Flow, Pull, Perfection), explained by many authors (e.g. Womack and Jones, 2003; Shah and Ward, 2003; Piercy and Rich, 2009; Shetty et al., 2010; Bozer, 2012). Furthermore, several studies (e.g. Smith, 2003; Kumar et al., 2006; Fine et al., 2009; Myerson, 2012; Sharma and Shah, 2015) have translated the “7-Deadly” Wastes of Lean production into the warehouse environment.

Table 1: The Seven Deadly Wastes

Waste Category	Description
Inventory	Production (raw materials, work-in-process, or finished goods) that goes beyond supporting the immediate need.
Transportation	Unnecessary movement of materials, work-in-process or finished goods
Waiting	Time when work-in-process is waiting for the next step in production. It can be truly illuminating to look at the time interval from order to delivery and ask – how much of that time is actually spent on true value-added manufacturing.
Motion	Unnecessary movement of people.
Over-production	Making something before it is truly needed. This is considered a particularly serious form of waste because it leads to excess inventory (e.g. safety stock) that typically masks many other underlying problems and inefficiencies
Overprocessing	More processing than is needed to produce what the customer requires. This is often one of the more difficult wastes to detect and eliminate.
Defects	Production that is scrap or requires rework

Source: (GEORGESCU D.,2012)

Lean transfer is a process that occurs at a dyadic level between a source and a recipient. (Dansel et al.,2017). According to Shah and Ward (2007), it involves the transfer of a complex system of interrelated hard and soft practices that permeate the organization and operate at multiple organizational levels (Maritan and Brush,2003;Inkpen,2008), and implies the transfer of explicit and tacit knowledge (Herron and Hicks, 2008). For these reasons, a lean transfer is challenging and more complex than other best practice transfer projects (Maritan and Brush, 2003).

Effective knowledge transfer process provides the warehousing operations with a competitive edge by ensuring better stock control, improved picking accuracy and lower storage costs (Sharma and Shah, 2016). Eliminating waste from the warehouse activities may constitute a resource that enhances warehouse operational performance. (Abushaikha et al.,2018).

3.3 Warehouse Operations

Warehouse operations are the basic part of a company. Companies can keep low costs and customers happy through efficient warehouse operations. When they're not, companies don't ship or receive inventory in time, workers are not as productive as possible, and the company loses money and credibility. Hence, warehouse professionals need to know exactly how to keep operations running efficiently. With the right mix of best practices, the company can maximize warehouse operations.

In warehousing, the flow of activities can typically follow these steps; Receiving is the process of off-loading and inspection of goods to ensure the correct quality and quantity of delivered orders. Then put-away is moving goods from the receiving area and storing them in a suitable location for future picking orders. Once a customer has placed an order, the relevant goods are picked and prepared for dispatch in an efficient and effective manner and finally the order is fulfilled, they are packed and made ready for delivery to the customer. (Abushaikha et al.,2018).

Warehouses can be viewed as a source of waste or non-value adding activities due to the intensive operations they undertake (Gu et al., 2010; Battista et al., 2014). According to the Dotoli, the principles and managerial tools of lean philosophy have been "typically applied to improve the internal logistics of the company and not the warehouse" (Dotoli et al., 2015, p. 57). Thus, there is an opportunity to minimize non-value adding activities of warehouses through identifying waste activities. In addition to that, warehouse management relates to optimizing warehouse resources including inventory, material handling equipment, loading/off-loading operations, staff and ensuring innovative solutions are in place (Rexhausen et al., 2012; Pires et al., 2017; Battista et al., 2014). Many researchers said that, the increasing need to enhance supply chain performance has forced warehouses to focus on reducing non-value adding activities (de Leeuw and Wiers, 2015; Faber et al., 2017; Salhieh and Abushaikha, 2016).

Significant cost needs to be spent for warehouse operations due to many non-value-added activities. Therefore, the requirement arises to lean the warehouse operation in terms of cost and time by eliminating non-value adding activities and optimizing value-adding activities. (Dharmapriya and Kulathunga, 2011). Various studies have investigated the effect of Lean production on performance (e.g. Swank,2003; Shahand,2003; BrandaodeSouza,2009; Demeter and Matyusz,2011; Jacaetal,2012; Vinodhetal,2014). Many researchers said that lean contributes to significant cost reduction, more productive workforce, shorter lead times and better quality (Krafcik, 1988; MacDuffie, 1995; Holweg, 2007; Shah and Ward, 2007; Aamer, 2018). Regarding warehouses, Lean provides the warehousing operations with a competitive edge by ensuring the following: (Salhieh et al, 2011)

- On-time delivery and low-cost service to its customers through improved efficiency and productivity, together with high quality and accuracy in preparing orders;
- Improved stock integrity and better control over services by preventing picking disruptions, lack of material availability and loss of sales opportunities;
- Accurate levels of information flow and trace ability between the warehouse and other echelons of the supply chain; and
- Management of the ever-changing customer requirements and market complexities by adapting to demand changes to meet seasonal and new customer demands.

4. Knowledge Transfer Model

The conceptual model is shown in Figure 2. According to the literature, mainly four reasoning factors were identified in order to share lean knowledge effectively with clients. Finally, it will help to increase the operational performance of the warehouse. There are many different lean practices applied in various contexts and among them, value stream mapping, 5S, just in time (JIT) are very common and useful practices in warehousing operations. Unnecessary motion, Standardized Process, Identification of bottlenecks and Employee's knowledge on end to end process are basic concerns in value stream mapping. Georgescu described, Sort (eliminate that which is not needed), Set In Order (organize remaining items), Shine (clean and inspect work area), Standardize (write standards for above). Sustain (regularly apply the standards) are as 5S concept. (Georgescu D. ,2012). Just-in time can highly effective in reducing inventory levels, improves cash flow and reduces space requirements.

These practices can be used in warehouse operations to identify non-value-added activities in order to improve efficiency. Hence, entire warehouse operations can be divided into four stages named receiving, put-away, picking, issuing and examine the types of lean practices used in each stage.

Capabilities of knowledge transferor is another factor which is affecting for effective knowledge sharing. Knowledge source must have the willingness to share knowledge with their clients. Teaching capacity is another capability of the transferor and it could be affected by the age and complexity of the knowledge, the experience in transferring knowledge as well as the transfer intents of the transferors. Complex knowledge is likely to involve many components and may be difficult to understand let alone communicate to others (Narteh,2008). The appropriate organizational infrastructure of knowledge transferor helps for effective knowledge transferring process. (Goh,2002). Breaking down hierarchies in the organization enables knowledge transfer [Nonaka,1994]. By encouraging cross-functional teams and teamwork in the organization is a solution to develop horizontal communication flow. (Goh S.C,2002). Appropriate knowledge mechanism can convey the knowledge from the source to the recipient effectively. Most knowledge experts agree that there are two specific types of knowledge named explicit and tacit knowledge. (Goh S.C,2002). Tacit knowledge is defined as complex, developed and embedded knowledge internalised by the knower, or otherwise in the collective organisational memory. (Daghfous et al, 2013) This knowledge can be transferred by mentoring, teamwork, chat rooms, personal intranets etc. (Goh S.C,2002). Explicit knowledge is a formalised structured form of knowledge that can be more easily communicated, shared and stored. (Daghfous et al, 2013). This type of knowledge is what is written or recorded in manuals, patents, reports, documents, assessments and databases and can be readily codified, articulated and captured. (Goh, 2002). An organization must aware of those types and select appropriate mechanism to transfer knowledge to the clients.

Not only the transferor, but also capabilities of the transferee must be taken into account for effective knowledge transfer. Willingness to receive knowledge, absorptive capacity and reward systems are some of the major concerns of transferee capabilities. Absorptive capacity can be qualified as 'the capacity to recognize the value of new external information, assimilate it and apply it to commercial ends' (Noblet et al, 2011). Firms that intend to learn from their partners must not only have the learning intent but also the absorptive capacity to absorb the new knowledge (Narteh,2008). Reward systems are another point of transferee capability. One way to encourage knowledge transfer is to base rewards to groups on more than solely financial success. (Goh, 2002) Conceptually, a firm's reward system could have an impact on its ability to explore alliance learning because it shapes the way managers perceive their tasks. (Narteh,2008).

Relationship of knowledge source and recipient has a high impact on effective knowledge transfer. High trust, motivation to share knowledge, collaboration and leadership capabilities affect to build a strong relationship with the valued customers. (Goh, 2002, Saini et al, 2019). Trust has mainly three factors named honest communication, reliance and delivery outcomes. People need to be open, willing to share valuable information, being honest to reflect the real situation. Trust can be improved through only this kind of communication. face-to-face communication plays a major role in initiating trust and that leads to collaboration in an interpersonal relationship (Saini et al, 2019). Motivation and the reward system are the factors that support and encourage knowledge transfer. In 2002, Goh emphasized the qualities and capabilities of the recipients, and the characteristics of the knowledge source depend on motivation. In 2015, Arif et al. and in 2002, Goh also emphasized that poor transfer of knowledge is the result of lack of motivation, absorptive capacity and retentive capacity of a knowledge recipient. Establishing a collaborative culture between both parties may lead to effective knowledge sharing and involvement of the senior management will guide to turn into the correct path.

Finally, effective knowledge transferring causes to maximize warehouse efficiency by improving order processing and tracking, reducing material handling, improving inventory in the organization and optimizing warehouse resources. (Frank and Garcia, 2013, Abushaikha et al,2018).

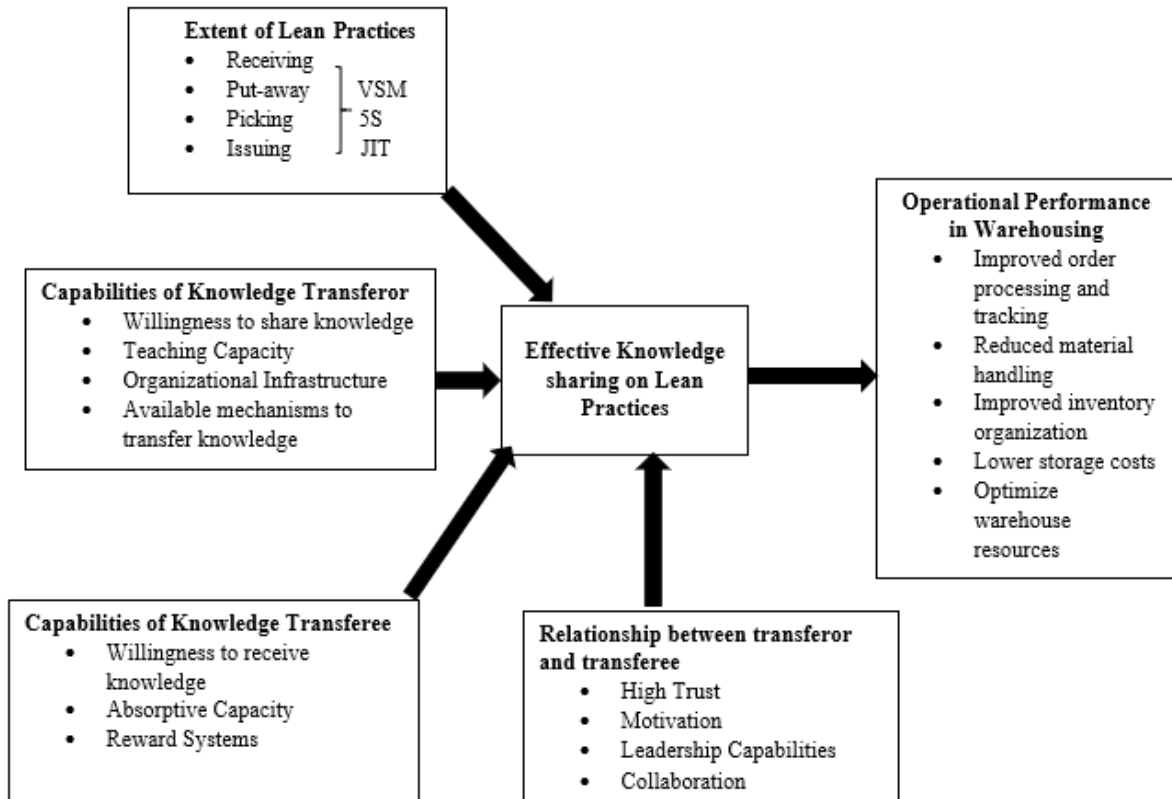


Figure 2: Conceptual Model

5. Conclusion

The purpose of this study is to develop a model to transfer knowledge on lean practices effectively from 3PL service providers to multi-stakeholders in the apparel sector. Hence, the model is providing a roadmap to both parties to identify the factors which are affecting for effective transfer. Sharing knowledge, experiences, values is one of the best practices to gain a competitive advantage in the industry. It is a vital need to find out existing capabilities and pitfalls in the organization in order to improve service efficiency. Although there are many knowledge-sharing models available in various contexts, still there is a lack of developing an appropriate model to transfer lean knowledge in warehousing field.

Different authors have focused on critical success factors which are affecting knowledge sharing and developed conceptual frameworks to share explicit and tacit knowledge within the organization. The proposed model goes beyond it to scrutinize the factors involved in sharing knowledge with external multi-stakeholders of the company. Hence the model is very important for both parties to improve their service level. The proposed model of the study is based on the assumptions that the selected 3PL service providers are using lean practices for their operations and have enough capability to share knowledge with the recipient. In addition to that, selection of knowledge recipient companies of respective 3PL provider is based on their revenue generation and that company has already implemented lean practices into their operations. The model is recommended to validate through multiple case studies and expert reviews. The study is focused on apparel based multi-stakeholder 3PLs and developing a model for entire stakeholders representing a variety of industry verticals can be studied as future research.

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