

Localization of Material Supply: A Literature Review

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ABSTRACT *Localization of Material Supply which is considered as a cost reduction method and a strategy that increases the flexibility of the supply chain in the companies has become one of the most recent trends in our globalized world. The awareness of the Localization increased over the last decade within both academics and practitioners. The purpose of the article is to suggest the factors that affect Localization and review the recent studies of Localization and analyse the methods that have been used in this field. The paper focusses on Localization in Supply Chains, more specifically, Localization of Material Supply. However, the publications about Sales Localization according to Regional Culture are also reviewed and discussed. This review considering Localization of Material Supply contributes to the literature by analysing the sectors, types and methods. Moreover, new research directions for Localization of Material Supply are proposed.*

Keywords :Localization of Material Supply, Supply Chain Management, Supply Chain Strategy

Malzeme Tedarikinde Yerlileştirme: Bir Literatür Araştırması

ÖZ *Tedarik zincirinin esnekliğini artıran ve maliyet azaltma tekniklerinden biri olarak görülen Malzeme Tedarikinde Yerlileştirme, günümüz küreselleşen dünyasında en son eğilimlerden biri haline gelmiştir. Son on yıla baktığımız zaman, hem akademisyenler hem de pratik uygulamacılar nazarında Yerlileştirmenin farkındalığı artmıştır. Bu makalenin amacı Yerlileştirmeyi etkileyen faktörleri önermek ve bu alanda uygulanan metotları ve güncel çalışmaları incelemektir. Çalışma Tedarik Zincirinde Yerlileştirme üzerine, özellikle de, Malzeme Tedarikinde Yerlileştirme üzerine yoğunlaşmıştır. Bununla birlikte, Satış Alanındaki Yerlileştirme konusundaki araştırmalar da incelenmiş ve tartışılmıştır. Bu çalışmanın literatüre katkısı, Malzeme Tedarikinde Yerlileştirme konusunda yapılan çalışmaların sektör, tip ve kullanılan metotların analizi noktasında olmaktadır. Ayrıca, Malzeme Tedarikinde Yerlileştirme noktasında yeni araştırma alanları da önerilmektedir.*

Anahtar Sözcükler : Malzeme Tedarikinde Yerlileştirme, Tedarik Zinciri Yönetimi, Tedarik Zinciri Stratejisi

Introduction

The world has been becoming more competitive and faster in every manner. Consequently, there has been no tolerance to waste of money and time. In addition, in result of the

competition in every area of the life, industries also want to purchase desired commodities with the lowest cost and highest quality.

Localization of Material supply is an activity which is strategically taken to action considering companies' Supply Chain Management (SCM). SCM is the management and coordination of a complicated network of activities including the delivery of products to the customer (Hervani et al., 2005).

As the SCM contains in itself purchasing activities (Supplier Selection, Bidding, Order Management etc.), Total Quality management, Green Supply Chain Management, Localization activities might include some of these in itself. Hence, Localization has been considered as an opportunity for cost saving in various companies by increasing local supply portion among all supply (Murat and Bayraktar, 2006). In addition, increasing the local sourced material portion provides flexibility and resistance to the global and worldwide enterprises for external shocks and uncertainties due to economic issues (Taş, 2012).

Considering the biggest economies in the world, the advantage of Localization of Supply allows foreign companies invest and design good according to local needs, also allows them to reach to the market easily, fulfil the customer demands and support them with better after sales service (Jiang and Prater, 2002). On the other hand, using local sourcing provides low-cost materials and there can be some doubts about the quality performance of the materials. Low performance of the supplier or no-qualified material may cause faults and undesirable result on the final product. Therefore, selection of most appropriate supplier and material becomes crucial with taking measurable risks with Quality Assurance activities.

The purpose of the article is to study factors of the Localization and review the publications about Localization of Material Supply. Besides, potential further studies will be pointed out regarding the related area considering Supply Chain Management concepts.

Material Supply

In this section, general information about Supply Chain Management and Globalization & Localization relationship will be covered in detail.

Supply Chain Management

The pursuit of acquiring advantageous position in incredibly competitive market leads companies seek new trends changing the management philosophy from company orientation to SCM orientation (Ugochukwu et al., 2012). SCM improvement activities are now an obligation more of a fashion in management.

SCM has several of definitions from the literature. Christopher (1998) notes that supply chain is a network that has upstream and downstream linkages between various activities and processes to produce finished products or services and make sure delivering them to consumer from raw material to the end product (Christopher, 1998). Similarly, it can be

suggested that SCM includes multiple organizations, upstream such as supply and downstream such as sales distribution, and the end user (Mentzer et al., 2001).

Localization of Material Supply

Although the all world has the trend of globalization, Supply Chains are more likely to be localized as far as the competitiveness in industry area is concerned. As globalization basically refers to living in one world (Giddens, 2002), companies try to broaden the horizon of sales activities. Globalization of a firm naturally increases the international integration activities and resources between different geographical markets (Mattsson, 2003). Globalization shifts the focus from production itself to the overall management areas from the design and marketing (Gereffi et al., 2001).

On the other hand, Localization refers to that sales and purchasing activities which use local sources considering geographical, cultural and lingual differences in between nations in terms of market segments (Lee et al., 1993). Activities in Localization like production, supply and Resource&Development have great significance for firms to be more competitive (Andersson and Segerdahl, 2012) and these activities are not only for particular country or region but also performed in large scale all over the world (Meijboom, 2003).

Basically, one meaning of Localization in business to manufacture, distribute or sell right in the customers' geographical location. Additionally, it is quite related to covering all basic customer needs such as demand for on time delivery, qualified product and conveniently finding the desired product. That is why companies' marketing strategies rely on Localization in Product Redesign according to cultural and geographical discrepancies, Localization Product Distribution System or Marketing Strategy of products suitable to Local environment features (Lee, H. et al., 1993).

As the Localization has broad meanings as mentioned, in SCM, Localization has different aspects and definitions. Localization of Material Supply is the relocation of material sourcing from a foreign country based suppliers to domestic based suppliers in order to take the advantage of low cost material and service. Localization of supply is generally discussed regarding purchasing activities when a manufacturing site is established in a overseas country (Morgenstern, 2006). Companies are looking for several opportunities for cost reduction in every aspect of business to serve better products to customers. Therefore, in order to this, strategic purchasing activities should handle supplier relationships and supplier involvement in product development or design (Ketchen et al., 2008).

Localization of material supply basically refers to, also, Localization of supplier's location because companies may use local distributors just to be treated better in terms of after sales services or shorter delivery times using supplier's stock for the products.

Localization has different objectives depending on companies' sourcing strategy which includes, generally, cost reduction opportunities, supply chain designs considering location of the supplier and risk issues (Monczka et al., 2015).

Cost reduction

As for newly invested companies in the region, there are several cost saving opportunities in terms of changing the sourcing strategy from Foreign Supply to Local Supply. As this strategy contributes companies financially, also it has large effect on supplier's development. Additionally, cost management begins from the beginning of the investment during technology or product design (Cooper and Slagmulder, 1999).

Inventory Management

According to companies' inventory management strategy; there can be an intention to be close to the supplier's facility in order to take the advantage of close interaction with supplier due to nature of the materials used in the manufacturing and uncertainty in requirement demand (Andersson and Segerdahl, 2012). This actually arises from buying companies' JIT systems (Monczka et al., 2015) in which they desire to keep less inventory and close suppliers can make smaller quantity deliveries according to short-time requirement.

Agile Supply Chain and Network

Agility is a skill that actually includes SCM activities including organizational structures, logistics and information system, which basically refers to organisation's flexibility in business environment (Christopher, 2000). According to Christopher (2000), there is a number of characteristics to be agile: Market Sensitive, Virtual, Network-Based, Process Integration. Among these, Virtual and Network-Based characteristics are highly related to the intersection of Agility and Localization of Material Supply. It is because location based closer supplier provides better communication, better information sharing and better usage of supplier's knowledge in particular areas. From the point of communication in network, it does not surprise anybody that executives are turning to partnerships to make the SC more agile and strong (Lambert et al., 1996). Besides, sometimes, quality communication is needed (van Weele, 2010) when the quality issues are critical.

Sourcing Through Distributor

There are many companies that purchase foreign manufactured items from domestic suppliers or distributors which are responsible for managing any international transactions. Companies may desire not to get involved direct purchasing from foreign manufacturer or lack the expertise to do so (Trent and Monczka, 2002). The reason is that international transactions take time and cost. Besides, buying organisation may use the advantage of better customer service from distributor.

Obligation of sourcing locally

Local Sourcing can be an obligation when global sourcing has not got sufficient global sources for a particular investment project or manufacturing facility. Hence, this situation may compel the companies verge the source of the materials or services in locally based suppliers. In this regard, Zhang et al. (2014) suggest that Localization depends on the degree of self-reliance of operation, design and management (Zhang et al., 2014).

Factors of Localization of Material Supply

There are several factors that affect Localization of Material Supply considering internal and external elements of SCM. First of all, risk factors have a high impact on Localization. Currency Fluctuation is one of the risk factors in Supply Chain. The businesses that especially work with tight margin are more fragile (Andersson and Segerdahl, 2012) and they may face disastrous ends in business area.

The currency fluctuation is high for EUR/TRY and USD/TRY and there are several dramatical increases as it is shown in Figure 1. Especially global companies are affected from this business environment (Makar and Huffman, 1997).

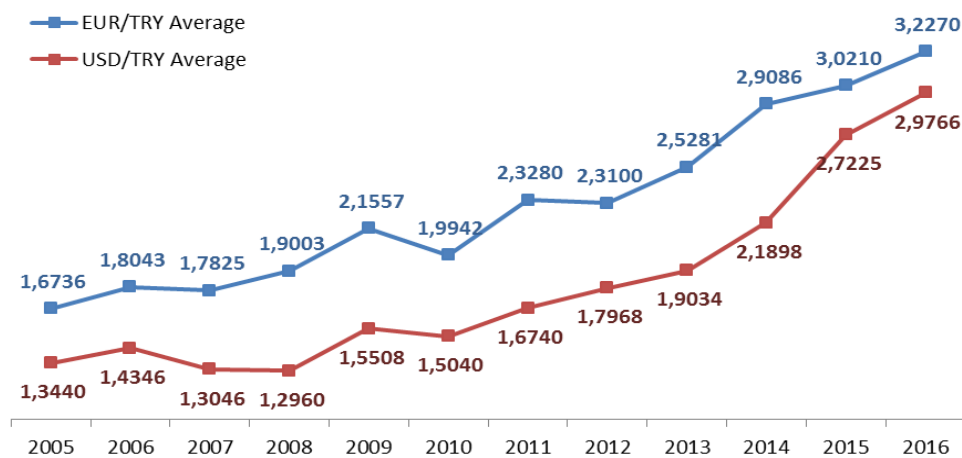


Figure 1. Currency Rates from 2005 to 2016 January (Central Bank of Republic of Turkey, 2016)

Cost of transportation is the other element for Localization as the subject is related to geographical location of the buying firms and supplier. In contrast to Localization, Globalization is triggered by low cost of transportation which allows companies broaden the business range (Mazzarino, 2012). Cost of transportation depends on oil prices considering the graph in Figure 2.

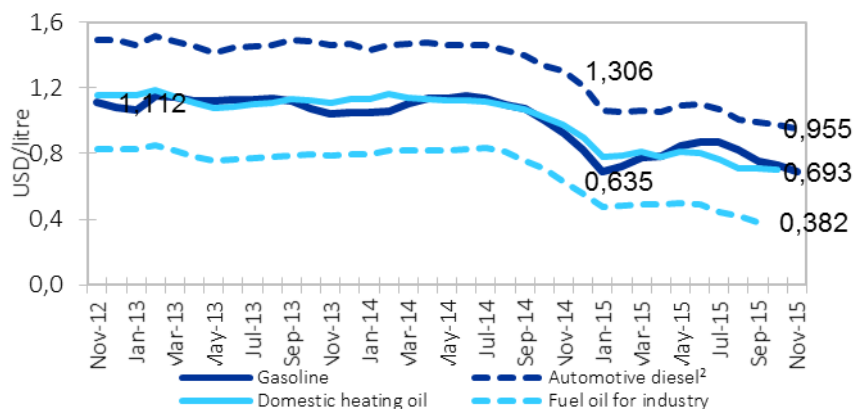


Figure 2. End-use prices for selected oil products (International Energy Agency, 2015)

On the other hand, improving Supplier Performance leads close relationship with key suppliers which brings improved quality, delivery service, reduced costs or all together, in operational manner. This can result sustainable improvements in the final product quality and innovation, high competition in the market and, consequently, better financial performance of the company (Kannan and Choon Tan, 2006).

The distance of the supplier determines the transportation mode in order to catch flexibility and speed for delivery (Lumsden, 2007). Far distance with fast delivery means high transportation cost (Andersson and Segerdahl, 2012). Therefore, at this point, sourcing the materials locally becomes vital for the companies which, especially work in Just-in-time conditions.

As far as regions are concerned, result of globalized world, the tariffs between countries is eliminated for free trade (Andresen, 2009) whereas restricting the free trade between regions push companies trade in local market which ends with Localization of Material Supply.

The companies are encouraged by Governments in terms of manufacturing activities through the national wide and refunded over time to support local manufacturing (Vargas and Johnson, 1993). Supporting technology (Sum and Yung, 1993) giving educational programs is another activity (Prasad and Sounderpandian, 2003) that Governments may implement in order to improve localization activities. Import restrictions which largely affect the supply of materials. Especially, for the suppliers that are not in the same region, there can be strict importing rules which are related regions' standards.

Internal factors affect operational purchasing functions of the companies. Company strategy, technology that the companies have, industry structure and financial requirements of companies should be considered in terms of Localization of Material Supply.

Moving the point of departure for production to the closer to purchase center for raw materials or components for production could reduce the complexity of manufacturing (Ersnt and Kamrad, 2000; Andersson and Segerdahl, 2012; Van Weele, 2010).

Taking the issue more broadly, according to theoretical propositions, purchasing service is more complex than purchasing materials and this complexity exists because of the risk involvement of purchasing activities (Smeltzer and Ogden, 2002; West, 1997; Gould, 1989). Location of the supplier has importance considering if a company uses Just-in-time manufacturing system. JIT simply means that all materials must be ready at the time they are needed (Van Weele, 2009). In addition, there are major benefits of collaboration of customer-supplier when parties complete adaptations to the other (Spekman et al., 1999; Hines, 1994) which is more likely the supplier is in the closer location to the buyer. As for spare parts, the inventory management is quite different from consumable items. Spare part stock is held according to criticality, replacement plans, maintenance plans and continuous equipment monitoring (Kennedy et al., 2002) unlikely to consumable materials. Despite these differences, companies can localize the supply of the spare parts in order to reduce the cost of inventory using consignee stock management in vendor's site.

Technology issue is not a matter to solve or develop in short run, contrary, there should be serious effort and R&D activities to reach the desired quality a technology to sustain the production when the materials are used in equipment that is used in the factory (Andersson and Segerdahl, 2012).

Literature Review for Localization of Material Supply

The review is made according to key words as "Localization of Material Supply", "Localization Supply", "Localization of Suppliers", "Supplier Localization", "Localization of Supply", "Local Supply Management", "Localization in Supply Chain", "Localization Material Supply", and "Localization". Totally 35 studies were found related to these key words. However, 13 of them were highly related to Localization in Material supply and also Sales Localization According to Regional Culture. As the sales activity is the beginning stage of Supply Chain, Sales Localization has a link to Localization in Supply Chain.

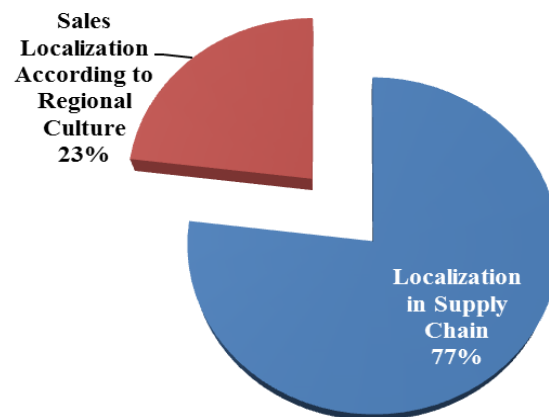
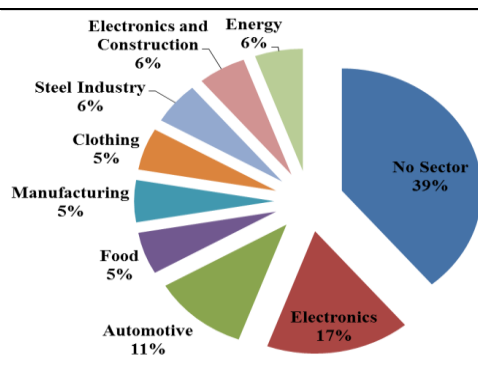


Figure 3. Localization Type for the Searched Studies

Localization of Material Supply is a purchasing activity which may occupy important portion in Supply Chain of any company depending on the sector. Supply of Localization is seen in the sector of Automotive, Food, Clothing, Manufacturing, Electronics and Energy. On the other hand, Sales Localization According to Regional Culture is also related to SCM. Therefore, as in Figure 3, the studies about Localization in SC occupy 77%, whereas Sales Localization takes 23% place among all publications.

Table 1. Table of Findings Related to Localization

Sector	Number of Studies	Pie Chart
No Sector	5	
Electronics	2	
Food	1	
Energy	1	
Clothing	1	
Manufacturing	1	
Automotive	1	
Electronics and Construction	1	

General studies in terms of sector occupy 38% of the publications as can be seen in Table 1. On one hand, Electronics has 2 articles about Localization; on the other hand, Food, Energy, Clothing, Manufacturing, Automotive and Construction have only 1 paperwork in the analysis. Actually, General studies take the Field Surveys or Strategical Decision Making methods in the publications.

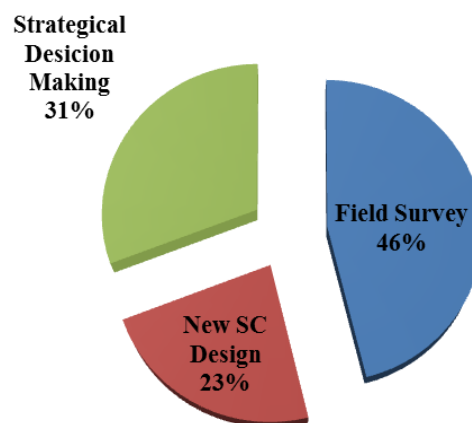


Figure 4. Method Analysis for the Searched Studies

According to Figure 4, 46% of the studies are about Field Survey which explains current situation and suggest new ideas regarding the case study in the paper. Besides, Strategical Decision Making occupies 31% of the publications which intends to help the companies to choose the appropriate Supply Chain Model or Strategy. Finally, 23% of the cases recommend new SC designs considering the trends and sector which the companies are in.

The Figure 5 refers that Localization case studies are started to be researched in 1993 and, although there are only 4 publications in between 1993 and 2000, the popularity of the subject has increased over the years. Until 2003, the Localization was researched in every year with 4 studies. It can be inferred that neither Localization of Material Supply nor Sales Localization has regularity of publication in every year.

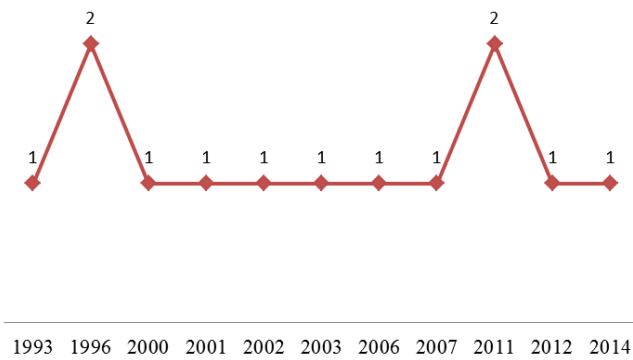


Figure 5. Number of Studies According to Years

The publications highly relevant to Localization either in SC or Sales can be seen in Table 2. As already analysed, it is shown 13 studies and year, author, subject, sector, type of Localization and method of these studies are provided in the Table 2.

Table 2. Publications Related to Localization

Year	Author	Subject	Sector	Type of Localization	Method
1993	Lee et al.	Control of Inventory and Service through Design for Localization	Electronics	Sales Localization According to Regional Culture	New SC Design
1996	Lee et al.	Different Strategies of Localization in the Chinese Auto Industry.	Automotive	Localization in Supply Chain	Field Survey
1996	Twomey and Tomkins	Supply chains, material linkage and regional development	General	Localization in Supply Chain	Field Survey

2000	Christopher	The agile supply chain: competing in volatile markets	Clothing	Localization in Supply Chain	New SC Design
2001	Munday and Roberts	Assessing the regional transactions of foreign manufacturers in Wales: issues and determinants	General	Localization in Supply Chain	Field Survey
2002	Garbelli	Over-Supply and Manufacturing Localization	General	Sales Localization According to Regional Culture	Strategical Decision Making
2003	Choi	The China Strategies of Korea's Winning Companies	Electronics and Construction	Sales Localization According to Regional Culture	Strategical Decision Making
2006	Morgenstern	Supply Base Localization: A Different Look at Low-cost Country Sourcing	General	Localization in Supply Chain	Strategical Decision Making
2007	Yang and Hsia	Spatial clustering and organizational dynamics of trans border production networks	Electronics	Localization in Supply Chain	Field Survey
2011	Nicholson et al.	The costs of increased localization for a multiple-product food supply chain: Dairy in the United States	Food	Localization in Supply Chain	New SC Design
2011	Bayo-Moriones et al.	Quality assurance practices in the global supply chain: the effect of supplier localisation	Manufacturing	Localization in Supply Chain	Field Survey
2012	Andersson and Segerdahl	Supply Chain Localization Strategies for the Future	General	Localization in Supply Chain	Strategical Decision Making

2014	Zhang et al.	Standard Requirements and Localization Development Trend for Nuclear Power Plant Key Components Material.	Energy	Localization in Supply Chain	Field Survey
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Lee et al. (1993) suggest the customization of design according the local requirements due to difference in taste, language or government. The paper suggests models for product redesign in order to meet geographical needs of the people who live in related locations.

Lee and Chen et al. (1996) study Chinese Automakers' localization strategies. The authors compare localization strategies and production systems between Shangia-VolksWagen and Tianjin Daihatsu. The conclusion of the author is that SVW and China government together implemented a strategy to support local manufacturers. However, TD and other companies in China carried out an approach of improvement of supply chain among local suppliers and it results quality decrease.

Twomey and Tomkins (1996) suggest analysis about structure of supply chains in order to be successful in industry. The paper also reviews strengths and weaknesses in SC of regional economies which have potential to grow but have constraints like unsuitable or weak support industry structure. Therefore, more relevant to Localization, the authors suggest that Localization activities in SC which might help to develop the host firm's region.

Christopher (2000) mentions that the Localization is one of the important factors to provide agility in supply chain in clothing industry. A localized supply chain contributes to speed of actions against fluctuations in the market and responds quickly. It is also convenient to be more responsive against the differences in taste, fashion and geographical difference in between countries. Local supply also helps the economic development of host region according to the author.

Munday and Roberts (2001) review the prospective of the foreign firms' features that leads to increase the supply from local sources. The result is that the age and size of the plant and industry group for the foreign firm is the features that affect the local sourcing.

Garbelli (2002) has studied about Localization of production facilities or setting distribution centres in end-users' country. The paper focused on manufacturing localization which means to produce and distribute according to local needs and requirements.

Choi (2003) emphasizes the strategy of localization in terms of penetrating and settling in China market and adopting China culture as the matter of strategical management of companies. This is a macro strategy not only for supply chain of SK and LG, but also adopting in China at every aspect such as manpower of China.

Morgenstern (2006) suggests supply base Localization for the companies that set the production facilities in outside of origin country. The author emphasizes the saving opportunities using local sourcing for the supply and there may be some limitations in order to perform Localization activities due to insufficient quality in knowledge, limited technology and know-how. Moreover, it is pointed out that why the global sourcing is still common which is justified that there is a tendency not to change the supply strategy if the current one works well.

Yang and Hsia (2007) reviews the geographical extension of production network of Chinese and Taiwanese manufacturers. Besides, in the related section, authors came up with a "Localization of supply chain index", which indicates impact of the locally supplied materials.

Bayo-Moriones et al. (2011) analyse the effect of Localization in quality practices in manufacturing sector. The authors aim to study the interaction between localization of suppliers and the quality assurance activities. It was found that there are good practices in localization of suppliers. However, there is a need to build a consensus to establish collaborative relations with suppliers to achieve improvements in quality and competitiveness in the market.

Nicholson et al. (2011) make a research about localization in Food supply chain and review the evidence of cost influence of localization in food supply chain of the USA. The authors develop spatially-disaggregated transshipment model for the dairy sector of US that tries to minimize SC costs. The result is that localization decreased the cost of assembly, but, on the other hand, it increased the cost of distribution and processing. It was found out that increased costs and localization seem to be nonlinear.

Andersson and Segerdahl (2012) reviewed the subject from both perspectives in their master thesis reviewing the strategies for Localization of companies' activities. It is deeply analysed in this study about internal and external factors of Localization strategies. Furthermore, it is concluded that large aspect based on demands on resilience, market structure and trade regions affect the Localization decisions.

Zhang et al. (2014) study the necessity for Localization of key component supply which is needed for Nuclear Plant in China. It is concluded in the paper that companies' self-reliance about design and management must be resolved in order to perform Localization activities in SC.

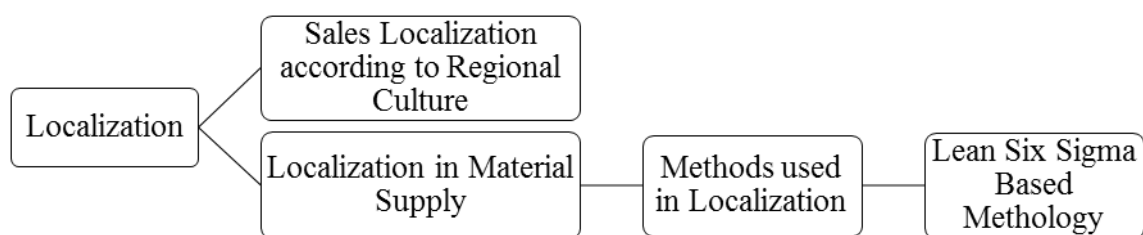


Figure 6. Research Direction for Localization of Material Supply

The reviews suggest that Localization subject related to SC splits into two parts; Sales Localization according to Regional Culture and Localization in Material Supply as can be seen in Figure 6. The direction of the study is on methods used in Localization of Material Supply. Especially, the review looks for Lean Six sigma (LSS) based method in Localization. However, there found no such a paper uses LSS. Therefore, this result may lead the authors to study on Lean Six Sigma Based Methodology for Localization of Material Supply.

Conclusions

This study conducts on Localization of Material Supply considering Sales and Supply aspect. On the other hand, the purpose of the paper is to discuss the factors and the methods for Localization activities and the type of Localization implemented in literature. Although some papers discussed Localization in Supply Chain, there are few studies especially researching Material Supply. Most of the papers focus on the field survey for particular sectors and analyse and try to suggest new Supply Chain designs.

Further study is required in order to analyse and find new methodology which can be used in Localization of Material Supply. Specifically, Lean Six Sigma method and its strong statistical tools may be used in future researches for Localization of Material Supply. Nevertheless, Globalization is a trend and target for most of the companies, Localization in Supply becomes significant for effective supply chains. Therefore, Localization of Material Supply needs more researches and projects using robust techniques such as Lean Six Sigma methodology.

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