

## An Evaluation of Challenges Faced by Cement Industry of Pakistan in Implementation of Lean Supply Chain

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### Abstract:

*Lean operations are one of the fastest devising business strategies of the modern businesses. These practices are visible in number of areas including supply chain management. A lean supply chain lessens wastes to minimize overall cost of doing business. Cement sector is among important industries of Pakistan, but this sector is missing its competitiveness because of weaknesses in its supply chain. Therefore, an analysis of supply chain related practices was carried out with an aim to achieve lean supply chain for cement industry of Pakistan. It was observed that cement manufacturers of Pakistan had been using supply chain practices such as demand-pull techniques, standardized methods, use of costing information, continual improvement, and latest technology. However, increase in lead time, delay in suppliers' consolidation, political unrest and process development for cutting energy cost, still need improvement.*

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## 1. INTRODUCTION

Yang et al. (2011) suggested that lean operations are one of the fastest evolving business tactics of the modern businesses. Toyota introduced the term “lean” and defined it as practices in which businesses use minimum time, stock, raw materials, etc. for maximum productivity (Hodge et al., 2011). It is related to decrease in wastes, flaws and all non-value adding steps in the organization. Stemmed from Japanese manufacturing techniques where managers focused on removing “Muda”, these techniques were associated with identification and elimination of non-value adding efforts, materials and time. Behrouzi and Wong (2011) suggested that lean operations are concerned with employing never-ending efforts to improve business practices such as reducing wastes. Businesses should reduce wastes so that resources consumed by wastes can be used in other matters like product and process design, manufacturing and customers’ relationship management.

Behrouzi and Wong (2011) suggested that supply chains have become a source of competitive advantage for the organization. Organizations have been struggling in developing supply chains which help them in meeting their strategic objectives. For this, organizations not only focus on their lean operations, rather scan all members of supply chain. This includes customers, suppliers and other intermediaries. These supply chain members match with strategic objectives of the organization. Porter (2008) highlighted the need for competitive advantage and suggested that an organization can develop competitive advantage through differentiation or low-cost production. These two strategies could be based on supply chain management (SCM). A cost-competitive or lean supply chain

can cater the needs and wants of the cost-centered customers by providing goods and services at lowest-possible cost. Barney (2012) suggested that development of a lean supply chain involves identification of such members in supply chain who offer lower cost so supply chains can respond to the cost-related needs of the businesses.

## **2. PROBLEM DISCUSSION:**

Hodge et al. (2011) and Carter and Easton (2011) suggested that organizations should consider lean business strategy at supply chain level. There are different ways through which a waste can take place in an organization. These wastes can take place at any level of manufacturing such as warehousing, order tracking, freight mailing, e-commerce related business links with other organization, waste could take place at any stage. So, organizations should keep an eye on these stages. It will help in ensuring effectiveness and efficiency of operations. In this way, organization can offer cost-competitive products by cutting out wastes from supply chain. Cao and Zhang (2011) suggested that development of lean supply chain is not free from effort. It needs an analysis of different reasons that may support or create hindrance for businesses.

Prajogo and Olhager (2012) highlighted the case of developing countries and suggested that developing countries face more challenges compared with developed countries. In developing countries, transport and socio-economic conditions may create extra challenges for setting up lean and agile supply chains. Panizzolo et al. (2012) highlighted that organizations in developing countries like India, Pakistan, Bangladesh and many African countries, can add value in their products and services through different lean SCM tactics. However, this is not an easy task and demands identification, evaluation, and management of different challenges associated with

implementation of lean supply chains (Arif-Uz-Zaman and Ahsan, 2014). Halldórsson et al. (2010) added that products and services offered by developing and underdeveloped countries are not advance and therefore, do not own premium price based differentiation. Managers of these organizations can offer competitive products and services by improving their cost-base.

Ma et al. (2011) suggested that in the current era, SCM related practices are indispensable source of survival of firm as markets and competition crossed the physical boundaries. Organizations can develop lean supply chains and increase value in their products and services. Hassini et al. (2012) highlighted there are number of business processes where wastes could occur. These include sales, purchase, production, ordering, carrying in and out, sales-return, and complaints handling. Elimination of wastes from these would enable organizations in development of a lean supply chain.

The research question for this research paper is as follows.

What challenges do cement industry of Pakistan face in implementation of lean supply chain and how do they tackle these challenges?

This research article has taken lean supply chain management at industry-level so focus of this article is not on any specific organization. Furthermore, selected industry for this project is cement industry of Pakistan.

The purpose of this research is to analyze the challenges associated with development of lean supply chain in cement industry of Pakistan. Researchers reviewed scholarly literature (such as lean operations, and supply chain management) and collected secondary data related to Pakistan's cement industry. This became basis of recommendations of this research. The main thrust of these recommendations was to help cement manufacturers of Pakistan so that they can overcome

challenges related to implementation of lean SCM. If cement manufacturers of Pakistan embrace these recommendations, it will help them in improving their economical and organizational base. It would make Pakistan's cement industry attractive for both local as well as foreign direct investment. Having a lean supply chain based cement industry would lead to prosperity for this industry which in turn lead to economic prosperity of the country.

The paper was based on review of secondary literature and highlighted features of lean supply chains and challenges associated with development of lean supply chains in developing countries especially in Pakistan. This paper adopted research method proposed by Creswell (2014). It started with identification of a management problem, followed by identification as well as refinement of research question. This led to review of literature and collection of secondary data for analysis and generating insights. At the end, conclusion and recommendations were given.

The main limitations of this research are as under:

1- The findings of this research are based on secondary data. Davis (2000) highlighted that secondary data may be less reliable as it is collected by someone else. Moreover, it may be noncurrent and irrelevant.

2- Researchers had limited opportunity of collecting primary data and confirming the findings of research.

3- Researchers highlighted few issues related to lean SCM. The list was not collectively exhaustive.

### **3. REVIEW OF LITERATURE:**

This section will present review of literature on subject matter. This includes an elaboration of supply chains, lean supply chain

and challenges associated with development of lean supply chains.

### **3.1: Supply Chain:**

Hugos (2011) suggested that a supply chain is a systematic group of various actions, information, people, supplies, and firms that move products and services from its suppliers to the end-customers. These activities include converting natural resources like raw materials and associated ingredients into finished goods for the end customers. Fawcett et al. (2014) suggested that supply chain management may create competitive advantage for businesses as optimization of supply chain lowers costs. This may produce better value for its customers. Supply chain management involves all companies who have interest in development and provision of a quality product to customers.

### **3.2: Lean Supply Chain:**

Arif-Uz-Zaman and Ahsan (2014) suggested that concept of lean manufacturing is essentially a team-centered approach. It involves continuous improvement in the products and services by identifying and removing all non-value adding activities or “wastes”. Yusuf et al. (2014) suggested that manufacturing organizations have been using lean practices yet now it gaining ever-higher prominence in logistics and supply chain management. Organizations are developing lean supply chains so they can reduce wastes and non-value adding actions to improve their procedures. Roh et al. (2014) suggested there are number of activities, which may add waste to organizational operations. This includes time, cost and stock levels. If an organization intends to develop lean supply chain then such wastes should reduce.

### **3.3: Requirements of Lean Supply Chains:**

Christopher and Ryals (2014) suggested that in order to develop a lean supply chain, a pull demand management system should be in place. Push and pull demand systems are opposite of each other. Where push demand is concerned with production or development of stock not based on actual demand of finished goods, pull demand management system is associated with production based on actual demand. Goods are only produced when they are required so no stocks will be developed and no stock holding cost will be implemented. This would result in reduction or elimination of waste related to stocks. Likewise, Leung et al. (2014) suggested that in order to develop a lean supply chain, lead times should be reduced as much as possible. Goods in transit, not only leads to production delays, but also leads to problems related to working capital tied-up in inventory. Reduction in lead times is associated with location of supplies. If suppliers are close to the organization, then lead times will be less and vice versa. Moreover, Bateman et al. (2014) suggested that in order to implement a lean supply chain, organizations should standardize products and services. Having done this, suppliers will not have to spend lots of time in analysis and processing of orders so lead-time will be reduced.

Turker and Altuntas (2014) suggested that where lean operations and lean supply chain are concerned with reduction in wastes so that cost can be reduced, information should be available so that such cost analysis can be performed. In order to do so, organizations should develop a costing system so that managers can have access to costing information. This information is to be used in decision making in the organization. In the absence of such information, one cannot judge the impact of lean supply chain on organizational cost. Further to this, Krajewski et al. (2012) highlighted another requirement for lean supply chain and suggested that lean

supply chain is a continuous process. Organizations face new challenges over the passage of time, which have an impact on the overall cost of the organization. In this regard, it is important that organizations should continuously improve its processes so that it can further reduce its cost. In the absence of national and organizational culture, which focuses on cost reduction, a lean supply chain may not be possible. Edgil et al. (2014) suggested that consolidation of suppliers might also bring supply chain related advantages. If suppliers are consolidated, this will eliminate various types of wastes in the organization along with overheads. Consolidation of suppliers in terms of process may lead to reduction in overall cost base of suppliers, which may have advantages for the other members of supply chain. Mohezar and Mohd Nor (2014) identified another factor and suggested that technology is a major enabler of waste elimination as well as cost reduction. As a result of technological enhancements, organizations can streamline and standardize their processes, which may lead to production of standardized products. This reduces wastes. Moreover, Keegan (2014) suggested that use of information and communication technology has enhanced communication as well as reduces cost of communication.

### **3.4: Current State of Pakistan's Cement Industry:**

Pakistan is one the developing economies of the world (Ahmed and Ahsan, 2011). It is the 6<sup>th</sup> largest country of the world. Because of its geographical location as well as participation in global political-economical issues, it is one of leading countries of the world. Ahmed and Ahsan (2011) suggested that Pakistan may serves as a corridor for trade between Europe and South Asian economies. Moreover, importance of Pakistan for trade between newly freed Russian states and rest of the countries is also highly acclaimed. However, Pakistan is facing several political, social, technological and economical challenges. This

may create barriers for its local as well as international supply chains. In this regard, it is important to understand challenges associated with development of lean supply chains associated with supply chains. Ahmed and Ahsan (2011) highlighted the importance of cement industry of Pakistan and suggested that cement industry of Pakistan is the key driver of economic development of the country. From last many years, cement industry of Pakistan is not performing well. There are number of reasons associated with this. This includes over-production, rising energy cost, non-availability of resources, fluctuating governmental policies, uncertain future demand, excess capacity, etc. (Shah, 2010). Further to this, The Dawn (2014) reported that cement industry has lost its competitiveness against foreign competition. One of the underlying reasons for this is the competitive supply chain management practices by rivals such as India. The supply chain of cement industry has number of problems. Consequently, it is unable to obtain required level of effectiveness and efficiency. Some of these factors are lower exports leading to high inventory levels, rising prices of raw materials, increase in taxes, transportation costs, gas development infrastructure cess, poor local demand, etc. Ali et al. (2015) highlighted characteristics of cement industry of Pakistan and suggested that there are over 20 cement manufacturers in Pakistan. 5 out of these are under the direct control and ownership of Government of Pakistan. Recently, Pakistan has started exports to its neighbouring countries including Russia, Iraq, Sri Lanka, Afghanistan, United Arab Emirates and Afghanistan. In addition to these, few export orders of African countries were also processed by these local manufacturers. Overall, these local manufacturers have created a cartel and they generally charge very high prices in the local market. However, since in international markets, it has to compete with companies of other countries so the cement manufacturers charge competitive prices. There are two main

regions in which whole cement is produced and sold. These two regions are southern region as well as northern region. The industry is also observing consolidations in the form of mergers and acquisitions. Owing to the importance of cement industry for Pakistan's economy, an analysis is required in this area.

#### **4: SITUATION IN PAKISTAN:**

Ahmed and Ahsan (2011) highlighted that Pakistan has started its journey on the road to prosperity yet it still has to overcome lots of challenges. Country is not having a strong economic condition and Government of Pakistan is also facing political challenges. Electricity shortage is among major problems of Pakistani organizations. Government of Pakistan is not having enough electricity. So, it is unable to fulfill requirements of household as well as business. Besides, the cost of energy (oil, electricity and gas) is also increasing on a consistent basis (Asif, 2009). Consequently, lot of private sector enterprises have developed their own energy units which are used for provision of uninterrupted power for their business activities.

Further to this, Ayyoub et al. (2011) concluded that although Pakistan has started documenting its economy yet major part of the economy is still undocumented. This made macro-economic management and business forecasting quite challenging and inaccurate. Further to this, strikes by residents of Pakistan, suicide attacks and terrorist attacks are also very common in Pakistan. These added to production delays and delays in supply of goods to people. Kiani et al. (2015) highlighted that present Nawaz Sharif government has started number of projects, which may enhance competitiveness of economy of Pakistan. Moreover, over the period of time, state of information and communication technology is also improving in Pakistan (Attari et al., 2011). This is also a major enabler of strategy for the businesses operating in Pakistan.

Zeshan (2014) highlighted that unplanned administration of Pakistan has caused major problems for business sector of Pakistan. Rising taxes, escalating energy costs and uncertain monetary policy of Government of Pakistan are notable hurdle for businesses. In addition to this, deteriorating condition of Pakistan rupees is also making exports cheaper and imports expensive. However, recent developments in region are likely to create lots of opportunities for business sector of Pakistan. One such thing is investment of US\$ 46 billion by China in next 3 years (Tribune, 2015).

## **5. APPLICATION:**

Irfan et al. (2011) suggested that economy of Pakistan is not very documented. There are very few companies who are conducting comprehensive consumer behavior surveys and rely on those. In the absence of information related to preferences of customers, organization produce without the solid knowledge of what to produce and when to produce. Godil and Shabib-ul-Hasan (2013) highlighted that in the absence of demand related information, both manufacturers and retailers have to keep stocks which leads to increase in stock holding cost. Thus, lean supply chain is compromised. However, for next 3 years, since China is spending US\$ 46 billion on the road, transport, ports and related infrastructure so there is some level of certainty of demand. As a matter of fact, total cement requirements for this project is more than 3 years annual total production of cement industry and remaining cement has to be imported from abroad. This could serve as a basis of demand forecasting. Further to this, Raja et al. (2011) highlighted the case of road and transport infrastructure in Pakistan and suggested that over the period of time, transport and road infrastructure of Pakistan has improved. Villages and cities are now more connected. This resulted in quick and efficient deliveries of

supplies to customers and markets. However, people do not have much traffic sense which leads to road accidents which may cause delays in supply of goods. Further to this, suicide attacks; strikers, public processions, etc. are also very common in Pakistan, which increases lead-time of deliveries, and thus achievement of lean supply chain is compromised. These also have detrimental influence on the cement industry of Pakistan. The underlying reason is that cement is manufactured on the two opposite corners of Pakistan (Balochistan and Khyber Pakhtoon Kha) and from these two provinces it is imported to the rest of the country. These two provinces have lots of political and militant disturbance. As a matter of fact, Pakistan army is doing an armed operation in these two provinces. Consequently, delays in transportation are occurring very frequently, which is a hindrance in the development of lean supply chain.

Asif et al. (2013) highlighted the case of cement industry of Pakistan and suggested that as a product, industry has standardized to a large extent. The size of bag, quantity per bag, production process, packaging material, chemical composition of material, usage pattern, skills required for production of cement, raw materials, etc. are almost same across the industry. Such a standardization of practices is a supporting factor for attainment of lean supply chain in cement sector of Pakistan. Further to this, Godil and Shabib-ul-Hasan (2013) suggested that now Pakistan has learned and well-trained people who are involved in management of large scale businesses. In addition to this, accounting education is now common so people can acquire and use costing knowledge. This supports them in calculation of cost and correctly analysis of cost related business decision. Such an ability to look at the business issues will lead to a situation where businesses and their managers can achieve lean supply chain as they are able to identify cost of wastes and benefits of lean supply chain. In

Pakistan, cement sector is an organized sector and lots of investment has been made in the sector. Organizations are well-developed and financed. Abdullah and Rosli (2012) suggested that quality and quality management practices are now getting popularity in Pakistan. In order to develop a lean supply chain, one has to constantly improve the process quality so that not only quality of product can be improved but also at the same time, one can also save cost of production. Since, quality movement is gaining momentum in Pakistan so attainment of process quality would lead to lean supply chain. In case of cement industry of Pakistan, the major cost of production is spent on energy. Because of energy crisis, cement-manufacturing firms are paying lots of attention in this area. Processes are optimized so that less energy has to be used. Moreover, in-house generation of electricity has also lead to a situation in which cement manufacturers can save money and thus lean supply chain can be maintained. However, a comparative analysis with Indian supply chain shows that in terms of energy, Pakistan does not have a competitive supply chain.

Khan et al. (2012) suggested that in Pakistan product clusters are not yet fully developed. The members of supply chain are not collaborating with each other so benevolence based contracts are not very visible. Suppliers are not collaborating with each other so that they can work together to meet the demand of large customers. In the absence of consolidation of business practices as well as operations, heterogeneity of business practices exists which may lead to duplication of efforts and resources, which is a waste for businesses. This is again a challenge for lean supply chain. This was also the case with suppliers of raw materials, parts, etc. So, in-terms of suppliers' consolidation, lean supply chain has not yet been achieved. Further to this, Naqvi and Bashir (2011) suggested that state of technology is improving in

Pakistan. Television, radio, telephone, Internet, computers, etc. are available at competitive prices. This supports communication between the members of supply chain and may encourage them to collaborate with each other. Anjum et al. (2013) suggested that in Pakistan, cheap information technology related labor is available. This creates an opportunity for the development of electronic data interchange software or platform through which members of supply chain can collaborate with each other. This factor supports creation of lean supply chain in Pakistan and cement industry can also get benefit from this.

## **6. CONCLUSION:**

Lean operations are one of the fastest evolving business strategies of the modern businesses. These practices are visible in number of areas including supply chain management. A lean supply chain is the one in which wastes are reduced so that overall cost of doing business can be reduced. Cement sector is one of the important industries of Pakistan. It is losing its competitiveness against other sectors because of weaknesses in its supply chain so an analysis of supply chain related practices, was carried with an aim to achieve lean supply chain for cement industry of Pakistan. It was observed that in last few years, demand for cement was not certain. There were number of reasons for this. This includes undocumented economy as well as limited ability of the businesses to forecast future demand. Moreover, unstable political and legal condition in Pakistan had resulted in varying demand patterns and had made planning difficult for businesses. This resulted in rise in stock levels, which resulted in loss in competitiveness of supply chain. However, recently China has started investing in Pakistan. This will lead to rise in demand of cement. Because of investment of China in road and transportation infrastructure,

one can assert that for the length of the project, the need for cement will be met from the local market. However, political disturbance, militant attacks and strikes may cause delays in delivery of raw materials to cement factory and delivery of packed cement to end-consumer. Because of this, production halts may also take place. This results in rise in labor cost as well as cost of energy. A notable requirement for lean supply chain was product and process standardization. This is quite visible in cement industry of Pakistan. Almost everyone uses same type of raw material and packaging materials. This has significantly reduces the cost of suppliers as they can produce in abundance and they can also purchase their raw materials in abundance. Cement companies have hired trained accounting professionals who provide them information concerning costs. By using this information, supply chain managers are able to evaluate their supply chain options and related practices. Based on this analysis, implementation of lean supply chain can be improved. Cement industry is also improving its processes, especially energy, which would also enhance competitiveness of supply chain. Lots of cement manufacturers have now developed their own energy development plants, which have resulted in elimination of production disruptions as well as reduction in overall energy bill. Likewise, level of technology has also improved which would also support in implementation of lean supply chain. Suppliers' consolidation is not taking place in cement industry of Pakistan. An underlying reason for this is that suppliers who not very learned and they do not understand benefits of such consolidation.

## **7. RECOMMENDATIONS:**

Following are recommendations for overcoming the challenges identified above.

1- Cement companies should continue improving their methods to further reduce the cost. As mentioned earlier, there is still room for improvement in the cement industry of Pakistan as it is still less competitive compared to Indian supply chain.

2- In Pakistan, if suppliers in cement industry will consolidate then it will help in increasing competitiveness and achieve lean supply chain. This is favorable for all members of supply chain. Cement manufacturing association should create awareness among suppliers and tell them about related benefits.

3- Government of Pakistan has responsibility to improve law and order of Pakistan. Unrest in the country sabotages businesses and cause significant delays in production and delivery. This will eventually reduce profits or increase losses of businesses.

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