The Implications of Cross-Docking in the Manufacturing Sector of Pakistan

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Abstract - ***Purpose of the study is to find out the role of cross-docking in FMCG sector of Pakistan. Research will be helpful to find out the benefits, risks, benefits and challenges for implementing the cross-docking in organizations. The researchers have gathered the interview from twelve supply chain managers working in the manufacturing sector of Pakistan. The study can be useful for the organizations adopting the cross-docking strategy especially in the uncertain countries. The result shows that cross-docking leads to improve the customer services and helps to achieve cost-effectiveness. It can improve the lead time tremendously but labor cost does not get reduced in cross-docking. Cross-docking may lead to increase the risk of uncertainties, chances of pilferages and damages.***

Keywords - *Cross-docking, warehouse, pilferage, lead time, cost, customer satisfaction, customer services, uncertainty, damages, safety stock*

1. Introduction

Traditionally companies used to work with the old warehousing strategy. They were used to produce in the large quantity to avoid the stock out problem in their warehouses. Their warehouses were always congested with inventories and it was leading them to the problems of congestion [21] and increased holding costs and other supply chain costs. Cross docking strategy lead them towards the reduction of the inventory and made the delivery more efficient than before [14]. As compared to the past, now supply chain management is getting more cost oriented and efficient. Companies which were used to pack their warehouses with the inventories are now trying to make themselves cost oriented. Their supply chain departments are always trying to reduce their costs and to make their supply chain more efficient. Cross-docking strategy is a tool in which the goods are received and directly transfers to the shipment with almost no storage, which leads the company to reduce lead times, reduction of costs and consolidation of supplies [5]. The purpose of the research study is to find out the role of cross-docking strategy in the fast moving consumer goods sector of the Pakistani Industry to find out its benefits, challenges, hurdles and risks associated with its implementation. Inventory management is always a problem for the supply chain professionals. Companies are always having problem dealing with it. In the traditional warehousing strategy, space cost and overall cost of the supply chain is always high [14] so if it is not properly handled; the problem related with the warehouse and inventory will always remain there. Cross-docking strategy has that magic which increases system level while decreases inventory stock, stock return and the total costs [13]. It also increases the efficiency of the delivery [16] and reduces lead time [20] if implemented efficiently. So it is required to conduct a research to find out the practical implementation of the cross-docking to resolve the warehousing issues. Although many studies have been conducted globally regarding the warehousing and cross-docking strategies but no research found in a very uncertain country like Pakistan. Ref [12] identified that Pakistan is a very uncertain, complex and ambiguous country so it is vital studying the cross-docking in Pakistani manufacturing sector.

2. Literature Review

Cross-docking is the distribution process of the freights by receiving inbound trucks and dispatches it direct for the outbound trucks with minimum or no storing the freight [5]. Study revealed that the firms can store the inventory for around 24 hours or more even and still it is considered as cross-docking [5] but some firms use both cross-docking and warehousing strategy to take the advantage of both approaches [1]. Cross-docking is a tool in which incoming consignments are delivered through inbound logistics, sorts according to destination and then heads to the point of destination through outbound trucks immediately [26]. Cross-docking is a tactic where incoming shipments are transferred directly to the outbound trucks without storing them meanwhile in the process which leads to the consolidation of goods,

minimization of costs, lead time, etc [5]. Cross-docking is basically a model in which goods are moved from receiving to the consignment. It actually leads to avoid overload and storage. Furthermore it improves the distribution and minimizes inventory [25]. It is a strategy which improves customer order time through transferring goods from receiving towards the shipment vehicle directly without storing it in the warehouse [9]. Cross-docking is a tool which focuses on removal of storage, and coordinate goods between receiving and shipping medium [28]. Cross-docking has many advantages and it is one the strategies to handle the inventory system properly to avoid warehouse packs and improving lead times. Some other studies pointed that it reduces two most significant expensive handling operations such as order picking and storage [4], [17]. Literature indicated following benefits of cross-docking [5] and [10].

- Reduction of lead time
- Improved customer satisfaction
- Cost reduction
- Reduction of storage space
- Reduce chances of loss and damage
- Better control over the distribution operations

Ref [16] pointed out that cross-docking can be an effective strategy as it reduces the cost but it requires trust, cooperation and proper communication among the supply chain partners. The cost reduced by around 21 percent [16]. They have found that cross-docking was a productive strategy as it increased the efficiency of the operations but they identified that trust and partnership is needed before the elimination of the buffer stock. According to Ref [13] cross-docking appears as a magical supply chain strategy in the organizations through reduction in warehouse area and inventory stocking. Alternatively, stock return was improved up to 14 percent. Furthermore, the researcher indicates that overall costs were also diminished after implementing cross-docking. Ref [31] studied the supply chain management in toy industry through in-depth case study and semi-structured interviews from 11 European toy dealers. The researchers had evaluated that since toy industry has shorter product life cycle and seasonal fluctuation that's why retailers implement Just-in-Time through cross-docking for the sake of avoiding inventory related uncertainties but they recommended conducting further study in order to provide solutions for the seasonal and different unpredicted business circumstances. Similarly, Ref [14] conducted a research on benefits of cross-docking through proposing two models that are cross-docking and warehousing strategy. According to them, organization's costs were tremendously diminished as compared with traditional warehousing strategy. Likewise, some researchers pointed out that cross-docking leads to the improvement in the lead time through minimizing it which leads to the improvement in the distribution [1].

Cross-docking has also some risks which can be very dangerous if not implemented properly or without proper strategy. Cross-docking can be an effective approach but taking benefit out of its implementation can be challenging as its effectiveness vary industry-to-industry and organization-to-organization [10]. Cross-docking cannot be implemented effectively without realistic approach due to uncertainty [10]. According to Ref [6], "*cross-docking corresponds with the goal of lean supply chain management: smaller volumes of more visible inventories that are delivered faster and more frequently"* (as cited in [10]). Warehouses are extremely necessary in supply chain management due to controlling the risk factors associated with not holding inventory [3]. A researcher has pointed out to propose practical models for the practical implementation of cross-docking which will be supporting professionals as a supporting decision making tool [8]. Generally, the concept of cross-docking means there is no inventory kept but it may lead to the stock-out situation due to fluctuation in demand [18]. Furthermore, Ref [18] suggested keeping some inventory to avoid the uncertainty. Implementation of cross-docking is complex but uncertainty is a factor which has to be considered but they have recommended proposing a scenario where it can be adopted easily [5].

3. Methodology

Researchers have used qualitative research approach to identify the role of cross-docking in the manufacturing sector of Pakistan. Supply chain managers were the target population. They will be able to provide better perspective of cross-docking and its implication in Pakistani setting. Twelve respondents were selected from the manufacturing sector of Pakistan via using convenience sampling. All the respondents were the managers of supply chain department and they were dealing with the warehousing and cross-docking. The researchers have collected the data through interviews and none of them were less than 30 minutes. Informed consent was taken by the respondents. Interviews were then transcribed into written form and the researchers used thematic analysis for the analysis of qualitative data. Themes were developed via thematic analysis and the results were shared with the respondents for its validity.

4. Data Analysis

RQ1: What are the benefits of implementing cross-docking?

4.1 Customer Services

Customer services is an important factor and cross-docking leads to the improvement of customer services. According to the respondent, "*Customer services get improved and moves toward faster response*". In the similar manner, cross-docking is an important tactic which helps the organization to strengthen their operations and customer services. Respondent has indicated that "*You are basically doing cross-docking to strengthen and improve your customer service"*. The lead time gets reduced as the firm use the cross-docking strategy. It ultimately makes the production process faster and makes the product available to the retailer thus leading the customer to the satisfaction. Previous study has also proven that cross-docking makes the customer response efficient [16]. Customer satisfaction is the firm's ultimate objective (as

cited in Ref [5]) and thus implementing cross-docking can be effective competitive advantage.

4.2 Cost effectiveness

Cost effectiveness is another benefit of cross-docking because the carrying and holding costs of inventory in the warehouse would not be there due to its usage as compared with traditional warehousing as the respondent has indicated,

Second is the most important, and that is cost effectiveness. Because in cross-docking you don't need to manage the entire warehouse so usually goods come in the particular warehouse, dock or whatever, then you do break-bulk or give value added service and furthermore distribute it ahead".

Cross-docking helps the organization to control the costs as supported by previous studies [14], [16] and [13]. Respondents have also revealed that the firms that use cross-docking can effectively reduce their costs but there are some factors which have to be seen before implementing cross-docking that are discussed below. Cross-docking eliminates the concept of warehousing through not keeping the inventory which ultimately reduces their cost.

4.3 Lead time

Lead time actually depends upon the aspect of the operations. It definitely gets reduced with the usage of cross-docking as respondent has said, *"Look lead time, it actually depends on how you basically implement the cross-docking. Lead time is the time when you trigger the order versus when the good receives. So in this obviously warehousing time gets saved because now you are not doing warehousing"*. But additionally the respondent has indicated that lead time does not get reduced if cross-docking is in the aspect of production as mentioned, *"The time for the production will remain there; the time of delivery will also remain there because cross-docking is not a name of efficiency of production"*. Lead time is only reduced in the circumstance where the storage would be there rather than the production as another respondent revealed:

"Cross-docking is not the name of efficiency of transit. Cross-docking is all about the elimination of a storage, so if storage is getting somewhere in your process, wherever it will be happening; will be reduced. Lead time will remain same wherever storage is not happening".

Another respondent has mentioned that lead time is reduced in using the cross-docking because there would not be factor of storage. According to the respondent:

"Definitely lead time gets affected because look your holding cost gets saved. When vehicle comes, there would be labor, labor will off-load the goods, place it after off-loading, sort it by area wise. After sorting then labor will consolidate it and then prepare it for departure. Then again load it. How much time gets saved? Cost gets saved and even time".

It clearly indicates that when an organization uses cross-docking, their costs, efforts and time regarding the storage and other supply chain operations will be saved. The result is somehow same as the previous studies [5] and [1] but it has furthermore identified that cross-docking would be beneficial more in the aspect of movement but it will not reduce the lead time that is associated with the manufacturing.

4.4 Labor cost

Labor cost is reduced with the usage of cross-docking but one of the respondent has indicated that it does not get reduced because the labors are hired and they are given salaries on monthly basis. It means whether they would be working or not, they will get their salaries each month. It can be reduced in the case of outsourcing of the labors whenever needed as mentioned:

"Look I think it does not have any significant impact on labor cost ….. So you will hire labors in the basis of daily wages, it will be beneficial now instead of hiring permanently. So whenever the container will come, you hired the labor on contract and they unloaded the container and then loaded into small vehicles. Then finally labor also gets free and your goods have also gone. So the working hours of labor; productive working hours will be same but if your method is contract versus permanent then your cost will be saved".

In a same manner, another researcher has pointed out that labor cost is only reduced if they are outsourced instead of hiring them permanently as:

"if your labors are in permanent basis and you have hired; not outsourced then definitely it will not be affectedlike it is happening in our company ……... our cost gets reduced in sense of cross-docking. Right? But if you hire permanent labor then definitely it will not have any significant impact on cost".

RQ2: What are the risks, barriers and challenges faced with the implementation of cross-docking?

4.5 Risk of uncertainty

Though cross-docking has its own benefits but uncertainty, stock-out and shut-down is the most threatening risk of cross-docking as discussed by the respondent:

"*There are many risks in the cross docking. Time is getting reduced in cross-docking and the process works quickly. If you have implemented cross-docking and have kept inventory in the critical phases then the risk will be diminished but if inventory is also drastically reduced along with cross-docking and buffer is also unplanned and uncalculated then of course production will be shut down in the case of raw material and packaging. If the scenario is the case of finish good then stock out can be faced. So you can say that cross-docking has risk but it depends that how you are managing the cross-docking. The level of inventory should not be diminished or too much reduced while doing cross-docking in order to cover*

the demand side or supply side deviation. Cross-docking is a good thing but risk also will have to be managing properly".

So there should be some inventory in the warehouse in order to avoid the chances of uncertainties like stock-out or shut-down situation as suggested [5] and [18]. It would be extremely risky in the uncertain countries like Pakistan [12] to completely implement the cross-docking as the respondent has suggested keeping safety stock in the warehouses to cover the fluctuations in demand.

4.6 Chances of damages and pilferages are high

Cross-docking has the aspect of uncertainties as well which should be controlled otherwise it cannot be implemented by the supply practitioners. According to a respondent, *"Risk gets high with the implementation of cross-docking"*. Cross-docking may sometimes lead to pilferages and damages as mentioned *"the chances of damage also gets increased …. The chances of pilferages are very high"*. So these are the factors which may occur due to cross-docking due to not having the warehouse. Sometimes goods may get damage as well due to not having enough space and place for its sorting and categorizing. Although previous studies indicated the cross-docking leads to minimizing the probability of damage and loss (as cited in Ref [5]) but the study revealed that cross-docking may lead to increase the chances of pilferages and damages. It is vital for the supply chain practitioners keeping their warehouses even when they are implementing cross-docking because it may be helpful for the effective sorting and planning of keeping inventories in vehicles.

RQ3: What are the recommendations regarding the implementation of cross-docking?

4.7 Safety stocks in small warehouses along with cross-docking

Inventory is an important factor in the supply chain management and there should be some safety stocks in the warehouse otherwise stock-out situation may occur. Of course, elimination of the stock may get reduction in the cost but ultimately it may cause to face the stock-out situation as well. Respondent has mentioned that, *"Again I will say that there should be some inventory as a safety stock. Wherever cross-docking can implement, it should be implemented"*. It means that cross-docking should be implemented but with having some level of buffer stock along with it to avoid any uncertainty. The respondent has mentioned that the complete elimination of the warehouse in Pakistan scenario may lead the company to a dangerous situation. Organizations should have small warehouses where they would be keeping some safety stocks as mentioned by respondent:

"Keep small warehouses to keep safety stock and covers to avoid any gap and support as a cushion while doing cross-docking effectively. So it does not mean that you should eliminate warehousing completely and work with zero-based inventory. It will be very dangerous scenario especially in Pakistani environment where there are issues of infrastructure and commitment. So it is better to carry some inventory and you need to create win-win situation. Implement cross-docking wherever it is possible but keep some safety stock as a backup and for that you may deal with a small warehouse".

The results are similar with the study of [18] as they have suggested keeping safety stock in the warehouses to avoid the uncertainty factor.

Respondent has suggested having hybrid approach through having small warehouses where safety stocks would be kept to avoid the risk of uncertainty along with cross-docking wherever it is possible as mentioned:

"But you will have to keep and manage some inventory. Actually you will have to make trade-off situation so then your production will also not get shut down and there would not lost of sales and also enjoying the benefits of cross-docking. And it will also drastically reduce the unexpected and significant cost of warehousing".

The respondent has mentioned that warehousing is required anyhow especially in the circumstances where delivery is required after some time then where that stock would be kept before its delivery to the point of consumption.

The respondent has mentioned the importance of having warehouse in order to keep equilibrium between the demand and supply. Cross-docking is good but totally elimination of warehouse may cause the stock-out situation of the product in the market as indicated, *"If demand rises suddenly because of marketing activities or any factor; demand has raised and if you don't have buffer stock or safety stock then you cannot manage.* In the same manner, organizations should use cross-docking with the combination of warehousing. The respondent has mentioned it, *"Cross-docking should be implemented but companies try to implement cross-dock along with the concept of warehousing; you can say combination of warehousing and cross-docking because both are important".*

4.8Awareness of supply chain tactics

Awareness of supply chain tactics would be helpful for the proper enhancement of cross-docking strategy effectively as mentioned by a respondent, *"Nowadays in our Pakistani environment, people are getting aware of the supply chain terms. As awareness gets increased accordingly the concepts of cross-docking will be seen implemented".*

Mostly people in Pakistani environment does not have much awareness and knowledge about the supply chain terms and tools so increasing its awareness is very necessary to implement the cross-docking strategy properly efficiently and effectively as per the need of industry. It can be happened through the professional trainings of relevant personnel.

5. Conclusion

According to the previous studies, cross-docking is a tool which is very beneficial and helpful. It reduces lead time, increase process efficiency and reduces costs [14]. Inventory management is always a challenging task for the company and cross-docking may overcome the challenge but it has also some dangerous risks which have to be looked carefully to properly implement it efficiently in all manners. The purpose of the study was to find out the way to increase the efficiency of the process by reducing lead time and inventory carrying costs which is very high. Customer services are improved with the implementation of cross-docking and the process move towards cost-effectiveness. Now whole warehouse is not supposed to be controlled in cross-docking and process becomes quick. It is the need of the industry especially in manufacturing sector where sometimes demand is increased swiftly and cross-docking is supposed to be implemented anyhow to meet on demand side deviation. Lead time also gets reduced. Time which was previously consumed on storing and warehousing has now saved due to cross-docking and obviously it leads to increase customer response time. The whole process should be planned with the collaboration of both parties because if container is dispatched before time then the whole planning of opposite party will be messed up. Proper collaboration is needed on every stage with every parties involved. Labor cost does not significantly reduced very much. Actually it has two scenarios. If the labors are hired on monthly basis then the cost will remain same and will not be changed but if the labors are hired on wages as per requirement then labor cost will be reduced. It does not depend on cross-docking. Cross-docking has also some risks which can be dangerous for the company. If the whole process is working on cross-docking and inventory is not kept for the critical phases then due to any uncertain reason, whole distribution or production can be disturbed. It can be shut down in the case of production or stock-out in the case of distribution. Another risk is of pilferages because cross-docking is a fast and quick process and inventories are directly dispatched forth without counting and tallying. Misrouting is also a significant risk of cross-docking because of lack of space i.e. there will be chances of error of sorting inventories accordingly with the place of destination. It may result in increasing of the lead time and even cost.

According to the findings, organizations are needed to implement cross-docking but with having small warehouses to remove the risk of stock-out, damages, pilferages and misrouting. The whole and sole implementation of cross-docking can be risky especially in the Pakistani scenario. Proper planning and collaboration is required with the every supply chain partners to avoid uncertainties. Labors should be hired on wages as per their requirement but organizations will need to have be in contact with the labor services provider company to avoid chances of labor deficit on the required time. According to many researchers, cross-docking should be implemented in the organizations because it increases the efficiency and reduces the cost [13] and [16]. Alternatively as per the findings, cross-docking should be implemented whilst having a small warehouse to remove the chances of uncertainty, damages, pilferages and mishandling of the stocks otherwise it may lead to dangerous situation of stock-out or production shut down especially in uncertain situation of Pakistan. Furthermore, proper model should be created to implement cross-docking with having proper level of safety-stock accordingly with different sectors as a future direction for researchers. It will help to have clear idea of the trade-off situation between warehousing and cross-docking strategy .Most importantly, supply chain professionals should be trained properly via professional certifications to give them proper awareness about supply chain tactics to adopt them accordingly.

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