Global Journal for Management and Administrative Sciences
ISSN (P): 2788-4821 & ISSN (O): 2788-483X
Volume 2, Issue 2, Page 113-129, December 31, 2021

CROSS DOCKING AS AN ENABLER OF LEAN WAREHOUSING IN PEPSICO PAKISTAN

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Abstract

This study aimed to evaluate the impact of the modern logistics strategy of cross-docking on lean warehousing in PepsiCo, Pakistan. The study involved the use of questionnaires filled by 25 respondents and the financial data of PepsiCo. The study respondent belonged to different age groups, social classes and areas of residence. Data analysis was conducted through regression, ANOVA and Correlation analysis. The analysis and comparative results suggested that cross-docking, which leads to lean in PepsiCo Pakistan, become more successful and bring efficiency in their logistics system to optimize supply chain cost and provide the best services to its end customer. The research outcomes might help the corporate decision-makers, government policy formulators, and other related quarters understand the impact on PepsiCo's successful logistics operations in Pakistan and understand the overall dynamics and mechanism of upcoming information technology in supply chain management.

Keywords: CD (Cross Docking), lean warehousing, inbound and outbound supplies, shipments, and optimization. JIT (Just in Time)

1. Introduction

During the late '90s, competition in the new business climate arises among emerging markets to become successful due to globalization. The core purpose of supply chain management is to provide optimal services to its customers and with maximum cost-effective methods, including logistics cost, transportation cost and warehousing cost. Further, the lean warehousing technique of cross-docking has been introduced to minimize transportation costs and enhance supply chain efficiencies. In the mid of the 21st century, Cross-docking as a modern warehousing strategy was introduced, which reduced logistics cost and increased supply chain efficiency and effectiveness, leading to a lean warehousing system (Al-Refaie and Abdelrahim, 2021). Lean warehousing enables the Just In Time (JIT) system, lowers the inventory level, reduces the transportation cost, increases customer satisfaction, increases responsiveness and time to market (Bernardo, 2009; Tanai and Dechenaux, 2021). It reduces the overall warehousing cost and leads to supply chain

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efficiency and effectiveness, and smoothness of the operations (Doumbia, Awudu, Yakubu, and Al Ganideh, 2021). Cross-docking is an efficient distribution system of Supply chain management (Morash, 2001). In the field of the supply chain, many things take place nowadays; companies use cross-docking as a way to cut transportation costs and lightener inventories, which improves the service lead time and reduces warehousing cost (Indranil, 2006). Cross-docking has become more popular among shipment companies and 3pl because it creates bullwhip between both parties to maintain inventory and eliminate warehousing activity timing (Claudia and Rosales, 2009). The ultimate purpose of cross-docking is to decrease the supply chain cost and increase customer satisfaction (Napolitano, 2000; Shete, Ansari, and Kant, 2021). The basic idea behind cross-docking involves the direct shipment of finished goods from the production line without having these items stored in a warehouse (Johnathon, 2000). The primary objective of the cross-docking method is to enable the integration of shipments of different sizes to a unique shipment with full trick loads so that transportation costs can be minimized (Li, 2004; Pegi, 2013).

Cross-docking is necessitude for the inventory, carrying cost function and rigid warehousing but still allows consolidate shipment (Al-Refaie and Abdelrahim, 2021). These consolidated shipments are received from different locations globally and dispatched to their final destination without being stored (Eldho, 2014). The shipment process typically took 24 hours or minimum time at the cross-dock (Morash, 2001). Cross-docking is also beneficial by improving customer services, minimizing warehouse storage space, speeding up the delivery process of goods and services to the customers, eliminating the risk of spoilage, pilferage, and damage resulting in rapid inventory turnover (Napolitano, 2000). Cross Docking strategically emerges with the material handling technique of transportation (Li, 2004; Tanai and Dechenaux, 2021). It is also a widely supportive technique in the manufacturing and retailing business (Doumbia et al. 2021). It is widely adaptable in the beverages industry in PepsiCo to enhance its logistics operation across Pakistan. In today's competitive business environment, the Beverage industry of Pakistan is growing rapidly because of the modern behaviour of customer's transform (Bernardo, 2009). Pakistan is also an emerging market where Beverage and fast food consumption tends to be developed in future (Johnathon, 2000; Wen, 2009). The warehouse management system (WMS) is responsible for scheduling the plan for incoming and outgoing shipments and distribution centres in the warehouse (Indranil, 2006; Shete et al., 2021).

Hence, this study aims to gauge the advanced warehouse technique and its efficiencies towards company performance. The basic idea behind the cross-docking is to analyze the lean warehousing system's efficiency, which leads to the efficiency and effectiveness of supply chain cost.

1. To determine cross-docking reduced storage cost
2. To Prove that Cross Docking Leads to JIT system
3. To determine Cross Docking reduced service lead time
4. To determine cross-docking reduced transportation chain cost

The research paper is restricted to the Beverage Industry of Pakistan. So the study comprises PepsiCo Pakistan because of its high demand and market share in the beverage industry. The geographical scope will be Karachi because it is a hub of the economy.

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2. Conceptual Framework

Supply Chain Management is the process of providing the best possible customer goods and services to its customer from initiation to the point of consumption (Al-Refaie and Abdelrahim, 2021). Whenever a company goes through successful logistic operations, it delivers the best supply chain services to its customers at optimum cost (Claudia and Rosales, 2009). This often results in companies moving towards growing by measuring their demand and planning forecasts to consolidate inventory, handling, safety stock, and delivering full loads (Morash, 2001; Zhengping, 2012). The core reason behind this is to reduce warehousing storage space and costs, optimizing capital investment (Pegi, 2013). It could be possible to adopt and apply advanced technology such as cross docking, WA warehouse automation, and RFID, as it initially requires high capital investment. (Managing International Supply Chain, 2006).

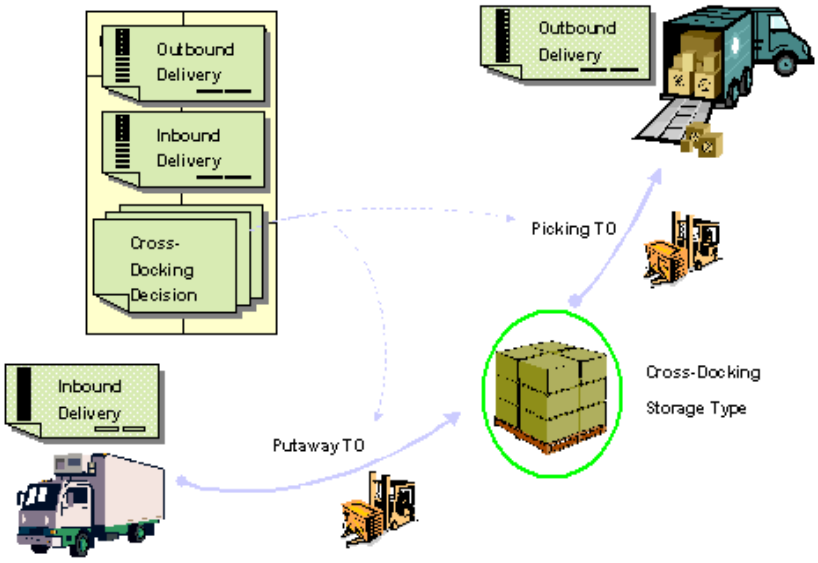
On the other hand, Cross Docking is a modern strategy of warehousing in logistics, which is involved in activities of material handling and reducing transportation costs (Doumbia et al. 2021). Goods are directly being received outside of the warehouse and dispatch to its transit point (Napolitano, 2000; Wen, 2009). That is a more reliable technique than traditional warehousing and distribution channels that may cause wastage of time (Eldho, 2014; Tanai and Dechenaux, 2021). Companies used this cross docking facility to improve logistic operations by keeping minimum storage space and order winning function of lean warehousing (Li, 2004). A leading company Wall-Mart approach to cross-docking, makes its business operations more profitable and successful by directly responding to its customer needs and dispatching orders without adding them into inventory (Johnathon, 2000; Shete et al., 2021). Figure 01 represents the cross-docking process adopted from Doumbia et al (2021) study;

Figure 1: Cross Docking Process



The cross-docking activities are typically inbound, and outbound supply chain costs, and the purpose behind this is to optimize the flows supply chain cost and satisfy the customer needs (Doumbia et al. 2021). Cross-docking infrastructure includes supply chain cost of inbound such as loading and unloading from trucks, a storage place, sorting of goods to its final destination, move across the dock and outbound trucks to deliver its services to final destination with lowering the cost (Claudia and Rosales, 2009; Zhengping, 2012). Cross-docking reduces the complications of the distribution network system, which improves its efficiency and reduces the order lead time (Bernardo, 2009). Cross Docking minimizing the transportation cost, which helps reduce the distribution cost and vehicle routing time and creates efficiency within inbound and outbound supplies, allowing to consolidate shipments and meet the level of cross-docking efficiency (Indranil, 2006). Figure 02 represents the distribution process of the cross-docking approach (Napolitano, 2000).

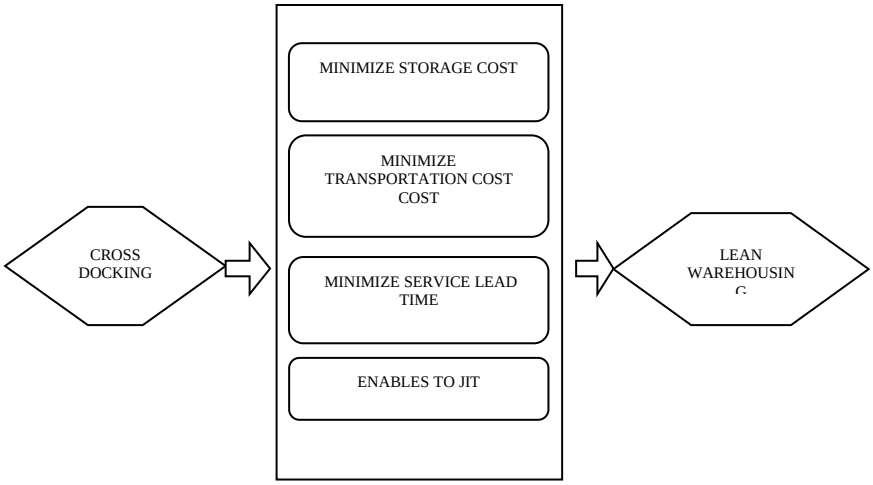
Figure 2: Distribution Process



Cross Docking interrelates the logistics strategies of cross docking to maximize the operational cost (Tanai and Dechenaux, 2021). The movement of the goods distribution process from initiation to the point of consumption becomes more flexible and convenient to deliver full services to its end customer (Zhengping, 2012). Cross Docking centralized the distribution process and minimized the traditional warehousing cost (Pegi, 2013).

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Figure 3: Conceptual Framework



Keeping in view the conceptual framework, we have derived four hypotheses from testing in our research which is stated as follows:

H_1: Cross-docking leads to minimizing the storage cost.

H_{o1}: Cross-docking does not lead to minimizing the storage cost

H_2: Cross-docking leads to minimizing transportation costs.

H_{o2}: Cross-docking does not lead to minimizing transportation costs.

H_3: Cross-docking leads to minimizing the service lead time.

H_{o3}: Cross-docking does not lead to minimizing the service lead time.

H_4: Cross-docking leads to Enables to JIT.

H_{o4}: Cross-docking does not lead to Enables to JIT.

3. Research Methodology

To determine the impact of cross-docking on lean warehousing, we conducted quantitative research comprising primary and secondary data sources. The present study has used regression analysis because of its stability for quantitative research (Siddique et al., 2021). The questionnaire will be based on 15 items adopted from various validated scales, and Managers of PepsiCo will fill it. The items will be measured through five points Likert scale. It would help to cover all variables from the conceptual framework of cross-docking, leading to lean warehousing in the supply chain. The Secondary data will be

collected from PepsiCo annual reports, Journals, books, articles and previous research work. The research aims to derive that cross-docking acts as an enabler of lean warehousing in the supply chain. Therefore the study would focus on supply chain organizational operations of warehousing by applying statistical analysis in PepsiCo and explore the relationship between cross-docking and lean warehousing. The sampling unit of this research is the managers and employees of PepsiCo. The present study has used stratified random sampling techniques because the research would require a quantitative method to analyze the questionnaire through SPSS (Siddique et al., 2021). It is said by Sekaran (2003) that stratified sampling is one of the most effective sampling techniques which help to analyze the data with given sample size. In stratified random sampling, the population is divided into groups based on mutual relevance. For this reason, the questionnaire would be distributed among the management and employees of PepsiCo.

4. Data Analysis

This study is an investigative study to analyze the logistics facility of cross-docking, which is an enabler of lean warehousing. For this purpose, we designed the questionnaire because it's quantitative research. The data collected from the questionnaire was based on the conceptual framework that we proposed in the present study. Four hypotheses were statistically tested in the organization that is cross docking leads to lean warehousing which results in optimizing logistics operations by maintaining lower inventory in storage space, reducing the transportation cost by consolidate shipments, provide just in time supplies to its customer which results in to eliminate order lead time and material handling cost through warehouse automation. Table 1 and Table 2 provides the results of the items score and descriptive statistics of the present study variables.

Table 1: Questionnaire and scores

S.No	Description	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	Cross-docking is an enabler of lean warehousing.	42.30%	38.50 %	15.40%	3.80%	0.00%
2	Cross-docking helps to eliminate warehouse storage space.	54.20%	33.30 %	12.50%	0.00%	0.00%
3	Cross-docking is a part of warehouse automation success.	50.00%	37.50 %	12.50%	0.00%	0.00%
4	Successful cross-docking leads to an increased market share of the company.	66.70%	25.00 %	8.30%	0.00%	0.00%
5	Cross-docking leads to a zero inventory method to maintain lower inventory.	45.80%	37.50 %	12.50%	4.20%	0.00%
6	Cross-docking minimizes the delivery process to its end customer.	66.70%	25.00 %	4.20%	4.20%	0.00%
7	Cross-docking leads to reduce the transportation cost consolidate shipments.	41.70%	41.70 %	12.50%	4.20%	0.00%
8	Cross-docking strategically emerged with material handling cost of logistics.	58.30%	33.30 %	8.30%	0.00%	0.00%
9	Sorting of goods to inbound and outbound docks cause to eliminate delivery lead time	52.20%	21.70 %	17.40%	8.70%	0.00%

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10	A cross-docking facility efficiently leads arrival of containers and pallets transformation smoothly and continuously.	45.80%	37.50 %	16.70%	0.00%	0.00%
11	Cross-docking is not only speedy and optimizing logistics operation but also with dynamic changes.	45.80%	45.80 %	8.30%	0.00%	0.00%
12	Cross-docking leads to lean warehousing, which influences just in time (jit) supplies to meet market demand.	58.30%	33.30 %	8.30%	0.00%	0.00%
13	The performance of cross-docking is based upon good planning, scheduling and forecasting.	62.50%	25.00 %	8.30%	4.20%	0.00%
14	Cross docking cross docking implementation in organization leads to optimize the supply chain cost	52.20%	39.10 %	8.70%	0.00%	0.00%
15	Cross-docking approaches to advanced information technology to deal efficiently with its operations	56.50%	34.80 %	8.70%	0.00%	0.00%

Table 2 : Descriptive Assessment

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
STORAGECOST	25	1.00	4.00	1.8100	0.722
TRANSPORTATION COST	25	1.00	2.60	1.8400	0.483
SERVICELEADTIME	25	1.00	3.25	1.7300	0.628
ENABLESJIT	25	1.00	3.50	1.4600	0.675
VALID N (LIST WISE)	25				

Data Reliability shows the data consistency internally, which explore the closest and strong relationship among variables. The questionnaire is tested through Cronbach's Alpha which measures the internal consistency, also known as the reliability coefficient. The reliability statistics, also called coefficient of reliability (alpha) of the present study instrument, is 76.5%, which is highly acceptable because alpha is more than .70. This means the internal consistency of the data is 76.5% which is very good and shows that data is reliable and consistent.

Table 3 : Reliability Statistics

Reliability Statistics

Cronbach's Alpha	N of Items
0.765	15

The research paper analyses the relationship between both variables; cross docking and lean warehousing, leading to efficiency in the distribution system. We have tested both variables cross-docking as an independent variable that leads to lean

warehousing, which is the dependent variable. The dependent variable further emphasizes five sub variables: minimizing the supply chain cost, minimizing the storage cost, minimizing transportation cost, minimizing service lead time, and enabling JIT System, which leads to a lean warehousing system. The hypothesis testing through the SPSS model will be;

Cross Docking Model = α + β1 CD

The results of testing of hypothesis are given below;

H_1: Minimize storage cost

The reliability statistics also called the coefficient of reliability (alpha) is 89.6%, which is highly acceptable because alpha is more than 0.70. This means the internal consistency of the data is 89.6% which is very good and shows that data is reliable and consistent.

Table 4: Data Reliability

Reliability Statistics

Cronbach's Alpha	N of Items
0.896	2

Table 5: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.670[a]	0.449	0.425	0.27568

a. Predictors: (Constant), STORAGE COST

Here, the value of R square is .449 (44.9%), representing the storage cost of 44.9%, which depicts that storage cost can be reduced by 44.9%, which was explained through an independent variable (IV) cross-docking. In other terms, storage cost can be minimized by 44.9% by one unit change in cross-docking. The adjusting R Square represents that the estimated reduction is 42.5% and significant.

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Table 6: Coefficient

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	0.979	0.151		6.468	0.000
	STORAGECOST	0.337	0.078	0.670	4.330	0.000

a. Dependent Variable: CROSSDOCKING

CD Model = 0.979 CD + 0.337

The coefficient model states that if other variables remain constant, representing a 1% change in cross-docking can efficiently minimize the storage cost by 97.9%, which shows a significant relationship between both variables. The results of t statistics are found to be .000, which is highly significant and represents a highly positive variation between the independent and dependent variables. Therefore, we can conclude that the decrease in storage cost depends on the effective implementation of cross-docking as a technique in the supply chain.

Table 7: ANOVA

ANOVA [b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.425	1	1.425	18.746	0.000[a]
	Residual	1.748	23	0.076		
	Total	3.173	24			

a. Predictors: (Constant), STORAGECOST

b. Dependent Variable: CROSSDOCKING

The ANOVA Model analyze the validation of the model. From the above table, it can be seen that the sig value is less than .05. It also indicates that R square and adjusting R square clearly elaborate the significance of this model. So the result analysis shows that the outcome is functional and relate to each other, so we can say that cross-docking has a significant impact on minimizing the supply storage cost. Hence the results show that Hypothesis Cross Docking leads to minimizing the storage cost is accepted.

H_2: Minimize transportation cost

Table 8: Data Reliability

Reliability Statistics

Cronbach's Alpha	N of Items
0.701	2

The reliability statistics, also called the coefficient of reliability (alpha), is 70.1%, which is acceptable because alpha is more than .70. This means the internal consistency of the data is 70.1% which is very good and shows that data is **reliable** and consistent.

Table 9: Model Summary

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.569[a]	0.324	0.295	0.30537

a. Predictors: (Constant), TRANSPORTATION COST

Here, the value of R square is .324 (32.4%), representing the transportation cost of 32.4%, which depicts that transportation cost can be minimized by 32.4%, which was explained through an independent variable (IV) cross-docking. In other terms, transportation costs can be minimized by 32.4% by one unit change in cross-docking. The adjusting R Square represents that the estimated reduction is 29.5% and significant.

Table 10: Coefficient

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	0.363	0.374		0.969	0.343
	TRANSPORTATIONCOST	0.820	0.247	0.569	3.320	0.003

a. Dependent Variable: CROSSDOCKING

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CD Model = 0.363 CD + 0.820

The coefficient model states that if other variables remain constant, represented by a 1% change in cross docking, it can efficiently minimize the transportation cost by 36.3%, showing a significant relationship between both variables. The results of t statistics are found to be .003, which is highly significant and represents a highly positive variation between the independent and dependent variables. Therefore, we can conclude that the decrease in transportation depends on the effective implementation of cross docking as a logistic technique in the supply chain.

Table 11: ANOVA

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.028	1	1.028	11.023	0.003[a]
	Residual	2.145	23	0.093		
	Total	3.173	24			

a. Predictors: (Constant), TRANSPORTATIONCOST

b. Dependent Variable: CROSSDOCKING

The ANOVA Model analyze the validation of the model. From the above table, it can be seen that the sig value is less than 0.05. It also indicates that R square and adjusting R square clearly elaborate the significance of this model. So the result analysis shows that the outcome is functional and relate with each other, so we can say that cross-docking has a significant impact on minimizing the transportation cost. Hence the results show that Hypothesis Cross-docking leads to minimizing the transportation cost is accepted.

H_3: Minimize service lead time

Table 12: Data Reliability

Reliability Statistics

Cronbach's Alpha	N of Items
0.785	2

The reliability statistics, also called the coefficient of reliability (alpha), is 78.5%, which is acceptable because alpha is more than .70. This means the internal consistency of the data is 78.5% which is very good and shows that data is reliable and consistent.

Table 13: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.677[a]	0.459	0.435	0.273

a. Predictors: (Constant), SERVICELEADTIME

Here, the value of R square is .459 (45.9%), representing the service lead time is 45.9%, which depicts that service lead time can be reduced by 45.9%, which was explained through an independent variable (IV) cross-docking. In other terms service lead, time can be minimized by 45.9% by one unit change in cross-docking. The adjusting R Square represents that the estimated reduction is 43.5% and significant.

Table 14: Coefficient

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	0.912	0.163		5.596	0.000
	SERVICELEADTIME	0.392	0.089	0.677	4.415	0.000

a. Dependent Variable: CROSSDOCKING

CD Model = 0.912 CD + 0.392

The coefficient model states that if other variables remain constant, represented by a 1% change in cross docking, can efficiently minimize the service lead time by 91.2%, showing a significant relationship between both variables. The results of t statistics are found to be .000, which is highly significant and represents a highly positive variation between the independent and dependent variables. Therefore, we can conclude that the decrease in service lead time depends on the effective implementation of cross docking as a logistic technique in the supply chain.

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Table 15: ANOVA

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.455	1	1.455	19.493	0.000[a]
	Residual	1.717	23	0.075		
	Total	3.173	24			

a. Predictors: (Constant), SERCICELEADTIME

b. Dependent Variable: CROSSDOCKING

The ANOVA Model analyze the validation of the model. From the above table, it can be seen that the sig value is less than .05. It also indicates that R square and adjusting R square clearly elaborate the significance of this model. So the result analysis shows that the outcome is functional and relate to each other, so we can say that cross-docking has a significant impact on minimizing the service lead time. Hence the results show that Hypothesis *Cross Docking leads to minimizing the service lead time* is accepted.

H_4: Enables the JIT system

Table 16: Data Reliability

Reliability Statistics

Cronbach's Alpha	N of Items
0.740	2

The reliability statistics, also called the coefficient of reliability (alpha), is 74.0%, which is acceptable because alpha is more than 0.70. This means the internal consistency of the data is 74.0% which is very good and shows that data is reliable and consistent.

Table 17: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.841[a]	0.707	0.695	0.201

a. Predictors: (Constant), ENABLESJIT

Here, the value of R square is 0.707 (70.7%), representing the JIT leads to efficiency by 70.7%which depicts that 70.7%which can maximize JIT supplies was explained through an independent variable (IV) cross-docking. In other terms, JIT is an

enabler to optimize the supplies by 70.7%by one unit change in cross-docking. The adjusting R Square represents that the estimated reduction is .695 (69.5%) and significant.

Table 18: Coefficient

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	0.741	0.121		6.146	0.000
	ENABLESJIT	0.642	0.086	0.841	7.458	0.000

a. Dependent Variable: CROSSDOCKING

CD Model = 0.741 CD + 0.642

The coefficient model states that if other variables remain constant, representing a 1% change in cross-docking can efficiently lead to the JIT system by 74.1 % that shows a significant relationship between both variables. The results of significance statistics are found to be 0.000, which is highly significant, representing a highly positive variation between the independent and dependent variables. Therefore, we can conclude that the JIT system depends on the effective implementation of cross-docking as a logistic technique in the supply chain.

Table 19: ANOVA

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.244	1	2.244	55.618	0.000[a]
	Residual	0.928	23	0.040		
	Total	3.173	24			

a. Predictors: (Constant), ENABLESJIT

b. Dependent Variable: CROSSDOCKING

The ANOVA Model analyze the validation of the model. From the above table, it can be seen that the sig value is quite acceptable. It also indicates that R square and adjusting R square clearly elaborate the significance of this model. So the result analysis shows that the outcome is functional and relate to each other, so we can say that cross-docking has a significant impact on the JIT system may lead to cross-docking efficiency. Hence the results show that Hypothesis *Cross Docking enables to JIT System* to be accepted.

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Hence, all the present study hypotheses will be accepted.

Hypotheses	Sig value	Result
H_1 Cross-docking leads to minimizing storage cost.	0.003	Accepted
H_2 Cross docking leads to minimizing transportation costs.	0.000	Accepted
H_3 Cross docking leads to minimizing service lead time.	0.000	Accepted
H_4 Cross docking enables JIT	0.000	Accepted

5. Discussion

Since the global emerging business operations have become competitive and challenging due to advanced information technology, many studies are conducted to make their businesses more profitable. This research paper was conducted in PepsiCo to determine the cross-docking efficiency which impacts lean warehousing. The hypotheses H1, H2, H3, and H4 pertaining to eliminating warehousing storage cost, transportation cost elimination, reduction in service lead time, and leading efficiency of JIT and cross docking are enablers of lean warehousing efficiency.

This research paper has explored the relationship between cross-docking and lean warehousing, leading to the successful implementation of this system in the organization. The hypotheses above (H_1, H_2 and H_3) are related to efficiently minimizing the cross docking operational cost whereas H4 leads to efficiency of inbound and outbound supplies, which consolidates shipments and maintains lower inventory in the warehouse. All hypotheses are statistically tested and prove the relationship through regression and ANOVA. All the tests proved the significant relationship among cross docking and lean warehousing which was studied through variables that included; eliminating warehousing storage cost, transportation cost elimination, reduction in service lead time, reduction in supply chain cost and leading efficiency of JIT hypothesis tested during the research.

PepsiCo Pakistan has a huge network of supplies worldwide, resulting in high profit on margins and leading to market share by consolidated shipments and eliminate warehouses. The present study has identified that PepsiCo's logistics successfully leads to its supply chain operations globally by implementing technological advancement to get information from customers. This leads to lower carrying costs and makes the process smooth and flexible. These include using RFID, Bar Code, OSA, and other technological advancements that may help deliver the best customer services.

All the hypotheses in this research were proved and broadly indicated that the relationship among variables is highly positive and related to each other in terms of minimizing the different costs of logistics which includes supply chain cost, reduction in physical and traditional warehousing techniques and reducing transportation cost which is

affecting the efficiency and effectiveness of cross-docking in logistics operation successfully. The conclusion of this research paper indicates that PepsiCo can successfully lead its supply chain and logistics operations by adopting cross-docking. Either it may require initially high cost but result in to optimize the costs of logistics operations. The present study hypothesis strategically tested results in successfully leading the cross-docking efficiencies within the PepsiCo Supply chain logistics operations.

6. Recommendations

Business organizations like PepsiCo and others should apply cross-docking as a distribution technique since it is proven to eliminating warehousing storage cost, transportation cost elimination, reduction in service lead time, reduction in supply chain cost and leading efficiency of JIT. However, few other research recommendations mainly are accurate understanding and execution of cross docking system and techniques, commitment and involvement of all the employees starting from the top to the bottom, and better communication and clear understanding of the goals and objectives of the firm.

Future research could also be done on cross-docking leading to optimizing the working capital of the firm. Also, cross-docking leads to a green supply chain by reducing the transportation cost and the number of vehicles, which ultimately minimizes any company's carbon footprint.

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