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EFFECTIVE WAREHOUSE MANAGEMENT USING LEAN CONCEPTS AND ITS EFFECTS ON PAKISTAN'S FMCG INDUSTRY

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Abstract:

Warehousing plays an important role in integrating the supply chain of the industry. But given the volatility and dynamic nature of supply chain management as a field, the factors that need to be considered when implementing lean in the warehousing that not every warehouse structure is the same. While implementing other external factors and the concerns of the people working the warehousing needs to be considered. Because the purpose is the same that effective and efficient warehouse, with less cost and more profit. In addition to this, the study will describe and the theory of core competencies on parallel practices and how these competencies are used in implementing the lean methodology in the warehouse. A survey was carried out through questionnaires to determine which competencies are best suited to choosing a lean in the warehouse. Hypothetically, the findings showed that in making warehouse effective all three independent factors have their own significance over the provided two dependent factors. Concluding, the study will act as a touchstone in understanding the lean management practices on shorter yet connected enterprises in small to large scale industries.

Key Words:

*Lean, Warehouse, Management,
FMCG Industry*

1. Introduction

The term 'lean' goes back to the 90s when a book called 'the machine that changed the world'. It was basically started with the automotive industry Toyota production system (TPS) (Wgbh Educational Foundation, 1992). Now it is used in other areas as well. It is name as lean design and lean constructive. The main purpose of lean implementation is to remove the waste from the process and make the process more effective and efficient with low cost and to provide more satisfaction to the customers bring competitive advantage. (Monden & Minagawa, 2016). The major principles of lean are as under; Identify the value, Map the value stream, create flow of the progress, established pull, seek perfection.

Warehouse is the big outlook of the management of supply chain. Its significant role is the consolidation, break bulk, storage of the goods. In order to optimize the transport cost, it will also play the role of the value-added services; like product bundling and unbundling, returns and repairs, assembly of services. (Gray, K., 2014).

This paper based on performance of the warehouse and the implication of lean concepts of the warehouse. Specially the warehouse management for the fast-moving consumer goods (FMCG) industry of Pakistan.

Fast moving industry serves its customer with two modes; direct selling to the customer like through website /online orders, or from their central warehouse. They deliver goods directly to the customer. Another way is the traditional way. Like deliver goods directly thought their warehouse.

Talking about lean it tells that how well a supply chain operates. It is the process of streamline the product and removing non-value adding and waste from the process.

In the FMCG industries of Pakistan, it has been seen that like other industries. They give less focus on their warehouse. Therefore, the study aims to implement the effective warehouse management by using lean concepts. Especially we will observe its effects on Pakistan's FMCG industry.

While implementing the lean some questions arises i.e.

- What factors can improve the warehouse performance and better customer services?
- What factors can reduce the cost, which incurred due to warehouse expenses?

While answering to above question we will try

- To Identify the impact of warehouse process on cost saving.

- To identify the impact of delivery of goods on cost savings.
- To identify the impact of value system mapping on cost saving.
- To identify the impact of warehouse process in customer services.
- To identify the process of delivery of goods on customer services
- To identify the impact of value system mapping on cost savings.

2. Literature Review

2.1 Supporting Theories and Models

The lean concept was started a decade ago but now it is gradually becoming the part of our supply chain. Lean in warehouse plays a significant role in lower cost, achieve flexibility. The framework of lean warehouse is made by combining the well-known tool of lean. Result shows major reduction in order reviving and picking bring reduction in costs like labor, machinery. Also, in service level and warehouse apace. Lean provide opportunities for betterment in process and re-engineering and process towards lean process (Lean Fundamentals, 2011).

The e-commerce business increasing need for more flexible and agile warehouse increases. Sometimes we need huge warehouse for material handling. Appropriate warehouses deign and handling devise selection during warehouse is sufficient, as it improves, material handling, storage utilization and productivity. (Palevich, R., 2012). They review the unique and new techniques for above mention factors. The purpose is to work in lean perspectives and reduce the waste. They work in palletized and Non-palletize, under the head of these, work on storage system and handling system.

Systematic review 1: Lean production system was being investigates of the internet to check. Does the world wide web helps in implementation on JIT (Just In Time) or it provides any support in implementation of JIT. Impact on supply chain, production, scheduling, quality improvement work force and other problems will be address. (Berg, J. P. van den, 2007). They want to implement lean through worldwide web. Internet defines the lean approach and implement JIT among B2B and B2C. There are many applications which helps and implementing lean. Additionally, some B2C and B2B also deals on internet. One of the negative parts of this is that it is leas protective data can be comprised. Nevertheless, there's huge market to play.

Systematic review 2: Lean is considered as effective thinking to improve the business in today's competitive world. It is by eliminating waste and earn more profit by improvement in operations. Lean cover the VSM (value stream mapping), simulation and lean accounting. Applying proper lean system helps in removing the ambiguity between lean benefits and financial cost. Method used is the VSM (value stream mapping). With its application management was convinced to adopting lean. By doing so there will be a major improvement in operational and financial perspectives. (Mahfouz, A., & Arisha, A. 2013).

Systematic review 3: The impact of the lean tools and techniques on warehousing of third-party logistics. Techniques of 5S, Kanban, Value stream mapping (VSM). Further, works on layout design, picking method, location storage are in observation to improve the system's performance were applied. Lean usually depends on many factors. Such as human factors and nature of products which have impact on our work. Methods may vary from case to case but in general core functions remains the same. Lean is the effective warehouse improvement approach. Approaches are personal training, layout planning and continuous improvement. During the process lean warehouse divided in to their types. (Han, W. W. 2013). Their process order receiving, picking delivery handled separately. Different quality charts are to be made, than 5S method; Seria – Sort, Seiton - Set in order, Seison - Shine , Seiketchu – Standardize, Shitsuke – Sustain . It can be said that lean is a continuous process. Lean is a powerful methodology to working in long term environment. However, there are some limitations. Cases vary from warehouse to warehouse.

Systematic review 4: Lean is not only a philosophy in the company, but it represents the insides of the company. (Myerson, P. 2012). On every stage of company where supports in profitability of the company requires the implementation on lean in it. To implement a lean in warehouse is just a startup. It should be implemented in whole company, there are certain steps in lean which improves the performance and the process of a warehouse, further it can improved whole organization as well. Having set this, many studies have been performed on the process of warehouse before and after execution of lean tools in warehouse. Furthermore, that work was about knowing that at which stage the improvement is needed and then the analysis is being done. Besides this correlation of the individual steps / parts according to the employees point of view from different departments like purchasing production and logistics. It was found that the individual direct and indirect factors of warehouse; that need to be tested

For Internal factors; people, process, layout, performance management

For External Factors; Interaction with third parties, ownership (Myerson, P. 2014).

By this it was concluded that it is the prime job warehouse manager to maximize the productivity and accuracy and increase the profit. However, there is no predetermined formula or recipe for this task one of the path is to use lean techniques. Before and after the implementation of lean technique.

This study is being done on lean manufacturing and below mention variables will be discussed in this study.

Independent variables

- Warehouse process
- Operational performance
- Planning

Dependent variables

- Better Customer services
- Cost savings

Assumption for conducting this study is as under

- H1: By improving warehouse process product final cost will reduce and customer satisfaction will be increased.
- H2: Changes in operational performance directly impact the cost of final goods and satisfaction of the customer
- H3: Planning supports in better customer services and cost savings.

3. Material and Methodology

This study is based on a quantitative approach with an explanatory strategy in order to understand exactly the current situation in the FMCG warehouse in Pakistan. Furthermore, the study is mono-method in that the data collected is purely quantitative in nature by using closed-ended questionnaires for primary data collection. Articles, journals, books and other reliable sources on the internet have been used to collect secondary data.

3.1 Sampling design and size

The target population includes employees working in the warehouse of FMCG industry, and the employees who used to work. Also, in the target population I have added the warehouse

employees of the distributors of the FMCG industries. The target population is form all over Pakistan. However, the main focus was on the city Karachi. Because it is the HUB of the FMCG industries. The responded are well aware of the complete warehousing process with a good experience in this department. They are also aware about the factors that are needed for implementing the need of the warehousing.

The population size has been estimated to include 250 individuals that are employed in the within the FMCG warehouse in the industry of Pakistan. The estimation is based on the information provided the employees of different level who work in the warehouse of the FMCG industry of Pakistan. Based on population using different methods it was find out that with collected data research can be continued further.

Moreover, the sampling technique used in this study is non-probability convenience sampling. The primary differentiator from probability sampling is that the sample is selected based on the independent observation of the researcher, rather than random selection. Therefore, respondents were selected at random from the professionals working in the industry as and when possible.

3.2 Instrument and procedure of data collection

The instrument used in this study was a questionnaire with closed-ended questions. This was the source of primary date in this research and by far the most common and effective technique for data collection in quantitative studies. In this case, the questionnaire format and the items used in the questionnaire were adapted from a research which has been done earlier. Assessment of validity of the conceptualized variables has been conducted using a reliability test for Cronbach's alpha coefficient

The primary data collection of this research has been conducted on professionals working in the supply chain, warehouse of the FMCG industry of Pakistan. For this purpose, questionnaires were digitally distributed to these professionals both directly as well as through a contact person within that organization. A short description was included with the questionnaire in order to provide a brief introduction to the purpose of this study to enable more accurate responses.

Analysis of the data gathered through the questionnaires were conducted through SPSS Software. The variables were defined and then the data was entered after which multiple statistical techniques were applied in order to test the hypothesis. This includes regression analysis, correlation and reliability tests (through Cronbach Alpha).

4. Data Analysis

Data gathered in this study is from professionals working in the supply chain, procurement or logistics departments of companies especially individuals belongs to the warehouse of the FMCG industry of Pakistan. Data was collected through questioner filled online and through personal visit.

4.1 Validation of the Model

Validation of the framework model can be seen in the reliability statistics in below.

Table 1: Cronbach's Alpha

Case Processing Summary			
		N	%
Cases	Valid	253	100.0
	Excluded ^a	0	.0
	Total	253	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics	
Cronbach's Alpha	N of Items
.738	5

It is the most common measure to check the internal consistency or reliability of the research which in being conducted. Through the design questioner. The questioner should be consistent and it should give roughly the same response every time it is tested. The Result of Cronbach's alpha shows whether this research is acceptable or not.

In this research the value for Cronbach's Alpha is at .738 or 73.8% which is an acceptable level and this research can be continue. It Shows that that more respondents more prone towards same response.

In order to check the reliability of the research. Other tests are also applied. On both direct and indirect variables of the research.

The results of those tests applied are mentioned below.

The summary statistics for the scale variables and measures of the data. In this research study of large data, these statistics help us to manage the data and present it in a summary table. It is showing the respondents response in summary also helps in comparing the response of one variable on another.

Annona test also applied and that shows this hypothesis is accepted and research can be processed further.

Table 2: Descriptive Statistics; Mean, Std. Deviation, Variance, Skewness

Descriptive Statistics						
	N	Mean	Std. Deviation	Variance	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
WS	253	2.9202	.66817	.446	.117	.153
POI	253	3.4196	.73992	.547	-.291	.153
VS	253	4.3004	.85256	.727	-1.161	.153
BCS	253	3.4577	.77990	.608	-.673	.153
CS	253	3.5399	.63361	.401	-.645	.153
Valid N (listwise)	253					

Skewness shows the extent to which a distribution of values deviates from balance around the mean. It also shows that respondents are either rightly skewed or negatively skewed. In above mentioned chart skewness is positive for all variables. This mean that it has a long tail in the positive direction.

Table 3: Standard error of estimate, Anova and Co-efficient

Execution of indirect variables on direct variable is BCS (Better customer services)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.608 ^a	.370	.362	.62291

a. Predictors: (Constant), VS, WS, POI

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	56.661	3	18.887	48.676	.000 ^b
	Residual	96.616	249	.388		
	Total	153.277	252			

a. Dependent Variable: BCS

b. Predictors: (Constant), VS, WS, POI

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.989	.253		3.911	.000
	WS	.478	.066	.409	7.284	.000
	POI	.324	.061	.307	5.283	.000
	VS	-.008	.049	-.009	-.168	.866

a. Dependent Variable: BCS

Execution of indirect variables on direct variable is CS (Cost savings)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.561 ^a	.314	.306	.52775

a. Predictors: (Constant), VS, WS, POI

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	31.816	3	10.605	38.078	.000 ^b
	Residual	69.351	249	.279		
	Total	101.167	252			

a. Dependent Variable: CS

b. Predictors: (Constant), VS, WS, POI

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.802	.214		8.408	.000
	WS	.199	.056	.210	3.579	.000
	POI	.387	.052	.452	7.453	.000
	VS	-.039	.041	-.052	-.939	.348

a. Dependent Variable: CS

The above tables show the result of regressions. Regression analysis basically shows the impact of data. The result is the regression analysis of WS, POI, VS on CS and BCS.

The one-way analysis of variance (ANOVA) tells whether there is any statistical significance between dependent and independent variable.

Discussing about last part to table 3, Coefficients. In regression with multiple independent variables, the coefficient tells, how much the dependent variable is expected to increase when that independent variable increases by one, holding all the other independent variables constant. It testes all independent variable on dependent variable one by one. It shows the significant impact of one variable on another. On testing if significant level is lesser than the value to B. Shows this hypothesis is accepted otherwise rejected. When indirect variables tasted on customer services. It was found that all hypothesis accepted. Except VS impact on better customer services. Moreover, impact of indirect variables on CS. It also had result as it is mentioned earlies. i.e. All accepted except VS impact on CS. Therefore, hypothesis having value system in rejected for both CS and BCS.

Are these tests we should know that

WS= Warehouse Process

POI= Operational Performance

VS= Value System (planning)

CS= Customer Savings

BCS= Better customer services.

5. Core Evaluation

The research covers all the important question of the research and objectives, by defining the factors or the Effective warehouse management, Using lean concepts and its effects on Pakistan's FMCG industry. The purpose of this study is to impose some of the factors for lean implementation in warehousing. Some of the important factors used in this research. The model was designed by gathering secondary data from articles, journals, papers, reliable internet sources etc. by reviewing their literature and summarizing it. The primary data was collected through questioner of twenty-five questions. With reference to all dependent and independent variable. Each factor has five question at the same time different theories were being in consideration by the different research regarding lean warehouse management. This helps in implementing the lean in the warehouse.

Literature review of discussed above describe the importance of implementation of lean in the warehouse. Having lean oriented warehouse helps in removal of waste form the warehouse. It makes warehouse operations more effective and efficient. Processed become smooth having less flaw and rework in the process. By applying lean it must be in consideration that the people working in the warehouse should know about their task. In order to get more prominent result. This research was conducted in limited span of time with the limited number of the responded. i.e. 250. And the questioner designed was close ended. So, the responded did not have any liberty to express their views regarding warehousing. Moreover, Future research can work on the limitation of this work. Data can be collected more accurately. With both close ended and open-ended questions, also the personal interviews. Different weightage should be given to the response of the responded based on the knowledge and position in the organization and the work experience. Further in order to make organization more effective and efficient six sigma concept can be introduced.

This study will help the organization to get to know about the lean and its advantages. Now they are more focused on working smoothly and removing the waste. Secondly, they will implement the lean or we can say by removing the waste they can do this by setting another company as their benchmark this will help them in removing waste from their warehouse process. Lastly in order to get the competitive advantage company should focus on their structure and advancement in the organization.

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