

IMPACT OF LEAN SYSTEM ON MERCHANDIZING PERFORMANCE EXCELLENCE

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Abstract

The study sets to achieve two objectives namely, identify the extent to which Lean system performance impact on Merchandizing Performance and bring recommendations to horizontally replicate the research findings for similar organizations. In recent times, many world renowned companies around the world have attempted to implement Lean, but the lack of clear understanding of lean performance and its measurements has contributed to the failure of lean practices. Among the industries, there are only a few service oriented organizations. Also, rare to find Lean applications to an organization, where its core is marketing. In order to fill this existing gap, researcher recommends to apply Lean by any service oriented organization which includes the marketing interface. The study found out that Lean System practices improve the long term business performance and success and this study establishes safety and ergonomics, quality management system and continuous improvement activity performance emanating from the implementation of lean system practices, and its impact to the merchandizing performance as a front-end customer interface function of the organization. These findings are recommended in encouraging the widespread adoption of lean system practices for any kind of an information processing environment.

Keywords: Lean Performance, Safety and Ergonomics, Continuous Improvement, Merchandizing

1. INTRODUCTION

Markets, people and organizations are developing rapidly in an unpredictable way with new technologies and innovations, which increases the uncertainty and complexity for today's operations and deviating from the set organizational directions.

Traditional management methods lose their efficacy to master these challenges which is why, according to (Saynisch, 2010) there is a need for updating these traditional methods (Saynisch, 2010) to overcome these complexities it is important to manage the information flow and communication with the internal and external customers to understand these continuous developing needs, which is why lean system is aimed to be used as a compliment for today's change management methods. Lean concept is a journey and not a destination, it is a culture that needs to be implanted in the minds of all in the organization and be understood and accepted across all levels of personal resources. As the process of becoming lean is tied together with organizational change, it is a commitment that takes time and resources to accomplish.

2. RESEARCH PROBLEM

(Ohno, 1988), relates the concept of lean manufacturing to the Toyota Production System (TPS) which is an integrated socio-technical system developed by Toyota, that comprises its management philosophy and practices. It organizes manufacturing and logistics for manufacturers, including interaction with suppliers and customers through an effectively functioning merchandizing process. With mass production being unable to cope with urgent or separate orders of production with special customized features, lean production had been generated to face this challenge and counter the potential problems. Just as mass production was the production system of the 20th century, lean production became the production system of the 21st century with the significant studies. Through this system any organization can be able to become vastly more flexible and responsive to customer desires with on-time responses. By eliminating unnecessary steps, aligning all steps in an activity in a continuous flow recombining labor into cross functional teams dedicated to that activity and continually striving for improvement company can develop, produce and distribute products through front end marketing operations with half or less of the human effort, space, tools, time and overall expense. With all the benefits tagged and highlighted by various sources, this research is carried out to investigate.

"The Impact of Lean System Performance on Merchandizing Performance Excellence". [Special reference to the dimensions, Safety and Ergonomics, Total Quality Management and Continuous Improvement Activities (Kaizen)].

3. LITERATURE REVIEW

LEAN, also referred as Lean Management, Lean Manufacturing, Lean Enterprise, or Lean Production, is a powerful set of tools and techniques that many companies choose to implement and sustain as a way of increasing the efficiency of production and the overall customer value while at the same time eliminating wastes. Waste is anything that does not add value but adds costs to a company. Typically, seven wastes have been identified in Lean Management: waiting, transportation, over-production, inventory, movement, over-processing, and re-work. (Drew, J., Blair, M. And Stefan, R., 2004). According to Dennis Hobbs, author of Applied Lean Business Transformation, Applied Lean methods are a series of scientific, objective technique that cause work tasks in a process to be performed with a minimum of non-value-adding activities, resulting in greatly reduced wait time, queue time, move time, administrative time, and other delays. Lean System seeks to identify and eliminate all non-value adding activities in design, production, supply chain management, and other activities used to satisfy customer requirements. A Lean facility is capable of producing a product or service in only the sum of the value-added work content time required to change its form, or function. (Hobbs, D, P, 2003).

Lean is commonly used in manufacturing and supply chain management, but it is a philosophy that can be applied to an entire company as long as the overall goal remains the same: to increase customer value while eliminating waste.

There are many different ways of measuring Lean System performance. However, the most predominant approach in the literature is to use safety, quality, and productivity in terms of continuous improvement and the cost as a calculated performance as four basic dimensions of operational performance (Liker ; Jeffrey, 2006). In some studies, these dimensions have

been expanded to include several additional measures (Miller, 1994). However, this study uses the above three basic dimensions because the organizations are mostly concerned with these measures.

4. METHODOLOGY

The source of data to prepare this research were both primary and secondary data, while the merchandizing process of the facilitated organization was supported to obtain the primary data, and secondary data was collected from the company’s monthly and annual progress review information presentations. The population of the research was considered as its all employee density, working in the customer interface Merchandizing department with MAS ACTIVE (PVT) Limited 160 as a total working for all reputed brands.

The questionnaire was structured by consisting open and closed ended questions. The close ended questions have been used to enable the collection of quantitative data for data analysis using a Likert-scale, while the open ended questions have been used to enable the researcher to collect qualitative data on the respondent’s view of Lean practices in MAS ACTIVE (PVT) Limited, customer interface merchandizing process.

Data was analyzed through descriptive statistics, and by using SPSS Software the multiple Regression model for quantitative data analysis, Pearson correlation analysis and Thematic Analysis was carried out with open ended questions in order to emphasis the impact and the relationship to the application of Lean practices in MAS ACTIVE (Pvt) Limited, merchandizing process and the relationship in between Safety & Ergonomic and merchandizing performance excellence, and the relationship in between Total Quality Management and merchandizing performance excellence, and Continuous Improvement (Kaizen) and merchandizing performance excellence.

The findings were presented by using tables, charts, percentages, proportions and frequency distribution. The frequency distribution and percentages were used to analyze data to create an in-depth understanding to the unified results. Means scores and standard deviations were used to analyze the extent of the use of Lean practices in MAS ACTIVE (Pvt) limited and the company’s Merchandizing Process.

5. RESULTS AND DISCUSSION

Reliability Analysis

Case Processing Summary

		N	%
Cases	Valid	141	100.0
	Excluded ^a	0	0
	Total	141	100.0

a. Listwise deletion based on all variables in the procedure

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Reliability Statistics

Cronbach's Alpha	N of Items
.299	2

Reliability Statistics

Cronbach's Alpha	N of Items
.460	2

Reliability Statistics

Cronbach's Alpha	N of Items
.297	2

The Cronbach's Alpha is 0.299, 0.460, 0.297 > 0.7, and the researcher considers to proceed with the questionnaire.

Lean System Performance: Safety and Ergonomics

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
What extent the Effects of Badly Designed Workplace impact for the Safety and Ergonomics	141	2.00	5.00	4.5461	.77897
What extent the Musculoskeletal Disorder effects for Safety and	141	2.00	5.00	3.7660	.99741
What extent the Effects of Lighting and Sound for Safety and Ergonomics	141	2.00	5.00	4.1206	.80601
What extent the Psychological aspects effects for the Safety and Ergonomics	141	2.00	5.00	3.7943	.97481
What extent the Results of Early Symptom Investigations for the Safety and Ergonomics	141	1.00	5.00	3.5248	1.05953
Valid N (listwise)	141				

The table 4.9.1, above shows the majority of the respondents with large extent indicated that badly designed workplace creates an impact for Safety and Ergonomics $m = 4.5461$. The respondents also indicated the Musculoskeletal Disorder Effects for safety and ergonomics $m = 3.7660$, while the effects of lighting and sound for safety and ergonomics $m = 4.1206$. The Psychological aspects effects for the safety and ergonomics is also indicated as $m = 3.7943$. The results of Early symptom Investigation for Safety and Ergonomics also rates as $m = 3.52448$.

The safety and ergonomics, is highly important area for an organization, but many forgets. The automobile industry's main role is to facilitate for transportation, so the safety and ergonomics is an implied objective to the industry and without safety, do the customers tend to by a vehicle. In this research, the researcher emphasis the importance of establishing a safe with an ergonomically set work environment to obtain the maximum business objectives. The understanding behind this dimension is, that the results depend with the less fatigue work conditions.

Total Quality Management

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Effect of receiving Customer feedback for the Service and Process Quality	141	2.00	5.00	4.1915	.75512
Effect of availability of Andon Alarms (Problem highlighting mechanism) for the Service and Process Quality	141	2.00	5.00	4.4468	.82311
Effect of receiving of Corrective Action Requests for the Service and Process Quality	141	2.00	5.00	4.1064	.83411
Effect of the availability of people with Knowledge and Awareness for the Service and Process Quality	141	2.00	5.00	4.1773	.74913
Effect of Error proving mechanisms for the Service and Process Quality	141	2.00	5.00	4.4955	.85877
Valid N (listwise)	141				

Majority of the respondents indicated that the customer feedback, Andon alarms (Problem highlighting mechanism), corrective action requests, Knowledge and awareness and Error proofing mechanisms are significantly impact for Total Quality Management., and its mean value is greater than 4.0000.

"The quality assured process brings the maximum results", and researcher has highlighted the highly important areas from quality perspective., receiving the customer feedback, effect of the availability of a fixed method to raise the problems, getting corrective actions on-time to facilitate for continuous service flow, knowledgeable team members, and the application of error proofing theories. These areas are directly combining with Lean principles.

According to the (Liker ; Jeffrey, 2006), the 4Ps, Philosophy, Process, People and Partners and Problem Solving are directing towards a better lean culture. In order to achieve the above Lean culture, the organization needs to focus for an empowered culture or a culture with Built in Quality. The researcher brings that idea, to drive an effective quality management system, it's essential to establish an effective Andon system, Problem solving, Error proofing mechanism and finally to achieve the above mentioned Built in Quality status.

Continuous Improvement Activities (Kaizen)

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Impact of having number of Suggestions and Kaizen activities for continuous improvement	141	2.00	5.00	4.2908	.93762
Availability of a Performance Evaluation System for continuous improvement	141	2.00	5.00	4.3262	.89838
Effectively functioning Work Place Organization mechanism (5s) for continuous improvement	141	2.00	5.00	4.3830	.86734
Existence of a New Product Development and Introduction process for continuous improvement	141	2.00	5.00	3.9149	.84928
Availability of an Information / material pull systems (Kanban) for continuous improvement	141	2.00	5.00	4.0780	.79346
Valid N (listwise)	141				

The results of table 4.9.3, indicates the getting suggestions and Kaizen activities, performance evaluation, work place organization (5s), new product development and information / material pull system (Kanban) impact for the continuous improvement activities as a collective effort and it's calculating as mean value, 4.2908, 4.3262, 4.3830, 3.9149 and 4.0780.

The activities for continual improvement of all process performance are essential to achieve the organizational objectives and to exist in today's competitive environment. The researcher selects, suggestion and kaizen activities, performance evaluation system, 5s, New Product Development (NPI) and information / material pull system to assess the division's current situation. The collective effort of all above areas, are leading to the continuous improvement of Lean System performance.

Merchandising Performance Excellence

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Influence to minimize the Work In Progress (WIP Inventory - Information)	141	2.00	5.00	4.0780	.67687
Influence to minimize the Sample Lead Time (1st Proto)	141	2.00	5.00	4.0638	.65697
Influence to the Productivity Improvement (On-time Information Delivery)	141	2.00	5.00	4.1206	.75095
Influence for Cost Reduction (Cost per hour - \$s)	141	2.00	5.00	4.0709	.75257
Influence for Sales Volume Improvement (Sales Targets)	141	2.00	5.00	4.0851	.76054
Influence for Labor Requirement Reduction (Number of Team Members)	141	1.00	5.00	4.0922	.73583
Influence for Empowered Culture (Number of Suggestions given)	141	2.00	5.00	4.1348	.64609
Influence for On-time Problem Solving as a culture (Closed PDCA's)	141	2.00	5.00	3.8298	.88606
Valid N (listwise)	141				

The table 4.10.1 results indicating that the majority of respondents with large extent proved that, minimizing the Work In Progress significantly impact to the Merchandizing Performance Excellence $m = 4.0780$, Minimize the Sample Lead Time (1st Proto) is predominantly impact to the Merchandizing Performance Excellence $m = 4.0638$. The highest value takes, empowered culture which impact to the Merchandizing Performance Excellence $m = 4.1348$.

The merchandizing process performance differs from the, minimum Work In Progress (WIP) activities, Sample Lead-time, Productivity Improvement (On-time information delivery), Cost reduction, Sales Volume Improvement, Reduction of Labor or manpower requirement (Number of Team members), Empowered work force and problem solving culture. All these areas are taken into consideration to monitor the Merchandizing Process Performance.

Multiple Regression Analysis

A multivariate regression model was applied to determine the significant impact of each of the three independent variables with respect to the merchandizing performance in performing Lean System.

Significance of the Regression Coefficients (Source: Researcher 2014)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.326 ^a	.105	.087	3.49357

^a Predictors: (Constant), Continuous Improvement, Safety and Ergonomics, Total Quality Management

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	198.815	3	66.272	5.430	.001 [*]
	Residual	1672.049	137	12.205		
	Total	1870.865	140			

^a Predictors: (Constant), Continuous Improvement, Safety and Ergonomics, Total Quality Management

^b Dependent Variable: Merchandizing Performance

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	20.295	2.565		7.913	.000
	Safety and Ergonomics	.092	.132	.063	.697	.487
	Total Quality Management	.453	.169	.316	2.675	.008
	Continuous Improvement	-.043	.132	-.036	-.328	.744

^a Dependent Variable: Merchandizing Performance

This is really important analysis where it gives the measure of how well the overall model fits, and how well the lean system performance is able to predict merchandizing performance. The first measure in the table is R, and this measures of how well the lean system performance predict outcome, but it's require to take the squire of R to get the most accurate measure.

The R-square, as mentioned earlier, it gives the amount of variance merchandizing performance explained by the multiple variables of lean system performance. R-square varies between "0" and "1" and in this research, it is 0.106, 11.0% of the variance in merchandizing performance can be explained by multiple variable, Safety and Ergonomics, Total Quality Management and Continuous Improvement (Kaizen) in the Lean System.

The regression model found:

$$X_1 = \text{Safety and Ergonomics}, X_2 = \text{Total Quality Management}, X_3 = \text{Continuous Improvement}$$

$$Y = (0.92) X_1 + (0.453) X_2 + (-0.43) X_3 + 20.295$$

It is observed that all the X_1 and X_2 coefficients are positive but the X_3 Coefficient is negative, meaning that a change in any one of X_1 and X_2 them affects organizational performance in the same direction, However, X_3 Coefficient's impact is negative. This means that all the independent variables except X_3 - Continuous Improvement, in this model are suitable predictors of organizational performance. However, the larger portions of Coefficient values are dominating towards the positive impact for the merchandizing performance. Therefore the hypotheses created by researcher are proven with the above statistical analysis.

Mean values and Std. Deviations

Variable Dimension	Mean	Std. Deviation
Safety & Ergonomics	16.9319	2.49958
Total Quality Management	17.8213	2.54679
Continuous Improvement	17.7305	2.99485

The above table shows, the majority of respondents with large extent indicated that Total Quality Management (TQM) and Continuous Improvement (Kaizen) are effectively applying in the Lean System. $m = 17.8213$ and $m = 17.7305$. Also the significant number of respondents indicated that the Safety & Ergonomics is applying effectively, $m = 16.9319$.

Pearson Correlation Analysis

Correlations

		Safety and Ergonomics	Total Quality Management	Continuous Improvement	Merchandizing Performance
Safety and Ergonomics	Pearson Correlation	1	.413**	.131	.189*
	Sig. (2-tailed)		.000	.121	.025
	N	141	141	141	141
Total Quality Management	Pearson Correlation	.413**	1	.650**	.319**
	Sig. (2-tailed)	.000		.000	.000
	N	141	141	141	141
Continuous Improvement	Pearson Correlation	.131	.650**	1	.178*
	Sig. (2-tailed)	.121	.000		.035
	N	141	141	141	141
Merchandizing Performance	Pearson Correlation	.189*	.319**	.178*	1
	Sig. (2-tailed)	.025	.000	.035	
	N	141	141	141	141

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

The correlations are reported within the above table, there are significant positive correlations in between Safety & Ergonomics, Total Quality Management, and Continuous Improvement as the independent variables for Lean System Performance against the dependent variable and providing preliminary support for the research model. The above table shows the high correlation in between Total Quality Management (TQM) and Merchandizing Performance ($r = 0.319$, $P < 0.01$)

6. CONCLUSION AND RECOMMENDATIONS

Conclusion

The research findings are proving that there is an impact towards the merchandizing performance excellence by existing Lean System performance, Safety and Ergonomics, Total Quality management (TQM). and Continuous Improvement (Kaizen) of the organization. Also, to what extent the impact effects for a better organizational performance as a culture. The researcher has brought literature to critically evaluate the above in order to ensure the sufficiency and accuracy of analysis. Therefore the researcher has proven the safety and ergonomics, total quality management and continuous improvement activities (Kaizens) are direct variables to measure the Lean System performance and its impact to the merchandizing performance is positive to obtain better business results and also it facilitates to horizontally replicate the best Lean practices and create a disciplined culture within the other service oriented organizations.

Recommendations and Managerial Implications

The results are giving important implications for practitioners. One of the major implications of this research is that any organization can increase their operational performance by systematically driving a lean system and inculcating the theoretical studies along with an organizational culture changes with the continuous employee development.

Further Research Directions

This research concentrated on studying the Impact of lean system on merchandizing performance excellence of MAS Active (Pvt) Limited in the front-end customer interface in manufacturing sector, and the researcher recommends for further research on same topic but in the other service oriented organizations than manufacturing companies both within the country and outside the country. This will help to establish the same effects within the other service oriented organizations than manufacturing organizations and in other parts in and out of the country. This will also assist in providing concrete facts upon which further reliable conclusions can be made.

Research Summary

In the recent years many manufacturing as well as the service organizations have been challenged to increase their focus on safety, quality of services and productivity while improving customer satisfaction. Putting into perception the challenges of global competition, many organizations have been worked to find ways of reducing cost, improving quality and shorten the lead time, simply the core meaning of Lean, while meeting ever-changing needs of a more informed class of customers.

The Lean System of MAS ACTIVE (Pvt) Limited, has brought evidence for its effective implementation, and the research findings have made it proven about the positive impact of against the operational performance.

As per the criticism made by (Treville, 2006) the results is limited and alienating work conditions but this research results are challenging the above criticism which was made by (Treville, 2006). However, the research findings reveal, the psychological effects on safety and ergonomics doesn't influence for the lean system performance predominately and the mean value states $m = 3.7$, as a medium range of rating from respondents. Implementing Lean in the merchandizing department is similar to the concept outlined by (Womack J. &., 2003) on the Lean Enterprise in which focus on Lean is not just exclusively for production or manufacturing but can be used in other departments such as Human Resource or Sales and Marketing. The researcher proves, Lean can be applied for office environment and idea given by (Womack J. &., 2003) is considered as a valid statement.

For a lean organization, Safety and Ergonomics is a fundamental area to focus, because it's highly influencing to the positive productivity as well as to bring the brand image to the customers by fulfilling the compliance requirements. The dimensions used are the basics to satisfy the above needs of customer compliance.

Also, the Total Quality Management is used as a quality dimension, where the applications of quality management principles are evident within the merchandizing process and the existing quality management system consists of standards, problem surfacing, problem solving, error proofing and the self-ownership where those are involving for establishment of an effective process oriented organization.

The continuous improvement activities, generally norm as Kaizen Mindset, is measured through number of suggestions and kaizen activities, performance evaluation system, work place organization (5s), new product development and introduction process, information and

material pull system and were the open ended relevant questionnaire clause is added to gather additional requirements suggested by the responders.

All the above variables are aligned to the Lean System Performance as an independent variable and the Lean System Performance is evaluated and measured through Safety, Quality and Productivity dimension by relating and proving with previous literature reviews.

The Merchandizing Performance, is measured through WIP (Work in Progress), where it discouraged to accumulate, Sample lead time as the time spending to develop a sample and sending for customer's approval as a proto type to proceed with the bulk. The productivity is taken into account to measure the efficacy. Cost reduction is a fundamental to measure for a process and sales volume improvement accompanied. The labor requirement application is a measurement of industrial engineering process performance, and the empowered culture and problem solving are all about the cultural aspects of a merchandizing process.

The hypotheses generated by the researcher have proven and accepted that there is an impact of Safety and Ergonomics, Total Quality Management and Continuous Improvement (Kaizen) on Merchandizing performance through the analysis of SPSS tool with the multiple regression analysis.

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