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ARTICLE/TOPIC

THE CONTRIBUTION OF LEAN SUPPLY CHAIN MANAGEMENT ON ORGANIZATIONAL PERFORMANCE IN AUTOMOTIVE SECTOR IN RWANDA; A CASE OF TOYOTA RWANDA

ABSTRACT

The intention of this study was to assess the contribution of lean supply chain management on organizational performance in automotive sector in Rwanda. Specifically, the study was meant to assess the contribution of waste elimination on the organizational performance in Toyota Rwanda; to ascertain the influence of customer value on the organizational performance in Toyota Rwanda; and to examine the contribution of continual improvement on organizational performance in Toyota Rwanda. In order to reach the achievement of the above objectives, a combination of questionnaires, interviews, documentary reviews and other reports were used. This study stems primarily on three theories; Resource Based Theory (RBT),

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Transaction Cost Analysis Theory (TCAT) and System Theory. Questionnaires were distributed to a group of 84 respondents who filled them and return them for analysis where interviews were held with the company management. Sampling technique called universal sampling technique was applied in the study. The data were analyzed using SPSS for descriptive statistics and inferential statistics. The study adopted descriptive statistics in form of frequency, percentages and mean; whereas inferential statistics which was used to measure the correlation between the research variables opted for both correlational and regression analyses. After data collection and analysis, 90.5% of the total respondents strongly agreed that Toyota finds it necessary to look at the whole sequence of lean events, from the customer's order to raw materials producer. Secondly, 85.7%.of the respondents strongly agreed that considering customer value helps to meet the company's objectives, solve its problems and improve the quality of services provided to the customers. Thirdly, 95.2% of the respondents strongly agreed that inventory optimization offers effective financial, legal and internal audit functions that lead to better performance. Lastly, 97.6% of the respondents strongly agreed that Toyota aligns the people, processes, and technology in supply chain around a continual improvement strategy which enables more effective collaboration. From the Spearman correlation analysis results indicated, the value was less than significant level which explains that there was a strong, positive monotonic correlation between lean supply chain management and organizational performance of Toyota Rwanda. Based on the correlation and regression analysis which indicated positive and significant contribution of lean supply chain management on the organizational performance of Toyota Rwanda, all the study's null hypotheses were not accepted.

GENERAL INTRODUCTION

In Europe, the manufacturing sector has undergone enormous change in the last twenty years. Globalization, technology advances and the growth of emerging market economies have driven ever-increasing competition. Companies in Ireland, the UK and Germany have adopted to these changes and have moved their manufacturing facilities up the value chain and expanded their activities so that many have become strategic sites for their parent companies. As these corporations focus on optimizing their global supply chains, there is a unique opportunity for Irish based Multinational's to

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increase differentiation amongst their peers, by assessing and streamlining their broader supply chains. Fortunately, the adoption of lean techniques and "Lean Thinking" that have proven so effective in improving performance within these companies have also been shown to be equally applicable across the broader supply chain (Elacqua & Alves, 2015).

According to Chupezi et al (2013), lean supply principles have been part of manufacturing success in Sub-Saharan Africa. South African businesses readily accept the status quo of logistics systems and processes already in place in the country targeted for expansion, rather than challenging them and looking for more efficient ways of getting the product to market. Focusing too much capital expenditure on the production and manufacturing side without enough investment in the outbound supply chain – warehousing and distribution – is probably the single biggest mistake that South African companies make when expanding into Africa (Estache, 2014). Every step of a new process needed to be designed through the eyes of the local workforce and their capabilities. When local supply chain owners completely understand the proposed solutions, only then can your team execute a sustainable process, which can successfully meet the needs of the organization today and well into the future (Croom & Romano, 2017).

In Rwanda, lean supply chain management is in its infancy stage with no or very few studies have been done on the subject. According to Rwanda Development Board (2020), the country's leading sectors include energy, agriculture, trade and hospitality, and financial services. Rwanda's economy is overwhelmingly rural and heavily dependent on agriculture. Strong growth in the services sector over the past decade, particularly in construction and tourism, has contributed to overall economic growth. In the country, the most prominent company that uses lean supply chain management is Toyota Rwanda. Toyota Rwanda was incorporated in December 2016 following the successful joint venture between Toyota Tsusho East Africa Limited and Akagera Business Group. Besides, according to Toyota Rwanda (2022), the company has been a part of Rwanda's culture since the first importation of Toyota to Rwanda in 1964 as the exclusive distributor of Toyota vehicles in the country.

It's under this motive the researcher was interested in carrying out a study to assess the

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contribution of lean supply chain management on organizational performance in automotive sector in Rwanda with reference to Toyota Rwanda.

PROBLEM STATEMENT

As competition in the automotive sector relentlessly increases, the ability of understanding the customers, making sure they are satisfied with services and products provided, has become of significant to companies in their logistics practices, supply chain management and organizational performance. Manufacturing firms face supply chain challenges while trying to competently maximize profits and usage of resources to meet their customer's demand. Some of these challenges include inadequate volume of sales, low profitability, uncompetitive market share, poor customer satisfaction, low return on investment associated with high supply chain costs, wastes, supply and demand imbalances, low-quality products, stiff competition which in the long run affects firm performance (Weru, 2015).

Rwanda is not spared either; since 2010, the country has been described as one of the favorite destinations in the region for investors that are willing to invest in manufacturing. RDB (2020) cited that the manufacturing sector is characterized by gradual diversification from basic manufacturing to more value-adding activities in other sub-sectors that include automotive manufactured goods such as vehicle-assembly.

However, according to MINICOM (2022), Rwanda vehicles market in recent years has been characterized by an unstable trend in volumes of sales and uncompetitive market share with registrations fluctuating. A report by RRA (2022) revealed that in 2021 the year started negatively for the vehicles market with 160 units having been sold in the first quarter, a representation of 18.4% decrease in volume of sales compared to the first quarter in 2020. In terms of brand, Toyota gained 6.8% market share, followed by Volkswagen, which on the other hand fell by 44.8%, and lost 6.2% share while Mitsubishi was in the third position and gained 0.9% market share. The most sold model in the country remains the Toyota Hilux with an increase by 53.1% while holding 38.4% market share.

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In line with the above, although the statistics which was cited in the above reports could have been affected by the COVID-19 pandemic outbreak, the researcher desires to tackle other possible factors that influence organizational performance — and in particular lean supply chain management. This study, therefore, assessed the contribution of lean supply chain management on organizational performance in automotive sector in Rwanda, a case of Toyota Rwanda.

OBJECTIVE OF THE PAPER

The main objective of this study was to assess the contribution of lean supply chain management on organizational performance in automotive sector in Rwanda.

RESEARCH HYPOTHESES

***H_o*: There is no significant contribution of lean supply chain management on organization performance in Toyota Rwanda.**

***H_1*: There is significant contribution of lean supply chain management on organizational performance in Toyota Rwanda.**

THEORETICAL REVIEWS

Resource Based Theory

In lean supply chain management, resources control, utilization and maximization are prime in any organization that has supply chain network with the goal of performance improvement. Organizations require control to maximize utilization of resources along value chain network by adopting lean supply chain management practices. Not only the extension of the resource-based view mentioned before might be of great benefit for economics, also its relationship to another theory, to which it constitutes a counterpart, is of importance. With the assumption that a firm derives a competitive advantage internally, the resource-based view stays in strong contradiction to another powerful theory. In this sense the resource-based view was firstly developed as a “reaction against

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the ‘competitive forces’ analysis of firm’s strategy (Giraldo-Luque et al, 2017).

Resource-based theory also stresses the merit of an old saying: The whole is greater than the sum of its parts. Specifically, it is also important to recognize that overall strategic resources are often created by taking several strategies and resources that each could be copied and bundling them together in a way that is difficult to duplicate. For example, WestJet’s culture is complemented by approaches that individually could be copied—the airline’s reliance on one type of plane and its unique system for passenger boarding (in bigger centers, WestJet loads passengers through both front and rear airplane doors, reducing turnaround time)—to create a unique business model whose performance is without peer in the Canadian manufacturing sector (Pérez-Dasilva et al., 2013). Similar to the resource-based view, Porter (2019), in general, focuses on how firms achieve and eventually sustain a competitive advantage. According to him, competition is not restricted to mainly other players and more related to competitive forces in an industry, which go beyond rival entities.

Hence, the theory clearly emphasizes an external oriented focus as competitive forces in the industry and with opportunities and threats need to be analyzed and the firm positioned according to it. Consequently, it also appears contrasting that while the competitive framework mainly focuses on the industry and products as the determinant of profitability and a competitive advantage, the resource-based view follows the logic that the firm exerts the power and hence becomes the success factor.

Transaction Cost Theory

The theory has its origin in management of the supply chains. According to Freeman (2014) the common interest in Transaction cost theory Transaction Cost Theory (TCT) and supply chain management is the focus on “the interaction between economic entities.” While TCT constitutes a general theory of the governance of exchange relationships and economic organization, it directs particular attention to the make-or-buy decision, sometimes described as “the canonical transaction”. This focus makes TCT readily applicable and relevant to research on operations and supply chain management. Indeed, not only is TCT one of the most cited and applied organization theories in operations and supply chain management research its potential in informing future research is also recognized.

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Unlike Neoclassical Economics, the New Institutional Economics recognizes the costs of using the market mechanism and it terms them transaction costs. Transaction costs are the costs of creating, using, maintaining, changing and governing the organization of economic activity within a vertically integrated firm or in a market. In effect, they are divided into market, managerial and political transaction costs including legal, administrative, information-gathering and other costs associated with negotiating and writing contracts, monitoring performance and enforcing promises. The minimization of absolute or relative transaction costs is not an economically reasonable aim. Rather, what matters for the judgment of the economic quality (efficiency) of an economic entity is its total economic results, and not its level of transaction costs. TCT uses the concept of transaction costs to explain the organization of firms and the method of their interactions along a supply chain by providing a conceptual framework for investigating some of the organizational challenges (Chamber, 2014).

In this study, we have two main objectives. One is prompted by the fact that both the general management literature and the literature on supply chains manifest at times serious misunderstandings of TCT. We seek to clarify these misunderstandings by examining TCT's key concepts, assumptions, and theoretical logic.

System Theory

According to Peursem (2016), concepts and techniques of systems theory are important in management of supply chain for a number of reasons. First, they are the bases for the development of computerized information systems, found in all types of organizations today. An organization systems analysis is an integral part of the planning and development of a computerized information system; and modern auditing today includes in its valuations a systems review. In order to meet today's operating challenges, regional and local governments are turning to ICT to enhance the services for residents, businesses and visitors, and improve internal efficiencies by lowering costs and increasing productivity. The systems management theory proposes that businesses, like the human body, consists of multiple components that work harmoniously so that the larger system can function optimally (Pickell, 2016).

Systems management offers an alternative approach to the planning and management of organizations. According to the theory, the

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success of an organization depends on several key elements: synergy, interdependence, and interrelations between various subsystems. Employees are one of the most important components of a company. Other elements crucial to the success of a business are departments, workgroups, and business units. In practice, managers are required to evaluate patterns and events in their companies so as to determine the best management approach in relation to supply chain (Gramling, 2013).

To the researcher of this study, a systems theory perspective allowed a deeper understanding of general nature, ethical values and society as a whole. This knowledge of elements, interconnections, and purposes of people, organizations, and communities helped the researcher in understanding the larger picture of the relationships and function of the society's ethical values and how they could be applied in supply chain management. This way, the entire organization is able to collaborate on different programs so that they can work as a collective whole rather than as isolated units.

CONCEPTUAL FRAMEWORK

Independent variable

Dependent variable

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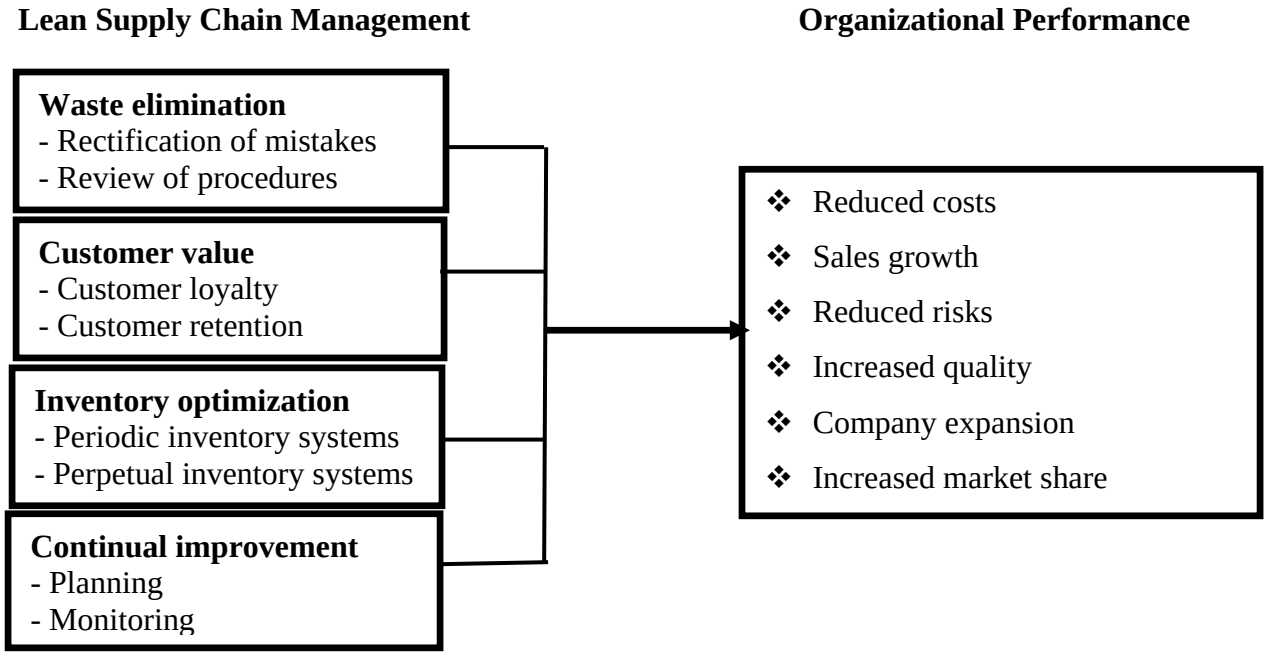

RESEARCH METHODOLOGY

Research design

Both qualitative and quantitative methods were used in the study and the qualitative data tools included reports, interviews and other related documents.

Population and sample size

The target population in this study involved eighty-four (84) staff working in corporate department, Vehicle sales, Service department and Parts departments at Toyota Rwanda. The researcher believes, these respondents are crucial since they have much information on how Toyota Rwanda are faring in line with lean supply chain management.

Data collection tools

This section intends to show the data collection techniques of the study which include questionnaire, interview, observation and documentation research techniques.

Questionnaire technique

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The study considered primary data mainly with the help of questionnaire whereby a self-administered questionnaire was developed and pre-tested prior to the full survey for achieving the objectives of the current study. Using Likert Scale, the staff indicated whether they strongly agree (SA), agree (A), Undecided (U), Disagree (D), or Strongly Disagree (SD). The items for the said scale are gathered for related research study of Kothari, (2014) where these authors used Likert Scale to measure such variables mentioned above.

Interview

According to Krlinger (2017), interview is a conversation from which the researchers try to get information to the interviewees. Qualitative questions were asked in relation with the research objectives, and this helps the researcher to get direct information from respondents; therefore, this technique allowed the researcher to collect information related to the significance level of the contribution of lean supply chain management and establishing whether there had been an improvement in success of Toyota Rwanda due to lean supply chain management components.

Documentary Review

The analysis of the documents in documentary research would be either quantitative or qualitative analysis or even both. The key issues surrounding types of documents and our ability to use them as reliable sources of evidence on the social world must be considered by all who use documents in their research (Marshall, 2015). The researcher used this technique to establish the significance level of the contribution of lean supply chain management and establishing whether there has been a progress in organizational performance of Toyota Rwanda due to lean supply chain management.

Data analysis

The researcher adopted descriptive statistics and besides, inferential statistics in form of correlation and regression analyses were used to measure the correlation between the research variables.

The model used in the study took the form below:

$Y= \alpha+\beta 1X_1+ \beta 2X_2+ \beta 3X_3 +ę$

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Where: Y= Organizational performance

α= Constant Term

β= Beta Coefficient –These measures how many standard deviations a dependent variable would change, per standard deviation increase in the independent variable.

X_1 = Waste elimination

X_2 = Customer value

X_3 = Inventory optimization

X_4 = Continual improvement

ę = error

DATA PRESENTATION AND DISCUSSION OF FINDINGS

Contributions of lean supply chain management and organization performance of Toyota Rwanda

Respondents' level of agreement on the organizational performance

Statements	Strongly Agree		Agree		Undecided		Disagree		Strongly Disagree		Total		Mean
	F	%	F	%	F	%	F	%	F	%	F	%	
LSCM helps to reduce costs	78	81.0	6	19.0	0	0	0	0	0	0	**84**	**100**	3.48
LSCM helps in sales growth	63	75.0	11	13.1	10	11.9	0	0	0	0	**84**	**100**	3.30
LSCM helps to reduce risks	72	85.7	12	0	0	0	0	0	0	0	**84**	**100**	4.52
LSCM increases quality	82	97.6	2	2.4	0	0	0	0	0	0	**84**	**100**	4.57
LSCM leads to ompany expansion	70	83.3	10	16.7	0	0	4	0	0	0	**84**	**100**	4.51
LSCM increases market share	78	92.9	6	7.1	0	0	0	0	0	0	**84**	**100**	4.54

Spearman test

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Model		Variables	LSCM	Organizational Performance
Spearman's rho	LSCM	Correlation Coefficient	1.000	.798**
		Sig. (2-tailed)	.	.008
		N	84	84
	Organizational Performance	Correlation Coefficient	.798**	1.000
		Sig. (2-tailed)	.008	.
		N	84	84

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

It is understood that all correlation analyses express the strength of linkage or co-occurrence between two research variables. A positive correlation coefficient which falls between +1 and -1 indicates a positive relationship between the two variables while negative correlation coefficients express a negative relationship. From the SPSS spearman correlation analysis results indicated in the table 4.12 above, the value of rs=0.798 and p=0.008 which explains that there was a strong, positive monotonic correlation between lean supply chain management and organizational performance of Toyota Rwanda (= .798, n = 84, p < .008). Based on the spearman analysis, therefore, the researcher learnt that lean supply chain management in terms of waste elimination, customer value, inventory optimization and continual improvement has strong relationship on the organizational performance of automotive sector in Rwanda.

Presentation of regression summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.851[a]	.676	.632	.2131

a. Predictors: (Constant), Waste elimination, Customer value, Inventory optimization and Continual improvement

Coefficients

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Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.912	.678		2.820	.774
	Waste elimination	.679	.871	.641	.758	.002
	Customer value	.317	.169	.465	1.876	.004
	Inventory optimization	. 383	.287	.533	1.336	.003
	Continual improvement	.129	.150	.489	.857	.009

Study findings presented in table established regression equation was:

$Y= \alpha+\beta_1X_1+ \beta_2X_2+ \beta_3X_3 + \beta_4X_4 +ę$

Organizational Performance = 1.912 + 0.641 (Waste elimination) + 0.465 (Customer value) + 0.533 (Inventory optimization) + 0.489 (Continual improvement) + 0.678.

The first hypothesis stated that there is no significant contribution of waste elimination on the organizational performance in Toyota Rwanda. Based on findings, it was revealed there is positive and significant contribution of waste elimination on the organizational performance in Toyota Rwanda ($\beta = 0.641$; t-test = 758; p-value < 5%). Thus, the null hypothesis was not accepted; and indication of positive contribution of waste elimination on the organizational performance in Toyota Rwanda. This implies that a unit increase in waste elimination would lead to an increase in the organizational performance in Toyota Rwanda by a factor of 0.641.

The second hypothesis stated that there is no significant influence of customer value on the organizational performance in Toyota Rwanda. The study findings revealed that there is positive and significant influence of customer value on the organizational performance in Toyota Rwanda ($\beta = 0.465$; t-test = 1.876; p-value < 5%). Thus, the null hypothesis was not accepted; and indication of positive influence of customer value on the organizational performance in Toyota Rwanda. This implies that a unit increase in customer value would lead to an increase in

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the organizational performance in Toyota Rwanda by a factor of 0.465.

The third hypothesis stated that there no significant influence of inventory optimization on the organizational performance in Toyota Rwanda. Based on findings, it was revealed there is positive and significant influence of inventory optimization on the organizational performance in Toyota Rwanda ($\beta = 0.533$; t-test = 1.336; p-value > 5%). Thus, the null hypothesis was not accepted; and indication of positive influence of inventory optimization on the organizational performance in Toyota Rwanda. This implies that a unit increase in inventory optimization would lead to an increase in the organizational performance in Toyota Rwanda by a factor of 0.533.

The fourth hypothesis stated that there no significant contribution of continual improvement on organizational performance in Toyota Rwanda. The study findings revealed that there is positive and significant influence of continual improvement on the organizational performance in Toyota Rwanda ($\beta = 0.489$; t-test = .857; p-value > 5%). Thus, the null hypothesis was not accepted; and indication of positive influence of continual improvement on the organizational performance in Toyota Rwanda. This implies that a unit increase in continual improvement would lead to an increase in the organizational performance in Toyota Rwanda by a factor of 0.489

The researcher concluded that there is a strong positive relationship between the study variables as shown by both correlation and regression analysis since they both indicated positive and significant contribution of lean supply chain management on the organizational performance of Toyota Rwanda. Therefore, all the study's null hypotheses were rejected.

Conclusion

Waste elimination and the organizational performance in Toyota Rwanda

Firstly, findings discovered that waste elimination ensures that an organization's decision-makers to review the existing activities. More so, Toyota Rwanda finds it essential to look at the whole sequence of lean events, from the customer's order to raw

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materials producer. From the findings, since all the statements made were both agreed and strongly agreed, it is enough to understand that there is evidence of the existence of strongly influence of waste elimination on the organizational performance of Toyota Rwanda.

Customer value on the organizational performance in Toyota Rwanda

Secondly, it was learnt that considering customer value helps to meet the company's objectives, solve its problems and improve the quality of services provided to the customers. However, findings showed that customer doesn't at some other extent help in identifying, choosing and implementing activities that will enhance the long-term performance of Toyota projects. Thus, it was again learnt there is moderate influence of customer value on the organizational performance of Toyota Rwanda.

Inventory optimization on the organizational performance in Toyota Rwanda

Thirdly, about inventory optimization, it was revealed that with effective lean supply chai offers effective financial, legal and internal audit functions that lead to better performance. It was also discovered that Toyota top management will have to assign clear responsibilities for the establishment of more specific inventory optimization. Therefore, the results discovered moderate influence of inventory optimization on organizational performance of Toyota Rwanda

Continual improvement on organizational performance in Toyota Rwanda

Finally, as regards to continual improvement, Toyota has mastered the art of aligning their human resources with their processes, and technology in supply chain around a continual improvement strategy and this empowers effective collaboration and growth. However, the company doesn't involve all the employees regardless of their positions for better continuous improvement. Hence, some gaps were identified.

The researcher concluded that there is a strong positive relationship between the study variables as shown by both correlation and regression analysis since they both indicated positive and significant contribution of lean supply chain management on the organizational

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performance of Toyota Rwanda. Therefore, all the study's null hypotheses were rejected.

Recommendations

Basing on the study results, the following are the researcher's recommendations and suggestions to Toyota and others in the automotive sector. These recommendations were highlighted in line with the study's objectives.

In line with the first objective, the company should not rely largely on the waste elimination since findings discovered that an organization's decision-makers can easily review the existing projects and plans once waste elimination is effectively carried out.

As regards to the second objective, the goal of supply-chain management is to create a satisfied customer by coordinating all of the activities of the supply-chain members into a seamless process. Therefore, an important element of supply-chain management is that it is completely customer driven.

Finally, as regards to employee motivation and career growth, the company should always involve all the employees regardless of their positions for better continuous improvement.

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