

## **THE RELATIONSHIP BETWEEN LEAN PRACTICES AND PERFORMANCE OF PARASTATALS IN KENYA**

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### **ABSTRACT**

The ability to identify changes in an environment and appropriately respond by choosing a convenient management approach is critical to the success of parastatals. Globally, lean is one of the management concepts that ensure this. There is limited evidence linking these in Africa, and particularly in Kenya. From several financial performance reports including 2021/2022, the performance of some parastatals in Kenya is below average (2.40). They register low performance yearly thus suggesting insufficient implementation of lean practices. Past studies investigated the effect of individual constructs of lean, leaving the composite effect unattended. This study sought to analyse impact of Lean Practices on performance of parastatals, and was guided by Institutional theory.

A census approach was applied with a target population of 34, comprising 102 respondents, out of which 12 respondents were sampled using a cluster technique and 86 for the actual study. Questionnaires were administered to collect data and were analysed using descriptive statistics. Cronbach's alpha tested reliability as content validity tested validity. Sample results show a coefficient of 0.818, implying that the instrument is reliable. The findings reveal that Lean had 71.7% significant effect on performance. The study concludes that lean has a significant and positive impact on the performance of parastatals in Kenya and recommends that parastatals in Kenya should continue to prioritize the implementation of lean practices as a key strategy for enhancing performance.

**Keywords:** Lean Practices, Parastatals in Kenya and Performance

### **INTRODUCTION**

#### **Background to the study**

Globally, Performance in management is becoming an increasing concern regardless of sector, with organizations adjusting from the traditional approach of annual appraisals. The benefits of performance management are more vital than ever after years' worth of continued disruptions and adjustment during the pandemic Gusman Nawanir (2016). It entails assessing strengths and identifying current weaknesses but more importantly, finding possible remedy to weaknesses for further growth and development. According to Donna (2021), traditional model of performance involved annual appraisal, where staff and managers would sit down to review performance perhaps once a year, after its design in the 1970s, a lot has evolved as corporations gradually move

to constructive and continuous methods. In modern time weekly or monthly catch ups timely or regular feedback, target setting, and constant review of progress and identify opportunities for learning and development are the orders of the day in performance Richard (2012).

Performance can be defined as ability of an entity to effectively use resources and processes to achieve goals (Lebans and Esuske, 2006). It is the ability of an organization to achieve goals in a state of constant change. Stephen and Mary (2002) view it as the ability of an entity to effectively use resources and processes to achieve goals. It is accumulated end results of all organization's work processes and activities Stephen and Mary (2002).

Several performance indicators are applied by entities but for business success, KPI by Kaplan is applied. Kaplan identified Key Performance indicators for a parastatals plan that express what it ought to achieve and by when. They're quantifiable, outcome-based statements you'll use to measure if you're on track to meet your objectives. He proposes 5 -7 KPI to manage and track the process of the plan. The anatomy of a structured KPI include efficiency and effectiveness examined through measure of targets e.g. time, data source, financial KPI to gauge (revenue, net profit,) operational KPI and customer KPI are recently relevant in businesses. Studies shows that private sector seem to be embracing this concept in daily operations for both competitiveness and survival purposes, however public entities especially parastatals lag behind. KPIs modalities and applications have not been comprehensively discussed.

From survival point of view, every parastatal just like any other entity has to put in continuous efforts for its survival in the current impulsive and competitive economy. It requires alignment of strategic and operational objectives and parastatals set activities in order to manage performance. In recent years, other organizations attempted to manage organizational performance using balance scorecards methodology where performance is tracked and measured in multiple dimensions such as financial performance, customer service, social responsibility, employee stewardship, performance measure system improvement in a parastatal and parastatals engineering.

By means of the swift development of the internal economy, parastatals just like other business organizations are confronting expanding pressure to accomplish and keep up functional distinction to advance their general performance and competitiveness Gheraradini et al (2007); Kirkham et al (2014). They are required to embrace and put into action and new operation management concepts and trends that include lean in order to continue in existing Zakuan et al (2010).

According to Gupta (2008), lean is a set of management practices whose fundamental objective is to embrace efficiency by drastically eliminating waste, reduce costs in all parastatal management operations and increase client or customer and other stakeholders' satisfaction. Vignesh et al (2016), looks at lean as amalgamation of tools and practices which if applied appropriately, would definitely improve the existing quality of operations and ensure the generation of large amount of favorable financial economic outcomes and improve the behavior of the workforce. David (2014) views it as a management strategy that aims at minimizing waste along entire value streams and create more value for customers. LM practices emerged as critical success factors that drive focus on cost cutting and improving service delivery to end user. The concept was funded by John Krafcit in 1988 and claimed that LM practices result to better quality service, wide market share expanded profit margins, revenue growth and quick response to dynamic market conditions.

After becoming familiarized with core principles of lean, many organizations including parastatals believe that it is not only just specific to physical products but it can be easily be shaped and adapted to suit service sector too Julia (2007) and Simon (2016). This was supported by Khalil (2016) who added that lean is a methodology that can be applied in any sector majorly on saving operational

costs. To implement lean practices, an organization must institutionalize this philosophy across sections and departments as a norm or culture or a policy. On the same note, Reed et al. (1996) insists on making lean a culture, norm or a custom or (institution theory) in an organization for it be fully practiced.

In this regard, parastatals in both manufacturing and service sectors are constantly under pressure to practice lean by being cost effective, delivering efficiently say excellent customer service, faster response times and valuable support to their customers Simon (2016). In the same context, governments around the world want to deliver better services like in private sector. They know that impatient electorates expect to see change and fast but funds required to meet such expectations are enormous- particularly in many developed economies where populations are aging and public sector's productivity has not kept pace with that of private sector Nina (2006). A number of management concepts related to efficiency and effectiveness exist today; in this regard, lean was adopted for current study to check the strength and form of relationship between independent and the dependent variables. In addition, lean was adopted due to its appropriate elements/principles which include identify value, value streaming, create pull flow and establish pull.

Studies have not clearly articulated modalities and applications of these in parastatals and as a result failure to adopt this management concept that literature indicates that enhances performance.

From retrospective studies reviewed, it's clear that studies have explored influence of lean as a management practices on organizational performance. However mixed findings were shown. Maware (2019); Neema et al (2019) Were (2015) had significant positive findings on relationship between Lean and organizational performance. This was after application of unique methodology, parameters and conducting these studies in different areas of studies on different respondents. In contrary, Hardard and Samuel (2022), overall result shows that there was insignificant weak positive correlation between lean and performance. Kudzai and Abubakar (2022) study concluded with mixed finding in a similar survey. Leony (2019) on the same context, had ambiguous results as both insignificant positive and negative finding were shown. Despite the use of lean as stated by Drew (2021), none of the current studies reviewed, attempted to establish influence of lean practices on performance of parastatals in Kenya specifically, on current 34 commercial state corporations according to PSPMMU 2021/2022 report. The current study attempted to fill the gap.

Parastatals are state corporations and corporate body established by Act of parliament or under state corporation Act. In Kenya its under section 3 of the state corporation Act, Cap 446, or by an Act of parliament under the company Act cap 486 where the government controls all or majority of the shares including all their subsidiaries. They originate from 19th century at the time of Kenya Railway line during Imperial British East Africa Company (IBEAC), agriculture commodity related regulatory and marketing regulatory being the first in place followed by others after independence in 1966. Globally, performance of state-owned enterprises is impressing in Europe, America and other developed continents, and a few in Africa. In Africa, majority are not doing well for decades Kenya inclusive, IMF 2021/2022 report. In Kenya, there are 248 state corporations headed by inspector general (state corporations) they are classified into eight broad functional categories based on mandate and core functions say financial, regulatory, training and research service, public universities regional development authorities, commercial/manufacturing, tertiary education and training National Treasury Report Financial Year (FY) 2019/2020. Majority of these are concentrated in transport and energy sectors performing strategic functions. In FY 2019/2020, these commercial enterprises accounted for 85% of total revenues and 89 % of total liabilities in the State Corporation sector (SC). Non-commercial sector includes universities and vocational training colleges, water development agencies and national hospitals. These entities have strong social

mandates to deliver core services to the citizens including provision of goods and services. Initially depended on government transfers and they are expected to generate additional resources for sustainability from the public.

According to several national treasury and planning reports, these state agencies have to beef up due to their low performances. To quote a few reports, in FY 2021/2022 report, the analysis of the fiscal risk parameters of majority state corporations found that the risk primarily relates to the liquidity challenges resulting from unfavourable revenue and economic performance (below average 2.40). The analysis revealed that 11 of these SCs are loss –making thus liquidity risk, implying that they may be unable to service short –term obligations when they’re due. Subsequently 14 SCs have accumulated sizeable arrears, totalling to Kshs 211 Bn (2.2% of GDP). Generally, the analysis revealed that there was a marginal decline in both financial and non-financial performance of these parastatals in 2019/2020 FY compared to 2018/2019 equally a decline was noted in 2020/2021, 2021/2022 FY and even other several previous financial years. In management context, this is a critical challenge that has to be investigated as literature indicate that similar challenges have resulted to demise of a number of organizations not only in Kenya but also Africa and world at large.

## **Objectives of the study**

### **General Objective**

The main objective of this study was to establish the impact of lean practices on the performance of parastatals in Kenya.

### **Specific objectives**

Specifically, the study aimed to

1. Analyzing the influence of Lean practices on Performance of Parastatals in Kenya.

### **Research Hypothesis**

The following Hypotheses guided the study:

H1- There is no relationship between Lean practices and Performance of parastatals in Kenya.

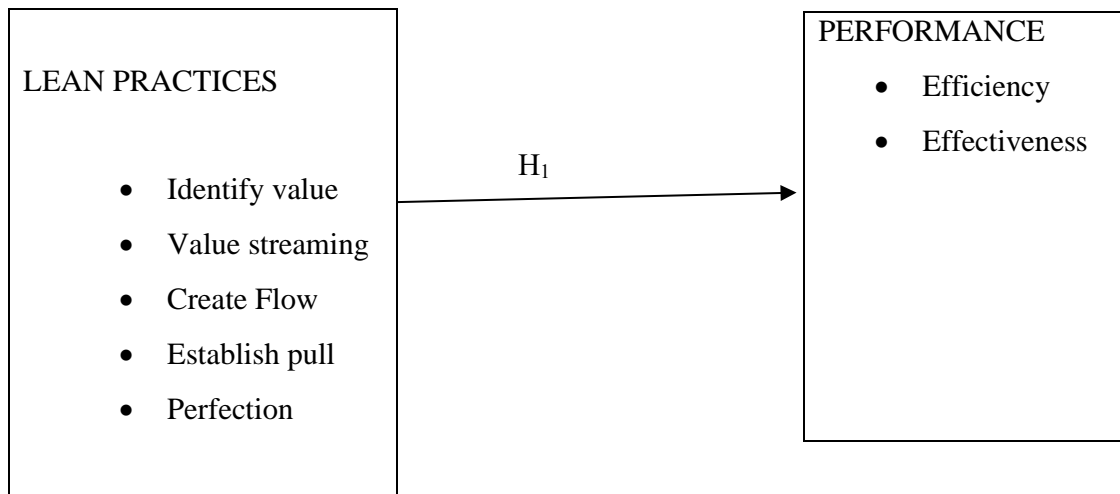
### **Conceptual Framework**

In this sub section, the conceptual framework explains the interplay of the Independent and dependent variables. Figure 1.0 shows Lean practices describes efficiency in terms identification, reducing and elimination of unnecessary costs, applying its principles comprising of Identify value, Value streaming, Create Flow, Establish pull, and perfection.

It was expected that lean practices would have effect on performance. The argument for the interaction of these variables was guided by Institutional theory. These theories helped in explaining, predicting and understanding the phenomena, and to challenge the prevailing understanding, within parameters of the critical binding assumptions.

Independent Variable

Dependent Variable



Source: Adapted from Henry F., (2014)

**Figure 1.0: Conceptual Framework, Lean practices and performance correlation.**

## LITERATURE REVIEW

### Institutional Theory

According to Nilmini (2019), institutional theory is the guideline for social behaviour in form of practices, rules, accepted norms, structures, schemas, and routines influenced by members of any organization. It encompasses a large body of theoretical and empirical work connected by a common emphasis on social norms and shared expectations as key sources of organizations structures actions and outcomes. It is an act of ensuring that a policy such as a management practice formulated is implemented. It's an approach to social theory; broadly speaking that focuses on rule – governed organizations Daniel et al (2022). It was introduced by John Meyer and Brian Rowan 1979 as a means to shape and ensure uniform practices, policies, norms culture and all business practices by society, state national, and global environment. The theory has been broadened in the decades since its induction.

Institutional theory is used to explain how institutions seek to find some kind of consistency in complying with overall rules and norms in departments, sections and subsidiaries in an effort to ensure compliances on all performance practices. To ensure the implementation of any management concepts or practice, Graziella et al (2021) states that institutional theory has to be in existence. Additionally, Daniel et al (2021) in their study posits that Institutional theory is a prominent perspective in contemporary organization and to implement lean practices, discipline, time management requires adoption of this theory.

From the global perspective, Henry M. and Schroeder R. (2006) states that the success of firms in China, American, Australia and even in some in South Africa is slightly due to adoption of institutional theory. The institutional theory is constructed on the notion that governs the institution regardless of ownership. Organizations implement this business theory because doing so enhance their legitimacy Marlei et al (2009). This theory can provide valuable insights on lean tools and practices adopted by parastatal globally, Kenyan state agencies inclusive.

### Empirical Literature

Maware (2019) in a descriptive study on impact of Lean manufacturing implementation on operational performance in Zimbabwe industries. It was a mixed approach as both quantitative and qualitative approaches were used and guided by institutional and contingent theories. To evaluate the effect of implementing LM on performance, qualitative measurement model was preferred due to its ability to use questions structures that allow qualitative data collection for a rich analysis of opinion. The study results shows that operational performance was improved by implementing the selected LM tools namely speed, flexibility and dependability variables significantly influenced. In addition, people integration will not influence operational performance directly. For example, it does through the mediating effect of “Just In Time” (JIT).

Hardard and Samuel (2022) in their study on influence of lean supply chain management practices and performance of manufacturing firms in Kenya used unilever as a case study. Using descriptive design, they specifically examined impact of JIT on performance, aimed at ascertaining likely influence of six sigma on performance and to establish the influence of TQM on performance of Unilever Company. Lean thinking concept, theory of constraints and transaction theories underpinned the study. The literature indicates that 400 staffs from various departments were issued structured questionnaires and from this the finding the researcher agrees with other researchers that in deed TQM and performance have insignificant positive correlation. Additionally, six sigma had insignificant weak positive correlation with performance implying that increased implementation of six sigma does not necessarily resonate to improved organizational performance. The overall result shows that there was insignificant weak positive correlation between TQM and performance denoting that more than TQM implementation led to minor increase in performance while JIT gave insignificant weak positive correlation with performance too.

In a qualitative study by Mathuva (2018) about effect of lean practices on performance of shipping firms in Kenya, constraints and contingency theories were used. J.I.T 5s Kaizen and value stream mapping were used in this descriptive research. The results showed positive insignificant result of use of 5s.

Neema et al., (2019) in a similar study at Guru Gobind Sighn in Indraprastha university India, reviewed literature and trends with an aim of reviewing journal articles on lean published in major academic sources provide taxonomy of the pertinent themes that exists in literature three major academic sources were comprehensively reviewed including emerald insight, T aylor and Francis and Science Direct. It further filtered (exclude) articles from irrelevant disciplines. Findings shows that lean had been adopted by both developed and emerging economies, though the extent of adoption of lean was not disclosed.

In a descriptive study by Weru (2015) systematic, resource-based view and informed theories anchored this study on lean manufacturing practices and performance of large-scale manufacturing firms in Nairobi Kenya. Lean manufacturing was tested through value stream mapping, J.I.T Kanban, 5s, visual display and control, standard work, total productivity, T.Q and production smoothing. Firms’ performance was assessed through time efficiency, flow Time, through put, and work in progress inventory. The data was collected by use of questionnaires that had been subjected to pilot test. The findings show that there was a significant relationship between firms’ performance of large-scale manufacturing and lean manufacturing practice. The study reveals that lean manufacturing ensures good performance to a great extent and that majority of firms employed continuous improvement practices. However, little was written as evidence of previous improvement activities and there was unclear literature on improvement process.

Leony (2019) in a study on lean manufacturing and business performance tested the s-curve theory. A descriptive survey done on manufacturing company in the industrial cluster in Brazil targeting



managers. There was non-linearity and the finding showed mixed results as positive, insignificant positive and negative finding were shown.

A similar empirical study on impact of barriers and enablers on effective lean implementation in India steel industry was done by Soumyadeep Hore (2019). It was limited from 2014 to 2017 financial years and adopted mixed (triangulation) methods approach, expert interaction was sought during on data tools, observation too was used and unit of analysis were managers and executive as they were target respondents from steel plant. Findings shows lack of senior management involvement and inadequate financial resources to invest, lack of formal training to managers and workers, lack of strategic partnership with supply chain members and finally lack of detailed strategic planning. Cross-functional conflicts were found out to be the most insignificant barrier among the selected group barriers. To mitigate barriers, top management was argued to lead with example in productivity quality and recommended that steel sector need innovative management technique and philosophies to be applied.

### **Summary of Literature Gaps**

From the above studies, it is evident that extensive research has been conducted on Lean and performance. Most of the above studies are similar in sense that they administered only a few principles of lean and case study in nature. Unique in sense that they were conducted in different units of analysis but thus giving unique findings.

None of them applied all five principles in 34 commercial parastatals and in Kenyan context. To note a few, Maware (2019), Hardard and Samuel (2022), Mathuva (2018), Neema et al., (2019), thus leaving the Kenyan context unknown. Whereas these studies enriched the researchers know how on the subject of, lean and performance, a further investigation on this relationship with all five principles of lean respectively is imminent.

## **METHODOLOGY**

### **Introduction**

#### **Research Design**

A research design is the overall strategy chosen by researchers to integrate the different components of the study in a coherent and logical way thus ensuring that they effectively address the research problem Kerlinger (1979). The study adopted quantitative research and cross-sectional design on a positivism paradigm. The study population entailed 34 parastatals with 102 respondents from which census survey was carried out. Three (3) respondents per parastatal, say Human resource manager, Operations manager and Finance Manager. Regarding sampling, Mugenda and Mugenda (2003) asserts that 10 percent of target population is sufficient for sample thus, four (4) parastatals.

Since Public Sector Performance Management and Monitoring Unit (PSPMMU) arranged all 34 commercial parastatals in Kenya depending on their financial and non-financial performance positions, say composite score say 2.0000 to 2.9999, 3.0000 to 3.9999 and 4.0000 to 4.9999. 5.0000 to 5.9999 the positions were maintained thus giving four clusters.

Finally, the first parastatal in every cluster was selected for pilot study. Thus, Kenya Seed Company, New Kenya Cooperative Creameries (KCC), Nairobi Oil Corporation of Kenya and Kenya Post office savings bank Ltd, were sampled. From the four (4) parastatals as sample size, the study only engaged twelve (12) respondents, say three (3) from every parastatal.

Regarding reliability, Carmines and Zellner (1979) states that Cronbach’s alpha is a superior measure of internal consistency than test- retest or split halves approaches. Thus, Cronbach’s alpha tested this. The reason for opting for Cronbach’s alpha is that it was difficult to subject survey to respondents twice yet they are bosses (top management) and as explained by Sekaran (2000) in this case the study resorted to Cronbach’s alpha. The pilot study showed reliability coefficient of.818.

**Analysis of finding**

The study adapted a model by Cohen and Cohen (1983) Fairchild and Mackinnon (2009), Whisman and McClelland (2005) as seen below

$$\alpha + \beta_9 IV + \beta_{10} VS + \beta_{11} CF + \beta_{12} EP + \beta_{13} P + \epsilon_i \dots \dots \dots 3.2$$

Y2 = Where:

Y2=Performance of parastatals, I V =Identify Value, V S = Value Stream, C F=Create Flow, E P= Establish Pull, P= Perfection,  $\epsilon_i$ = Error Term,  $\beta$ =Regression coefficient,  $\alpha$ = Regression constant. The confidence level of 95% statistics set at  $p < 0.05$  and taken to be statistically.

**Analysis of the Association of Variables.**

Quantitative data generated was analyzed using descriptive statistics (percentages) and inferential statistics. Inferential statistics tested hypothesis (Ho and H1) for purposes of reaching conclusion about the association between variables and for generating relevant reports. Multiple linear regressions were used to test the association between variables and statistics set at  $p < 0.05$  at a confidence level of 95% and taken to be statistically significant at that point. Significant at that point.

**Findings**

**Table 4.10: Correlation between Lean and Performance of Parastatals**

		Performance	Identification Value	Value Streaming	Create Flow	Create Pull	Perfection
Performance	Pearson Correlation	1	.836**	.870**	.868**	.873**	.925**
	Sig. (2-tailed)		.000	.000	.000	.000	.000
	N	86	86	86	86	86	86
Identification Value	Pearson Correlation	.836**	1	.883**	.860**	.853**	.850**
	Sig. (2-tailed)	.000		.000	.000	.000	.000
	N	86	86	86	86	86	86
Value Streaming	Pearson Correlation	.870**	.883**	1	.930**	.932**	.888**
	Sig. (2-tailed)	.000	.000		.000	.000	.000
	N	86	86	86	86	86	86



Create Flow	Pearson Correlation	.868**	.860**	.930**	1	.935**	.867**
	Sig. (2-tailed)	.000	.000	.000		.000	.000
	N	86	86	86	86	86	86
Create Pull	Pearson Correlation	.873**	.853**	.932**	.935**	1	.878**
	Sig. (2-tailed)	.000	.000	.000	.000		.000
	N	86	86	86	86	86	86
Perfection	Pearson Correlation	.925**	.850**	.888**	.867**	.878**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	
	N	86	86	86	86	86	86
**. Correlation is significant at the 0.01 level (2-tailed).							

The Pearson correlation coefficients indicate the strength and direction of the linear relationships between the Lean practices: - Identification Value, Value Streaming, Create Flow, Create Pull, and Perfection—and the performance of parastatals. All correlations are significant at the 0.01 level (2-tailed), suggesting that the relationships observed are statistically significant and unlikely to be due to chance.

The correlation between Performance and Perfection is the highest, with a Pearson correlation coefficient of 0.925. This indicates a very strong positive relationship, meaning that improvements in Perfection are associated with substantial improvements in the performance of parastatals. Similarly, strong positive correlations are observed between Performance and Create Pull ( $r = 0.873$ ), Value Streaming ( $r = 0.870$ ), Create Flow ( $r = 0.868$ ), and Identification Value ( $r = 0.836$ ). These results suggest that all Lean practices under study have a significant and positive relationship with performance, with Perfection showing the strongest association.

These findings are consistent with previous research that has explored the impact of Lean practices on organizational performance. For instance, a study by Shah and Ward (2007) found that Lean practices, particularly those emphasizing continuous improvement and waste elimination (akin to Perfection), are strongly correlated with improved operational performance. Similarly, a study by Fullerton, Kennedy, and Widener (2014) confirmed that Lean practices such as Value Streaming and Create Flow are positively associated with better performance metrics, including efficiency, quality, and customer satisfaction.

The strong correlation between Perfection and Performance aligns with studies emphasizing the importance of striving for defect-free processes as a key driver of organizational success. For example, a study by Liker and Morgan (2006) on Toyota's production system underscored the critical role of Perfection in achieving high levels of performance and competitiveness. The findings of the current study reinforce this perspective, suggesting that parastatals in Kenya that prioritize Perfection are likely to see significant improvements in their performance.

The correlations among the Lean practices themselves are also noteworthy. For example, the Pearson correlation between Value Streaming and Create Flow is 0.930, indicating a very strong

positive relationship. This suggests that these practices are closely related and may reinforce each other. The strong correlations between Create Flow and Create Pull ( $r = 0.935$ ) and between Create Pull and Value Streaming ( $r = 0.932$ ) further support the idea that these Lean practices are interdependent. Organizations that effectively implement one of these practices are likely to see improvements in the others, leading to a cumulative positive effect on performance.

These interrelationships align with the concept of Lean as a holistic system, where the success of individual practices depends on their integration with others. Past studies have highlighted the synergistic effects of Lean practices. For instance, Karlsson and Åhlström (1996) argued that Lean practices must be implemented in concert to realize their full potential, a finding supported by the strong inter-correlations observed in this study.

The significant positive correlations between Lean practices and performance suggest that Kenyan parastatals could benefit greatly from implementing these practices. The strongest relationships were observed with Perfection and Create Pull, indicating that efforts to eliminate defects and streamline processes could lead to substantial performance gains. These findings imply that Kenyan parastatals should focus on these areas as part of their Lean implementation strategies.

However, the correlatively lower correlation between Performance and Identification Value ( $r = 0.836$ ) compared to other practices suggests that while important, this aspect of Lean may not be as critical in driving performance improvements. This could be due to the specific context of Kenyan parastatals, where other factors such as operational efficiency and defect reduction may play a more significant role.

The correlation analysis provides strong evidence that Lean practices are positively associated with the performance of parastatals in Kenya. The results suggest that all five Lean practices under study are significantly correlated with performance, with Perfection showing the strongest relationship. These findings are consistent with past research, reinforcing the importance of Lean as a comprehensive approach to improving organizational performance.

When compared to the results from the regression analysis, which will be discussed in detail, it becomes evident that while correlation provides an understanding of the relationships between variables, regression analysis offers a deeper insight into the causal effects and the relative importance of each Lean practice on performance. The strong correlations observed here set the stage for the regression analysis, which will determine the extent to which these practices contribute to performance when controlling for other factors

### Effect of Lean on Performance of Parastatals

This section presents, interprets, and discusses the standard multiple regression analysis conducted to examine the influence of Lean practices on the performance of parastatals in Kenya. The null hypothesis tested is that there is no significant relationship between Lean practices and the performance of parastatals in Kenya. The findings on model summary results are presented as shown in Table 4.11 that follows.

**Table 4.11: Percentage Variance of Lean Practices on Performance of Parastatal**

Model Summary										
Model	R	R Square	Adjusted R Square	Std. Error of Estimate	Change Statistics					
					R Square Change	F Change	df1	df2	Sig. Change	F

1	.847 <sup>a</sup>	.717	.712	.33945	.717	148.676	5	80	.000
<b>a. Predictors: (Constant), Perfection, Identification Value, Create Flow, Create Pull, Value Streaming</b>									

The regression model summary provides insights into the strength and explanatory power of the relationship between Lean practices and the performance of parastatals. The model shows a correlation coefficient (R) of 0.847, indicating a strong positive relationship between the five predictors—Perfection, Identification of Value, Create Flow, Create Pull, and Value Streaming—and the performance of parastatals. The R Square value of 0.717 indicates that 71.7% of the variance in the performance of parastatals is explained by these Lean practices, reflecting the model's substantial explanatory power.

The Adjusted R Square value of 0.712, slightly lower than the R Square, accounts for the number of predictors in the model and suggests that the model remains strong even after adjusting for the complexity. The standard error of the estimate is 0.33945, indicating that the model's predictions have a moderate level of accuracy, which is consistent with the overall fit.

The change statistics further confirm the model's robustness. The R Square Change of 0.717 shows that the inclusion of these Lean practices explains 71.7% of the variance in performance, reflecting their significant contribution to the model. The F Change value of 148.676, with a significance level (Sig. F Change) of 0.000, confirms that the model is statistically significant, with less than a 0.1% probability that the observed relationship is due to chance. Therefore, the results indicate that the model provides a good fit for the data, supporting the conclusion that these Lean practices are strong predictors of performance and therefore, management should embrace this practice as culture in parastatals.

**Table 4.12: Model Coefficient on Lean practices**

<b>Coefficients<sup>a</sup></b>						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	.109	.136		.798	.425
	<b>Identification Value</b>	.262	.035	.302	7.531	.000
	<b>Value Streaming</b>	.399	.043	.382	9.250	.000
	<b>Create Flow</b>	.116	.023	.178	5.072	.000
	<b>Create Pull</b>	.012	.021	.019	.565	.573
	<b>Perfection</b>	.182	.033	.228	5.560	.000

a. Dependent Variable: Public Service Delivery

The coefficients table provides a comprehensive overview of how each Lean practice influences public service delivery within Kenyan parastatals. The table presents both unstandardized and standardized coefficients, along with their corresponding t-values and significance levels, allowing for an in-depth analysis of each predictor's impact. The dependent variable in this model is Public Service Delivery, and the predictors include Identification Value, Value Streaming, Create Flow,

Create Pull, and Perfection. Understanding these relationships is crucial for identifying which Lean practices most effectively enhance performance in the public sector context.

Starting with the constant (intercept) value of 0.109, the p-value of 0.425 indicates that it is not statistically significant. This suggests that when all Lean practices are set to zero, the predicted level of public service delivery does not differ significantly from zero. In practical terms, this means that the baseline performance of parastatals cannot be attributed to the absence of Lean practices alone, highlighting the necessity of these practices in driving performance improvements.

Identification Value emerges as a highly significant predictor of public service delivery, with an unstandardized coefficient (B) of 0.262 and a standardized Beta of 0.302 ( $t = 7.531$ ,  $p < .001$ ). This indicates that for every one-unit increase in Identification Value, there is an associated 0.262 increase in public service delivery, holding other factors constant. The strong positive relationship underscores the importance of accurately identifying value-added activities within parastatals, aligning with Lean principles that emphasize eliminating waste and optimizing processes to enhance overall performance (Womack & Jones, 2003).

Value Streaming also shows a significant positive impact on public service delivery, with an unstandardized coefficient of 0.399 and a standardized Beta of 0.382 ( $t = 9.250$ ,  $p < .001$ ). This suggests that effective value streaming—ensuring that all processes contribute directly to delivering value to the end-user—substantially enhances service delivery outcomes. The high significance and relatively large coefficients highlight Value Streaming as one of the most influential Lean practices in improving the efficiency and effectiveness of parastatals, consistent with findings by Rother and Shook (1999) on the critical role of value stream mapping in Lean implementations.

Create Flow is another significant predictor, with an unstandardized coefficient of 0.116 and a standardized Beta of 0.178 ( $t = 5.072$ ,  $p < .001$ ). This positive relationship indicates that enhancing the flow of processes—ensuring that services are delivered smoothly without interruptions—contributes significantly to better public service delivery. Efficient process flow reduces delays and bottlenecks, thereby increasing the overall responsiveness and reliability of parastatals. This aligns with Lean methodologies that prioritize seamless workflow to achieve higher performance levels (Ohno, 1988).

In contrast, Create Pull exhibits a non-significant effect on public service delivery, with an unstandardized coefficient of 0.012 and a standardized Beta of 0.019 ( $t = 0.565$ ,  $p = .573$ ). This indicates that Create Pull, which involves producing services in response to actual demand rather than forecasts, does not significantly impact performance in the context of Kenyan parastatals. The lack of significance suggests that this Lean practice may not be as critical or may require different implementation strategies to be effective within the public sector environment. This finding diverges from some Lean literature that advocates for pull systems to enhance responsiveness (Womack & Jones, 2003), indicating the need for further investigation into its applicability in public service contexts.

Perfection is a significant predictor with an unstandardized coefficient of 0.182 and a standardized Beta of 0.228 ( $t = 5.560$ ,  $p < .001$ ). This indicates that striving for perfection—continuous improvement and the elimination of defects—has a meaningful positive effect on public service delivery. The significant relationship underscores the value of adopting a culture of excellence and ongoing refinement in processes to achieve superior performance outcomes. This finding is consistent with the principles of Lean, which emphasize relentless pursuit of quality and efficiency (Deming, 1986).

Overall, the regression analysis reveals that Identification Value, Value Streaming, Create Flow, and Perfection are significant predictors of public service delivery in Kenyan parastatals, while Create Pull does not exhibit a significant impact. The high R Square value of 0.717 and Adjusted R Square of 0.712 indicate that approximately 71.7% of the variance in public service delivery is explained by these Lean practices, demonstrating the model's robust explanatory power. The F Change statistic ( $F = 148.676$ ,  $p < .001$ ) confirms that the model is statistically significant, reinforcing the validity of the findings.

In conclusion, the regression analysis supports the substantial positive roles of Identification Value, Value Streaming, Create Flow, and Perfection in enhancing public service delivery within Kenyan parastatals. These findings suggest that parastatals should prioritize these Lean practices make it a norm, and institutional policy/ mandatory practice to achieve better performance outcomes. The non-significant impact of Create Pull highlights the need for a tailored approach when implementing Lean practices in the public sector, potentially exploring alternative strategies or addressing specific contextual challenges. Future research should investigate the underlying reasons for the limited effectiveness of Create Pull and explore how Lean practices can be optimized to fully realize their potential in improving public service delivery.

**Table 4.13: Regression Analysis**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
2	.901 <sup>b</sup>	.813	.808	.42330	.021	9.496	1	83	.003
a Predictors: (Constant), Lean Practices									

**Table 4.14: Coefficient variable**

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	.079	.114		.690	.492
	Total Quality Management	.964	.054	.889	17.839	.000
2	(Constant)	.046	.109		.418	.677
	Total Quality Management	.412	.187	.380	2.205	.030
	Lean Practices	.570	.185	.530	3.082	.003

3	(Constant)	.119	.113		1.056	.294
	Total Quality Management	.181	.214	.167	.849	.398
	Lean Practices	.854	.227	.795	3.769	.000
a. Dependent Variable: Efficiency						

In the second model, Lean practices are introduced as an additional predictor. The inclusion of Lean practices improves the model's explanatory power, with the R-square increasing to 0.813. This suggests that Lean practices account for an additional 2.1% of the variance in performance (R Square Change = 0.021, F Change = 9.496,  $p = .003$ ). The standardized coefficient for Lean practices is 0.530 ( $t = 3.082$ ,  $p = .003$ ), indicating a significant positive impact on performance. These results underscore the complementary nature of Lean practices, suggesting that Lean enhances the effectiveness in improving performance outcomes.

The significant interaction term implies that the relationship between lean and performance is contingent upon the level of Lean practices implemented. Specifically, while Lean practices independently contribute positively to performance, the negative interaction suggests that when Lean practices are strongly emphasized, the marginal benefit of lean on performance may be reduced. This could be due to overlapping effects where the principles of Lean converge, leading to diminishing returns in certain areas when both are applied simultaneously at high levels.

For Kenyan parastatals, these results suggest that while Lean practices are individually beneficial, their combined use should be carefully managed. Organizations may need to assess the specific contexts in which Lean practices might reduce the marginal effectiveness of performance and vice versa. This might involve a strategic evaluation of which elements of Lean are most critical to their operations and how these can be harmonized to avoid overlap and inefficiencies.

It is important to consider the limitations of this study when interpreting the results. The negative interaction term might not necessarily indicate that Lean diminishes the effectiveness of performance in all cases. Instead, it could reflect specific challenges within the Kenyan parastatal context, such as resource constraints or the difficulties in integrating complex management systems. Future research could explore these dynamics in greater detail, potentially using qualitative methods to gain deeper insights into how these interactions play out in practice.

Although some statistical findings show negative results, the coefficient variable and regression analysis findings indicate a significant positive effect of lean practices on performance. The study agrees with empirical results by Weru (2015), Neema et al (2019) and Mawere (2019) that lean positively influences performance and therefore it should be a policy to practice lean in entire parastatal operations.

## SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

### Introduction

#### Lean practices and parastatal Performance in Kenya

The study also analyzed the influence of Lean practices on the performance of parastatals in Kenya. The findings indicated that Lean practices have a significant and positive impact on performance, as evidenced by the results of the regression analysis. The introduction of Lean practices as an



additional predictor in the model resulted in an increase in the R-square value to 0.813, indicating that Lean practices contribute to an additional 2.1% of the variance in performance. The standardized coefficient for Lean was also statistically significant, further affirming its positive influence on performance.

These findings align with existing literature that highlights the effectiveness of Lean practices in enhancing operational efficiency, reducing waste, and improving overall organizational performance. Lean practices, which focus on improvement, and efficiency by streamlining processes and eliminating non-value-added activities. This synergy between Lean and overall performance of parastatals, making Lean an essential component of the management strategy in these organizations.

The correlation analysis further supported the regression findings, showing significant positive correlations between Lean practices and performance indicators. These correlations indicate that as Lean practices are more effectively implemented, performance improves. The strength of these relationships suggests that Lean practices should be integrated into the operational strategies of parastatals to maximize performance outcomes. The consistent positive impact of Lean across various analytical approaches underscores its importance in the performance framework of Kenyan parastatals.

## **Conclusions**

The study also concludes that although Lean practices had some negative statistical findings, still it the overall Coefficient variable and regression results shows significant positive influence on the performance of parastatals in Kenya. This is also based on the fact that the concept of lean is not embraced in these parastatals thus having such findings. The findings lead to the rejection of the null hypothesis (H2) that there is no relationship between Lean and performance. Lean practices contribute significantly to performance improvements by enhancing efficiency, reducing waste, and optimizing processes. The consistent positive impact of Lean across different analytical methods highlights its importance as a complementary strategy to performance.

Lean practices are particularly valuable in environments where operational efficiency and cost-effectiveness are critical. In the Kenyan parastatal sector, Lean practices can help organizations streamline their operations, improve resource utilization, and deliver greater value to stakeholders. The study's findings reinforce the need for parastatals to integrate Lean practices into their operational strategies to achieve sustained performance improvements.

This conclusion highlights the need for a strategic approach to integrating Lean practices and performance of parastatals. Managers should consider the specific contexts and capacities of their organizations when implementing these practices to avoid potential conflicts and inefficiencies.

Statistical findings also shows that failure to embrace lean practices say value streaming, create flow, establish pull, perfection in Kenyan parastatals has been established in most of these entities thus becoming a major limitation.

## **Recommendations**

It is recommended that parastatals in Kenya continue to prioritize the implementation of lean practices as a key strategy for enhancing performance. Given the strong positive relationship between lean practices and performance, managers should focus on lean as a management practice.

Parastatals should integrate Lean practices into their operational strategies to further enhance performance. Lean practices should be tailored to the specific needs of the organization, with a

focus on eliminating waste, optimizing processes, and delivering value to stakeholders. It is also recommended that managers regularly assess the effectiveness of Lean practices and make adjustments as necessary to ensure that they are aligned with the organization's performance goals.

### **Further studies suggestions**

Studies can be conducted by scholars on lean but in different parastatals and other private organizations to establish its relevance and applications. Lean Principles that showed negative finding could form an important area of emphases.

### **Contribution to Existing Knowledge**

The study addresses a significant gap in the literature by focusing on the application of lean practices specifically within Kenyan parastatals, an area that has received limited attention. It builds upon previous studies while aiming to provide empirical evidence regarding lean practices' effects on performance, thus contributing valuable insights to both academic and practical realms.

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