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LEAN PROCESS MANAGEMENT

ENHANCING ADMINISTRATIVE EFFICIENCY IN THE PUBLIC SECTOR IN RIVERS STATE

KEY WORDS



► Lean Process, Continues Improvement, Automation, Employee Involvement, Value Stream Mapping, Office Productivity

Abstract

Government from all over the world are looking for ways to reduce the complexity and costs of the public sector while the same times simplifying and streamline organizational processes in the public sector. While pursuing both objectives government face challenges and try to solve the problems by focusing on the transfer of lean thinking concept which is a new wave which appearing as a response and transform government challenges from the private to the public sector in Rivers State. Over the years, the lean concept has evolved becoming a managerial paradigm applicable to different sectors and processes with impressive results. In Rivers State the concept is barely known. This research assessed the lean process management and office productivity in Rivers State Public Sector. To effectively carry out this study, a cross sectional survey approach/design/methodology was adopted. The instrument for data collection was the questionnaire using Likert five scales while data were analysed with the use of percentage for socio-demographic data while the hypotheses were analysed using the Spearman's rank order correlation coefficient. The findings of the empirical evidence show that there is a positive significant relationship between lean process management and office productivity in the Rivers State Public Sector. The study further revealed that employee involvement, value stream mapping, continuous improvement and automation are keys in implementation of lean. It is recommended management of the several public sector should ensure to get the employees involve in some of decisions and innovation to be carried out in the office.

Introduction

The demands on efficiency and quality in the public sector have increased over the past few years, which have raised the need for strategies on how the public sector can be improved (Denhardt and Denhardt, 2000). The public sector is highly bureaucratic and it affects the quality of services in terms of delay, lack of duty focuses, depravity and performance. The structure of public sector has largely remained the same since 1999. While there have been changes in nomenclature and mergers and demergers of ministries, the core structure of, and approach to managing government has stayed largely the same and has not kept pace with modern advances in public service delivery. Office productivity can be understood as the value derived from the administrative efforts of information and organisational facilities management which leads to total organizational success. Because of the emergence of new technology in business globally, the office status has tremendously changed from where clerical work are done to any point of contact where business information, and operational decision are efficiently gathered, disseminated and utilized for business success. (Nwinyokpugi, 2017). Information management strands of the office function embrace the human element and non-human elements at work. The nucleus of the public sector is the office and it is expected to have undergone several organizational and structural reforms, yet there is no tremendous improvement in the quality of service provided to the public servants. Corruption is still very paramount in governance and money spent by Government is being lost to underhand practices. There is weak national consciousness due to political affiliation and the introduction of regionalization policies that encouraged ethnicity and sectionalism in the rank and file of staffers in the public service. The need to modernize and tackle the administrative bureaucratic structures to provide quality services in terms of the delay and productivity has been a concern to the public sector organizations. This is gap that lean process is geared to address. Public administrations all over the world are forced to transform themselves into more efficient and effective, customer-oriented service providers (Fountain, 2001) because the public sector is subject to constant changes (Sims, 2010). Confronted with rising citizens' discontent over public service delivery, new technological challenges, cultural changes and globalisation, public organisations everywhere in the world are seeking means of improving their productivity. Their quest is not new; rather, the concern is more at improving organisational productivity on service delivery to citizens. Moreover, providing public services to needy citizens is an indicator for assessing sustainable delivery of efficiency and effectiveness of governance. Aalto & Westermarck (1993) assert that office productivity is all about supporting the business operations and helping in the recording process of those actions and decisions. In their assumption, office work is divided into two parts; information processing and information gathering. Information gathering is adjusting for different situations and the information processing is about the natural flow of the information. These processes of gathering and processing information is done with the help of different kinds of documentation and equipment.

Thus, for effectiveness and efficiency in the use of the equipment, the process and human effort must have the technical knowhow. Thus, when the right expertise and equipment is utilized there will be ease of the usage of the information. The 21st century evolution has increased the level of industrialization. It has introduced new methods and processes of doing work especially in the office workplace. Haynes productivity framework is developed around the work pattern (Laing et al, 1998), which allows for categorization of workers by the way they undertake their work. The work pattern contains the physical environment and behavioural environment. The behavioural environment allows a greater appreciation of how workers interact in the office environment while the physical environment supports the office layout and office comfort. The study is centered on the behavioural environment and the strategies workers use in a continuous manner to improve the best design processes. The process describes the personnel, work tools and method and the output. Lecklin (2006)

The demand for new advanced management concepts that has strong focus on modernizing the public sector to reduce waste and to improve productivity and performance in the New Public Management (NPM) inspired reforms and modernization efforts. Hyndman &Lapsley, 2016) opined that there is any technique that has swept the administrative hub of the public sector organisations in the recent years;it is Lean. Lean management or lean philosophy has emerged as one of the best tools available to academics and professionals, which enhances doing more with less resources, higher performance and continuous improvement. Lean has over time been largely popular, not only among private sector firms, for example among manufacturing or construction firms but increasingly also in other sectors and particularly during the 2000s, been put forth as a viable management concept with high degree of applicability in the public sector. The essence of lean process management is the creation of a culture that encourages learning and thus continuous process improvement through simplifying and standardizing the way work is performed and systematically attacking problems as they occur (Womack and Jones 1996, 2003; Spear 2002). The usefulness and applicability of Lean in the public sector cannot be over-emphasized as it provides the capacity to improve work flow and reduce administrative waste (Tapping and Shuker, 2003). It also allows greater flexibility with quicker response to market changes (Engle, 2012) and providing positive results to this sector by creating value for the citizen, who represents the end users (Turati and Musetti, 2006). Lean is a 'philosophy' that helps companies to bring value to customers faster and better by doing the same processes smarter than before. (KseniiaMironiuk 2012). Being lean implies a continuous effort to reach a state known by minimal waste and maximum flow. Becoming lean requires a change of mindset, learning and facing change, continually increase the visualization of waste and its elimination.

Lean thinking is a way of doing more with less, less effort, less equipment, less time and less space, more and more approaching the ideal of meeting clients' needs and delivery exactly what they want. It is agreeable with other studies that the overall goal of lean is to free up time and to work more efficiently. Lean process management will be shortening lead times; create a working workflow, orderliness, reducing waste, flexibility and continuous improvement (Hines et al, 2004).

Lean process management has been widely studied by academics and management consultants such as Bergstrom and Lapsley (2017), using relevant variables and presented as "novel and new despite being a recycled idea from decades earlier" that has to be adopted when it is applied in a public sector. Several recent literature reviews have shown that there is emerging but still small body or lack of published theoretical research on the use of Lean in Rivers State, Nigeria especially in the public sector based on the need and strategy to reduce cost, improve efficiency and increase productivity in the public sector. The public sector is strongly characterized by the presence of large inefficient, wasteful, slow, underperforming, with evidence of political and bureaucratic abuses (Anacleto 2010). The sector is operated as a 'no man business' and caused losses by waste, variability and inflexibility. Within the concept of lean thinking, waste is everything that does not directly add value to a product or service based on customers' needs and requirements (Ohno, 1988). These forms of loss are apparent in the public sector such as movement of materials or people, files, unnecessary duplicative trips, waiting times, idle periods. When no value is added resulting from poor coordination between activities, employees may be either overworked or idle because work often accumulates before moving to the next stage, thus unnecessarily delays loss of man hour evolves. Processes are poorly designed which result in work-in-progress being frozen after each step is made, people tend to make things more complicated than they actually are. Employee loafing is one of such problems that public sector offices experience, wear and tear of equipment, rework, high errors. Imprecise or missing information leads to a wrong or inaccurate execution of processes. Not using ideas, skills, and knowledge of talented and experienced people in the organization. Also, high case of deviation that create unnecessary costs. All these affect office Productivity in the public sector that has been conceptualized from different perspective to measure output and input. Most researchers have used organizational productivity, others have used employee productivity but not much on office productivity. This challenge is mostly due to the fact that there is no generally accepted definition of office productivity. There are so many aspect of industrial work scope that cannot be made functional without the support of administrative engineering from the office. Therefore, office productivity becomes the focus of the new public sector management process. This study therefore, strives to fill the gap with the application of Lean which is designed to remove wastes from each process that delivers a service.

Literature Review

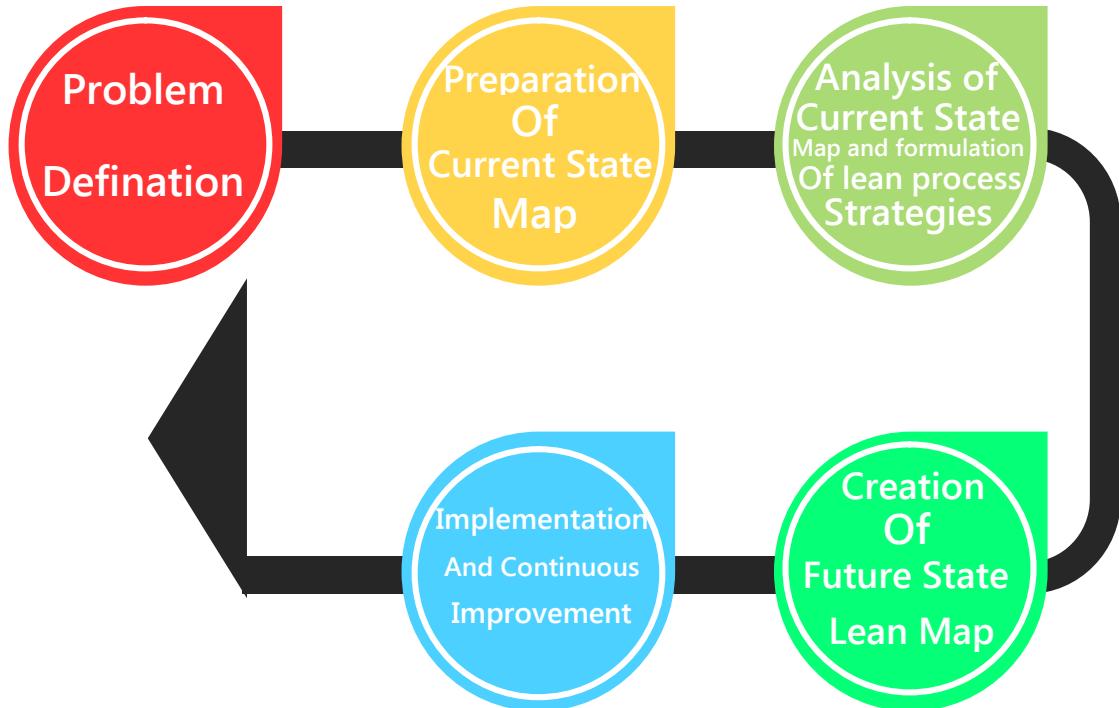
The concept or term called “lean management” or “lean thinking” is mostly associated with Japanese manufacturing, particularly the Toyota Production System (TPS). The essence of lean management is to reduce waste by using lean in achieving more. Lean management is a management strategy that has to do with improving process and as such could be applicable to all organizations. The reason is because all organization activities involves processes intended to create value to stakeholders or better explained the end users of its product. According to Bame, (2017), lean management is a philosophy of continuous process improvement by eliminating waste and maximizing value for the customer. Therefore, the core idea of lean management is support for continuous improvement and process to improve quality and efficiency. Lean management is thus, an approach to work that systematically seeks to achieve small, incremental changes in process in order to give value to the service. Lean approach is best described as the process of distinguishing value-added steps from non-value-added steps, and eliminating waste. Shaha& Ward (2007), averred that the varied conceptualizations of lean are generally described from two perspectives, either from a philosophical perspective related to guiding principles and overarching goals, or from a practical perspective of a set of management practices, tools or techniques that can be observed directly. Hines, Holweg and Rich (2004) supports the two distinctions of the lean concept. The philosophical perspective according to Bhasin& Burcher (2006) indicates that organizations often implement lean as a process rather than as a philosophy. The successful lean process management is as a philosophy. Furthermore, if lean is seen as a philosophy it becomes a certain way of thinking, while the tactics or processes are mechanisms to action this way of thinking. The practical perspective is based on two levels; the strategic level and the operational level. The strategic level of lean thinking applies to

everywhere while the operational level applies to the shop-floor. The distinction between the strategic level and operational level is crucial for the understanding of lean as a whole, in order to apply the right tools and strategies to provide customer value and hereby creating a consistent link between the strategic level and the operational level. The basis of lean operational level is to eliminate wasteful activities, which is composed of over production, waiting, transportation, inappropriate processing, inventory, unnecessary motions and defects (Bhasin& Burcher, 2006). While lean thinking is for the strategic value chain. Lean thinking emphasizes “more of less” in terms of less space, less time, less equipment, less cost, less human effort geared towards enhancing value or perceived value) to customers (Hines, Holweg, & Rich, 2004). It is respect for the voice of the customer and it is respect for those who do not work, who are “on-the-spot and are, therefore, the “world’s greatest experts” in their work; Lean is the elimination of waste in all its forms. Lean is the ability to distinguish between work that actually adds value to your customers and work that does not. By eliminating waste, you free resources to devote to value-adding activity that serves your customers; Lean is a work environment that assures the quality and safety of all work for both customers and staff; Lean is a focus on improving the work process and not on blaming people or creating fear; Lean is a culture of teamwork, shored responsibility and ownership that cuts through organisation walls or silos; Lean is a culture that returns the joy to work; Lean is flow and Lean is an interruption free process that flows from beginning to end without interruption.

Value Stream Mapping (VSM)

is a standardized way of documenting (mapping) processes and information/material flows as they are, and applying a systematic way to analyze these processes in order to identify various waste and target specific areas for improvement (Ciarapica et al., 2016; Kuipera et al., 2016; Rother and Shook, 1998). VSM was originally developed to focus on the analysis and improvement of disconnected flow lines in manufacturing environments, but it has emerged as the preferred way to support and implement the lean approach for all industries. VSM enables a company to see the entire process in both its current and desired future (lean) state, and identify and eliminate waste, thereby streamlining work processes, cutting lead times, reducing costs and increasing quality (Abuthakeer et al., 2010; Ballard and Howel, 1994; Jasti et al., 2014; Tabanli and Ertay, 2013). The first step to implement VSM is to draw a current state map. The value stream map of current process is created and identifies different kinds of value-added as well as non-value-added activities in this stage. The current state map is typically drawn by a cross-functional, multi-disciplined team to document how things actually operate ("as-is" process). The next step is to develop a future state map ("as should be"). In order to do so, the current state map should be analyzed first. The team needs to identify gaps or improvement areas (e.g. large inventories, long lead/cycle time), and provide rationale as to how and why these activities identified are non-value-added. Based on the gap areas found, the team proposes what must change in the process, methods, and organization. Then, the future state map is developed to design a lean process flow through the elimination of non-value-added activities and through process improvements. The last step is to analyze the results after implementing the proposed changes. This has to be quantified in terms of lead time reduction, cycle time reduction, inventory reduction, etc. In addition, the team needs to develop a change plan that provides action steps needed to support the proposed changes.

The steps in the implementation of VSM are shown in Figure 1 below.



Source: Bong KeunJeong& Tom E yoon Steps in Implementation of VSM 2016

Automation

According to the Encyclopedia Britannica (2008) the addition of computers and IT-systems affected the organization of office work. The automation of work has, though, resulted in fewer jobs as no longer are machine operators needed and many clerk tasks are redundant, which again cuts costs. This means that through the introduction of automation specifically the computer and typewriter, there is a reduction on the burden of executing office work manually.

Otherwise called Kaizen in Japan is a process-oriented thinking, it is people-oriented, and is directed at people's efforts. Rather than identifying employees as the problem, Kaizen is a combination of two Japanese words (kai+zen), which literally means "Change for the Better" (Alukal& Manos, 2006). It is a compound word involving two concepts: Kai (change) and Zen (for the better) (Palmer, 2001). This is translated as "Continuous Improvement" in English. The word kaizen indicates a process of continuous improvement of the standard way of work of an organization in step by step improving process efficiently and eliminating wastes (Chen et al 2000). It is a system that involves everyone in the organization from top management to the cleaning team. Everyone is encouraged to come up with small improvement suggestions on a regular basis (Khan, 2011). To use kaizen means to regularly identify new processes and services and to enhance the organizational goal (Brunet & New, 2003). Kaizen emphasizes that the process is the target and employees can provide improvements by understanding how their jobs fit into the process and changing it. Continuous Flow is an ability to execute a certain part of work right when it is needed by the next process or is directly followed by the next process. It is also termed as one-piece flow, as the goal of the tool is to move an item through the process continuously by making only what is required by the next step of the process. The flow is created by allocation of people and equipment in a correct way (order) and close to each other. Continuous flow also requires employees to be united not only in their goals but also to have common measures of their performance evaluation. Measures serve as help in attaining the company's aims. Continuous flow is reached by use of various approaches, such as FIFO (first in, first out). The FIFO method controls the work flow and organizes it the way that when a certain job is finished by the previous process (first in) it is prioritized for the next process (first out).



Is creating an environment in which people have an impact on decisions and actions that affect their jobs. Employee involvement is not the goal nor is it a tool, as practiced in many organizations. Rather, employee involvement is a management and leadership philosophy about how people are most enabled to contribute to continuous improvement and the ongoing success of their work organization. When employees are involved in decision making, it is believed that it would lead to an increase in productivity and also the achievement of the organizational goals. In these days of intense competition, to achieve growth and stability, eliciting employee's commitment towards achievement of organizations objectives is very crucial. The greatest challenge management face in organizations is how to effectively motivate and involve employees towards achieving organizational goals Apostolou (2000). Employee involvement is a process of participation and empowerment of employees in order to use their input towards achieving higher individual and organizational performance. Involvement refers to the employee participation in decision making and problem solving, and increased autonomy in work processes. As a result, employees are expected to be more motivated, more committed, more productive and more satisfied with their work (Sofijanova and Zabijakin-Chatleska, 2013). Employee involvement enables the organization to have a better insight about the way of functioning and where it can potentially make improvements that would be beneficial for both, the organization and the employees. There are many studies providing evidence that the employee involvement affects the organizational performance. Also, employee empowerment is considered an important contributor to organizational success. Much effort has been made to test the direct relationship between the level of employee empowerment and employee performance, and also, the job satisfaction and commitment.

Methods

The study adopted a cross sectional survey design with a population of 180. The target population consists of Permanent secretaries, Directors, Heads of departments and supervisors from six (6) ministries and agencies in the Rivers State public services. The study sample was 154 determined by the use of Taro Yemen sample size determination formula. After the process of data collection, only data for 139 respondents were finally used for data analysis due to sorting and cleaning. The content validity of our instrument was achieved using supervisor's vetting and approval while the internal consistency of instrument was achieved using the Cronbach Alpha coefficient with all the items being above 0.70. Data was analyzed and results presented in tables, showing their mean and standard deviation. The hypotheses were tested using the Spearman Rank Order Correlation Coefficient. The target population of this study consists of Permanent secretaries, Directors, Heads of departments and supervisors from six (6) ministries and agencies in the Rivers State public services. These 180 respondents made up the population for this study. The sample size for the study was determined using Taro Yamen's Formula for sample size determination. The instrument was further tested for reliability and validity. This study conducted reliability test using Cronbach's alpha coefficient. Alpha coefficient was developed by Cronbach to meet the need of finding an objective way of measuring the internal consistency reliability of an instrument used in a research work (Cronbach, 1951).

Table 1: Reliability Coefficients of Variable Measures

S/No	Dimensions/Measures of the study variable	Number of items	Number of cases	Cronbach's Alpha
1	Employee Involvement	4	139	0.843
2	Continuous Involvement	3	139	0.696
3	Value Stream mapping	3	139	0.912
4.	Automation	3	139	0.775
5	Task Accomplishment	3	139	0.752
6	Cost Reduction	3	139	0.790
7	Technology	3	139	0.781
8	Organizational Culture	3	139	0.699
Source: Research data output, 2018				

Methods of Data Analyses

The use of descriptive statistics such as percentages and weighted mean is applied to the socio-demographic data and research questions of the study. While, the hypotheses are analyzed using the Spearman's rank order correlation coefficient, with the aid of a Statistical Package for Social Sciences (SPSS) version 21. The spearman's rank correlation coefficient test requires that the response be at least in the ordinal level. That is, the responses can be ranked from low to high. Spearman's coefficient of rank correlation, denoted by r_s , provides a measure of relationship. The coefficient of rank correlation can assume any value from -1.00 to +1.00. A value of -1.00 indicates perfect negative correlation and a value of +1.00 indicates positive correlation among the ranks. A rank correlation of 0 indicates that there is no relationship among the ranks. A significant level of 5% will be used to test the variability of the test statistics.

Table 2: Descriptive Statistics for the Dimensions of Lean Process Management

	N	Minimum	Maximum	Mean	Std. Deviation
Employee Investment	139	1.00	5.00	3.8633	.92628
Continuous Improvement	139	1.00	5.00	3.7506	1.02865
Value Stream	139	1.00	5.00	3.7458	1.12259
Automation	139	1.00	5.00	3.9400	.89932
Valid N (listwise)	139				

Source: Research Survey Data, 2018

Table 2 above illustrates the descriptive statistics for the dimensions of lean process management which are employee involvement, continuous involvement, value stream mapping and automation with mean scores of 3.86, 3.75, 3.75 and 3.94 respectively.

Table 3: Descriptive Statistics for the Measures of Office Productivity

	N	Minimum	Maximum	Mean	Std. Deviation
Task Accomplishment	139	1.00	5.00	3.8969	.96713
Cost Reduction	139	1.00	5.00	3.5516	1.17112
Valid N (listwise)	139				

Source: Research Data 2018, (SPSS output version 23.0)

Table 4.15 illustrates the descriptive statistics for the measures of office productivity which are task accomplishment and cost reduction with mean scores of 3.90 and 3.55 respective

Table 4: Descriptive Statistics for the Study Variables

	N	Minimum	Maximum	Mean	Std. Deviation
Lean Process Management	139	1.00	5.00	3.8249	.90379
Administrative Efficiency	139	1.00	5.00	3.7242	.98391
Moderating Variables	139	1.00	5.00	3.9209	.95497
Valid N (listwise)	139				

Source: Research Data 2018, (SPSS output version 23.0)

Table 4 above illustrates the descriptive statistics for the variables of the study which are lean process management, office productivity and moderating variables with mean scores of 3.82.

S c a t t e r t e r e l a t i o n s h i p b e t w e e n - s t u d y V a r i a b l e s

According to Neuman (2000) cited in Asawo (2009), Scatter graph is one of the techniques used in deciding whether a bivariate relationship does exist between interval scaled variables. In our bid to determine the existence and trend of this relationship, we plotted a scatter diagram as presented in Figure 4.6 Lean Process Management as the independent variable is plotted on the X axis whereas Office Productivity as the dependent variable is on the Y axis.

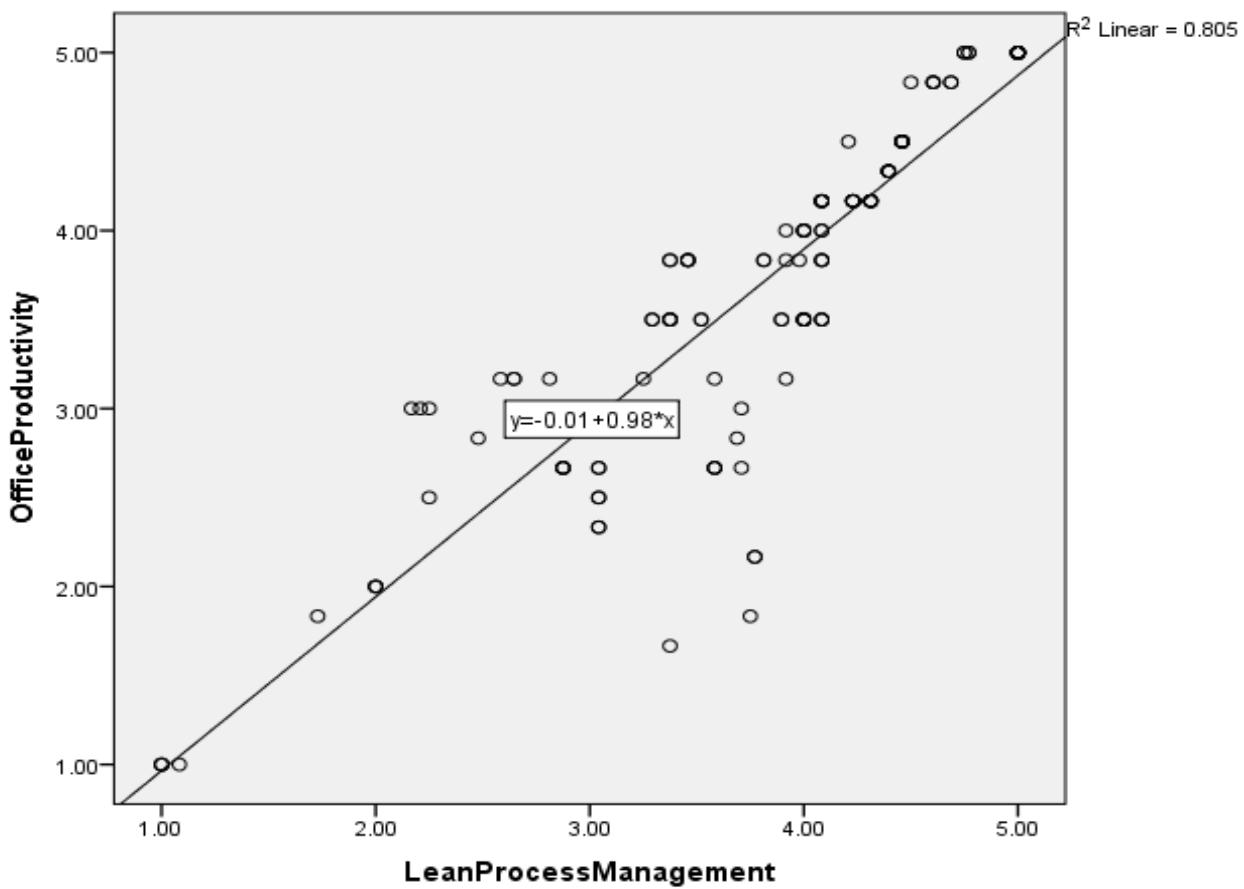


Figure 2: Evidence of linear relationship between the constructs

The apparent pattern of the cases in the scatter plot sloping upwards from left to right is an indication of existing linear relationship between Lean Process Management and Office Productivity.

4. Presentation of Results on Testing of Hypotheses.

The Spearman's Rank Order Correlation is calculated using the SPSS 23.0 version to establish the relationship among the empirical referents of the predictor variable and the measures of the criterion variable. We used this to answer research questions one to ten. Correlation coefficient ranged from -1.00 to +1.00. The value of -1.00 represents a perfect negative correlation while the value of +1.00 represents a perfect positive correlation. A value of 0.00 represents a lack of correlation. In testing hypotheses one to nine, the following rules were upheld in accepting or rejecting our null hypotheses: all the coefficient values that indicate levels of significance (* or **) as calculated using SPSS were rejected and therefore our alternate hypotheses accepted; when no significance is indicated in the coefficient r value, we reject our null hypotheses. Our confidence interval was set at the 0.05 (two tailed) level of significance to test the statistical significance of the data in this study.

Table 5: Correlations Matrix for Employee Involvement and Office Productivity

		Employee Involvement	Task Accomplishment	Cost Reduction
Spearman's Rho	Employee Involvement	Correlation Coefficient	1.000	.759 **
		Sig. (2-tailed)	.000	.000
		N	139	139
	Task Accomplishment	Correlation Coefficient	.759 **	1.000
		Sig. (2-tailed)	.000	.000
		N	139	139
Cost Reduction	Cost Reduction	Correlation Coefficient	.854 **	.730 **
		Sig. (2-tailed)	.000	.000
		N	139	139

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

Source: Research Data 2018 and SPSS output version 23.0

Table 5 above illustrates the correlation coefficient (*r*) showing that there is a significant and positive relationship between employee involvement and task accomplishment. The *rho* value 0.759 indicates this relationship and it is significant at $p < 0.05$. The correlation coefficient represents a high correlation indicating a strong relationship. Therefore, based on empirical findings the null hypothesis earlier stated is hereby rejected and the alternate upheld. Thus, there is a significant relationship between employee involvement and task accomplishment in the public sector in Rivers State. It also shows that there is a significant and positive relationship between employee involvement and cost reduction. The *rho* value 0.854 indicates this relationship and it is significant at $p < 0.05$. The correlation coefficient represents a high correlation indicating a strong relationship. Therefore, based on empirical findings the null hypothesis earlier stated is hereby rejected and the alternate upheld. Thus, there is a significant relationship between employee involvement and cost reduction in the public sector in Rivers State.

Table 6: Correlations Matrix for Value Stream and Office Productivity

		Value Stream	Task Accomplishment	Cost Reduction
Spearman's Rho	Value Stream	Correlation Coefficient	1.000	.499 **
		Sig. (2-tailed)	.	.000
		N	139	139
	Task Accomplishment	Correlation Coefficient	.499 **	1.000
		Sig. (2-tailed)	.000	.
		N	139	139
	Cost Reduction	Correlation Coefficient	.643 **	.730 **
		Sig. (2-tailed)	.000	.000
		N	139	139

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

Source: Research Data 2018 and SPSS output version 23.0

Table 5 above illustrates correlation coefficient (*r*) showing that there is a significant and positive relationship between value stream mapping and task accomplishment. The *rho* value

0.400 indicates this relationship and it is significant at $p < 0.05$. The correlation coefficient represents a high correlation indicating a strong relationship. Therefore, based on empirical findings the null hypothesis earlier stated is hereby rejected and the alternate upheld. Thus, there is a significant relationship between value stream mapping and task accomplishment in the public sector in Rivers State. The correlation coefficient (r) also shows that there is a significant and positive relationship between value stream mapping and cost reduction. The ρ value 0.643 indicates this relationship and it is significant at $p < 0.05$. The correlation coefficient represents a very high correlation indicating very strong relationship. Therefore, based on empirical findings the null hypothesis earlier stated is hereby rejected and the alternate upheld. Thus, there is a significant relationship between value stream mapping and cost reduction in the public sector in Rivers State.

Table 7: Correlations Matrix for Automation and measures of Office Productivity

		Automation	Task Accomplishment	Cost Reduction
Spearman's Automation Rho	Correlation Coefficient	1.000	.871**	.856**
	Sig. (2-tailed)	.	.000	.000
	N	139	139	139
Task Accomplishment	Correlation Coefficient	.871**	1.000	.730**
	Sig. (2-tailed)	.000	.	.000
	N	139	139	139
Cost Reduction	Correlation Coefficient	.856**	.730**	1.000
	Sig. (2-tailed)	.000	.000	.
	N	139	139	139

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

Source: Research Data 2018 and SPSS output version 23.0

The correlation coefficient (r) shows that there is a significant and positive relationship between automation and task accomplishment. The *rho* value 0.871 indicates this relationship and it is significant at $p < 0.05$. The correlation coefficient represents a high correlation indicating a strong relationship. Therefore, based on empirical findings the null hypothesis earlier stated is hereby rejected and the alternate upheld. Thus, there is a significant relationship between automation and task accomplishment in the public sector in Rivers State. The correlation coefficient (r) shows that there is a significant and positive relationship between automation and cost reduction. The *rho* value 0.856 indicates this relationship and it is significant at $p < 0.05$. The correlation coefficient represents a very high correlation indicating a very strong relationship. Therefore, based on empirical findings the null hypothesis earlier stated is hereby rejected and the alternate upheld. Thus there is a significant relationship between automation and cost reduction in the public sector in Rivers State.

Table 8: Correlations Matrix for the Continuous Improvement and Office Productivity

		Continuous Improvement	Task Accomplishment	Cost Reduction
Spearman's Rho	Continuous Improvement	Correlation Coefficient	1.000	.744 **
		Sig. (2-tailed)	.	.000
		N	139	139
	Task Accomplishment	Correlation Coefficient	.744 **	1.000
		Sig. (2-tailed)	.000	.
		N	139	139
Cost Reduction		Correlation Coefficient	.893 **	.730 **
		Sig. (2-tailed)	.000	.000
		N	139	139

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

Source: Research Data 2018 and SPSS output version 23.0

The correlation coefficient (r) shows that there is a significant and positive relationship between continuous improvement and task accomplishment. The *rho* value 0.856 indicates this relationship and it is significant at $p < 0.05$. The

correlation coefficient represents a high correlation indicating a strong relationship. Therefore, based on empirical findings the null hypothesis earlier stated is hereby rejected and the alternate upheld. Thus, there is a significant relationship between continuous improvement and task accomplishment in the public sector in Rivers State. Also, the correlation coefficient (r) shows that there is a significant and positive relationship between continuous improvement and cost reduction. The ρ value 0.856 indicates this relationship and it is significant at $p < 0.05$. The correlation coefficient represents a very high correlation indicating a very strong relationship. Therefore, based on empirical findings the null hypothesis earlier stated is hereby rejected and the alternate upheld. Thus there is a significant relationship between continuous improvement and cost reduction in the public sector in Rivers State.

Table 9: Correlations Matrix for the Moderating effect of Technology on Lean Process Management and Office Productivity

Control Variables		Lean Process Management	Office Productivity	Technology
-none ^a	Lean Process Management	Correlation Significance (2-tailed) Df	1.000 .000 0	.897 .000 137
	Office Productivity	Correlation Significance (2-tailed) Df	.897 .000 137	1.000 .000 137
	Technology	Correlation Significance (2-tailed) Df	.845 .000 137	.841 .000 137
Technology	Lean Process Management	Correlation Significance (2-tailed) Df	1.000 .000 0	.644 .000 136
	Office Productivity	Correlation Significance (2-tailed) Df	.644 .000 136	1.000 .000 0

a. Cells contain zero-order (Pearson) correlations.

Source: Research Data 2018, (SPSS output version 21.0)

In table 9 above, the zero-order correlation between lean process management and office productivity in the public sector in Rivers State shows the correlation coefficient where technology is not moderating the variables; and this is high at 0.897 and statistically significant (p-value (=0.000) < 0.05). The partial correlation controlling for technology however, is 0.644 and statistically significant (p-value (= 0.000) < 0.05.). The observed positive "relationship" between Lean Process Management and Office Productivity is due to underlying relationships between each of those variables and technology. Looking at the zero correlation, we find that both lean process management and office productivity are positively correlated with technology, the control variable. Removing the effect of this control variable increases the correlation between the other two variables to be 0.897 and significant at $\alpha = 0.05$, therefore we reject the null hypothesis and conclude that technology moderates the relationship between Lean process management and office productivity in the public sector in Rivers State.

Table 10: Correlations Matrix for the Moderating Effect of Organizational Culture on Lean Process Management and Office Productivity

Control Variables			Lean Process Management	Office Productivity	Orgl Culture
-none ^a	Lean Process Management	Correlation	1.000	.897	.894
		Significance (2-tailed)	.	.000	.000
		Df	0	137	137
	Office Productivity	Correlation	.897	1.000	.878
		Significance (2-tailed)	.000	.	.000
		Df	137	0	137
	Organizational Culture	Correlation	.894	.878	1.000
		Significance (2-tailed)	.000	.000	.
		Df	137	137	0
Organizational Culture	Lean Process Management	Correlation	1.000	.524	
		Significance (2-tailed)	.	.000	
		Df	0	136	
	Office Productivity	Correlation	.524	1.000	
		Significance (2-tailed)	.000	.	
		Df	136	0	

a. Cells contain zero-order (Pearson) correlations.

Source: Research Data 2018, (SPSS output version 23.0)

In table 10 above, the zero-order correlation between lean process management and office productivity in the public sector in Rivers State shows the correlation coefficient where organizational culture is not moderating the variables; and this is high at 0.897 and statistically significant (p-value (=0.000) < 0.05). The partial correlation controlling for organizational culture however, is 0.524 and statistically significant (p-value (= 0.000) < 0.05.). The observed positive relationship" between Lean Process Management and Office Productivity is due to underlying relationships between each of those variables and organizational culture. Looking at the zero correlation, we find that both lean process management and office productivity are positively correlated with organizational culture, the control variable. Removing the effect of this control variable increases the correlation between the other two variables to be 0.897 and significant at $\alpha = 0.05$, therefore we reject the null hypothesis and conclude that organizational culture moderates the relationship between Lean process management and office productivity in the public sector in Rivers State.

DISCUSSION OF FINDINGS

This study using descriptive and inferential statistical methods investigated the relationship between Lean process management and office productivity in the public sector in Rivers State as well as the moderating roles of Technology and Organizational Culture. The findings revealed a positive significant relationship between Lean Process Management and Office Productivity using the Spearman rank order correlation tool and at a 95% confidence interval. This reinforces previous studies by Womack & Jones (1996), The findings from this study further corroborate with the works of Dehdari (2013) who posited that Regular training motivates employees so that they become more open to changes.

The findings revealed that there is a positive and significant relationship between Employee Involvement and the measures of Office Productivity- Task Accomplishment and Cost Reduction. This finding is in line with earlier findings according to Drew, McCullum and Roggenhofer (2004) who posited that, the success of Lean process management is highly dependent on the employees and their mindsets. It also agrees with the works of Sofijanova and Zabijakin-Chatleska (2013) who stated that involvement refers to the employee participation in decision making and problem solving, and increased autonomy in work processes. As a result, employees are expected to be more motivated, more committed, more productive and more satisfied with their work. There are many studies providing evidence that the employee involvement affects the organizational performance. Also, employee empowerment is considered an important contribute or to organizational success. Much effort has been made to test the direct relationship between the level of employee empowerment and employee performance, and also, the job satisfaction and commitment.

The Study finding revealed that there is a positive and significant relationship between Value Streaming Mapping and Office Productivity - Task Accomplishment and Cost Reduction.

Our findings agreed with previous study in which Value Stream Mapping (VSM) is seen as a standardized way of documenting (mapping) processes and information/material flows as they are, and applying a systematic way to analyze these processes in order to identify various waste and target specific areas for improvement (Ciarapica et al., 2016, Kuipera et al., 2016; Rother and Tapping and Shuker, 2003). VSM enables a company to see the entire process in both its current and desired future (lean) state, and identify and

eliminate waste, thereby streamlining work processes, cutting lead times, reducing costs and increasing quality (Abuthakeer et al., 2010; Jasti et al., 2014; Tabanli and Ertay, 2013).

The study also revealed that there is a positive significant relationship between Automation and Office Productivity – Task Accomplishment and Cost. The automation of work has, though, resulted in fewer jobs as no longer are machine operators needed and many clerk tasks are redundant, which again cuts costs. This means that through the introduction of automation specifically the computer and typewriter, there is a reduction on the burden of executing office work manually.

Findings revealed that there is a positive significant relationship between Continuous Improvement and Office Productivity – Task Accomplishment and Cost. Our findings corroborate the findings according to Khan (2011) who posited that it is system that involves everyone in the organization from top management to the cleaning team. Everyone is encouraged to come up with small improvement suggestions on a regular basis.



Conclusion

The idea which necessitated this study was to examine the relationship between lean process management and office productivity in the public sector in Rivers State. From the data generated and analysed, it was empirically discovered that a strong positive and significant relationship between lean process management and office productivity in the public sector in Rivers State. Based on results and the findings of the present study, our study revealed that employee involvement will increase task accomplishment and cost reduction of the public sectors in Rivers state. Value stream mapping also increase task accomplishment and cost reduction of the public sectors in Rivers state. Our study also revealed that automation and continuous improvement increases as voluntary turnover and involuntary turnover also increase task accomplishment and cost reduction of the public sectors in Rivers. Organizational Culture and technology also significantly moderate the relationship between lean process management and office productivity in the public sector in Rivers State.

RECOMMENDATION

Based on the discussion and conclusion above, the following recommendations are hereby made:

1. The management of several of the public sectors in River state should ensure to get the employee involved in some of the decisions and innovations to be carried out in the office, as it will go a long way to improve office administrative productivity.
2. The management should encourage value stream mapping as a critical as it makes it easier for the flow of efficient delivery of services because if the flow of the process is followed, only the most important task will be executed and the less important will be considered as waste and, to that extent, the other can be reviewed for other purposes without necessarily making it a waste.
3. Automation which involves the use of computers should be fully employed as there is a relationship between automation and effectiveness because the computers assist in making sure that the work and inter department relationship between the departments is carried out without delay and in order.
4. The public sector should create room for continuous improvement of its employee to enable them develop better strategies and ways of improving in the management and productivity of the work in the office. The improvement could include going for further studies, trainings, course, etc.

This study having empirically confirmed the existence of a positive significant relationship between lean process management and office productivity thus has theoretically contributed to the existing body of literature.



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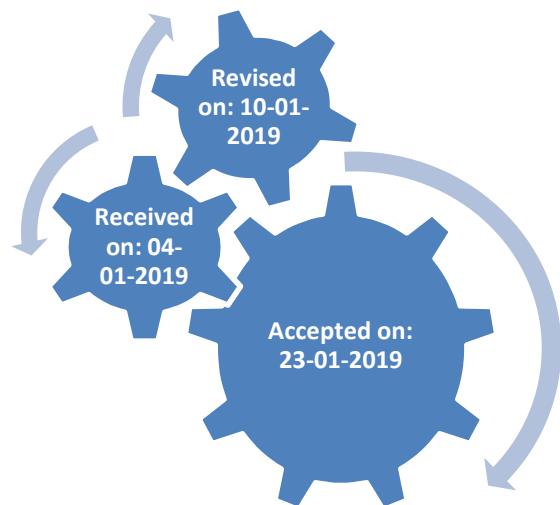


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