Improving Productivity in Service Sector: with Special Reference to the Over Time Payment Process (OTPP) in the University of Kelaniya, Sri Lanka – A Case Study

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Abstract- There is a negative perception towards the productivity of the government sector organizations in the general public in Sri Lanka. This paper discusses the wastes in the OTPP of the University of Kelaniya, Sri Lanka. The purpose of this study is to improve the productivity by eliminating waste and improving efficiency in the University OT payment process. The key objective of this particular study is to explore the possibility of re-engineering the existing OTPP that is leading to reduce the Lead Time (LT). There are four specific objectives viz., 1) to recognize the existing OTPP, 2) to understand the bottle necks of the existing OTPP; 3) to understand the existing rules and procedures belongs to the payment of OT, 4) to identify ways and methods to overcome barricades leading to delaying OTPP. Ten numbers of individuals, twenty five OT vouchers and three hubs of the OT payment process were selected for the sample study. As the nature of the study simple random sampling technique as well as the purposive sampling technique were associated to select ten numbers of individuals appropriately. Data were collected in relation to seven types of wastes, time in minutes, distance in footsteps and numbers were used to measure the data applicably. The process map was created through observations. In the process of data presentation it was associated tabulations, process charts, and graphs. The nature of the study influenced to use simple mathematics. To recognize the existing OT payment process, four bottle necks of the existing OTPP, rules and regulations that are leading to create wastes, not updated, deceased. And also identified that adjusting slightly the existing rules and procedures, automating the process, can be simplified the process, reduced the LT drastically, and overcome the existing bottle necks. Based on these findings, it can be concluded that there are possibilities to improve the productivity of the OTPP by simplifying and automating the OTPP of the University of Kelaniya, Sri Lanka.

Index Terms- Productivity, Seven Wastes, Lead Time, Efficiency, University of Kelaniya, Service Sector

I. INTRODUCTION

Productivity is defined as a measure of quantifying the output against the amount of input. It expresses the relationship between the quantity of goods and services produced (output) and the quantity of labor, capital, land, energy, and other resources to produce it (input) (Zandin, 2001). Productivity is not a simple and it has different diversified definitions based on its taken place. Productivity is computed by dividing average output

per period by the total costs incurred or resources (capital, energy, material, personnel) consumed in that period. Productivity is a critical determinant of cost efficiency. (businessdictionary.com). Workforce productivity is the amount of goods and services that a worker produces in a given amount of time. It is one of several types of productivity that economists measure. Workforce productivity can be measured for a firm, a process, an industry, or a country. Adam Smith (1776) divided up labor into two broad categories, productive and unproductive labor. Productive labor, according to Smith, was any work which fixed itself in a tangible object. Unproductive labor, was any work where the value was consumed as soon as it was created. Smith contrasted the role of laborers in a manufacturing plant (productive work) with the tasks of a servant (unproductive work).

Hence, the productivity is not a simple and clearly understandable term. However one thing is clear that it makes some relationship in between the input and output. To make the relationship among these two components the suitable way is to reduce the cost of the inputs. In other words eliminating the waste or non-value added activities (MUDA) from the process of working. Realizing this theoretical fact the Sri Lankan government has been made a policy decision to increase work place efficiency and productivity by 50% during the next six years by introducing a new work ethic under the policy framework of '*Mawbima Dinawamu*" (*Mahinda Chinthana-2010*)

University system is considered as a one of the biggest public organization which is consisted of 7432 teaching staff and 14925 non-teaching staff. Teaching staff refers to the Lecturers, Senior Lecturers and Professors while non-Teaching includes all others such as Staff grades, Librarians, Medical Officers, Clerical and Allied grades, Skilled/Semi Skilled/Unskilled, Academic Support and other Academic Staff not belongs to the Teaching Staff. (Sri Lanka University Statistics 2012) Besides that the student enrolment is 73,295 internal students, External 289,234, Open University 35,665, Postgraduate 5,576, grand total 403,770 (UGC Statistics 2012). The statistics prove that the importance of the study and also its relevance to the government policy statements.

The aim of the study is to improve productivity of the OTPP by eliminating waste in the process. The key objective of this particular study is to explore the possibility of re-engineering the existing OTPP that is leading to reduce the Lead Time (LT). There are four specific objectives namely; 1) to recognize the existing OTPP, 2) to understand the bottle necks of the existing

OTPP; 3) to understand the existing rules and procedures belongs to the payment of OT, 4) to identify ways and methods to overcome barricades leads to delaying OTPP.

II. LITERATURE REVIEW

There are numbers of factors effect on productivity. Among them ineffective resource utilization, poor information flow and non-productive or unnecessary activities are considered as the main factors that contribute to low productivity. (Vilasini et al.)

Among the very few studies conducted in Sri Lanka, an empirical study carried out by Bandara & Karunaratne (2010) on Sri Lanka's manufacturing productivity covering 27 industries over a 20 year period ending 1997 and suggests that Sri Lanka's productivity slowdown was mainly due to the decline in technical progress rather than the technical efficiency both of which extensively contribute to the TFP. They further argue that this is mainly due to the political instability and prolonged ethnic conflicts during the period.

Many authors suggest various strategies to improve productivity. Jan (1994) suggests that reduction of throughput time is an effective strategy to improve productivity of manufacturing firms irrespective of the size, nationality and type of the industry. Wacker et al. (2006) states in their review that investment in both human and equipment resources will improve plant efficiency and the manufacturing productivity is also increased from various non-production activities such as well-defined tasks, employee improvement suggestions, and the interaction of production employees with equipment engineers. However, according to Jan (1994), factors such as investments in new technology, motivating employees through gain sharing, computer aided information management and planning systems and management restructuring could not be associated with the productivity improvements. On the other hand, studies in Japan by Yamada et al. (1997) and Tomiura (1997) stated that there is a significant positive influence of capital resources on productivity.

Most studies have made attempts to quantify the productivity of various industry sectors and few studies have discussed underlying causes for any low productivity. It is important to find out what factors affecting the productivity and how influential they are in the context of the particular region of concern. The literature shows that the popular perceptions among the industry community regarding poor productivity which have not yet been proved with a scientific method. There is a lack of studies on international productivity regarding factors that affect productivity and understanding of how and why productivity varies between countries which is a largely untapped area of research (Wacker et al., 2006). Hence this study focuses on identifying the factors affecting productivity and estimating the extent to which each factor contribute towards productivity.

III. METHODS AND MATERIALS

The Study carried out aiming a Key objective and four specific objectives. The first stage the specific objectives will be discussed as the following ways;

1) To recognize the existing OTPP

In the process of recognizing the existing OTPP of the University of Kelaniya, empirical data were gathered using observation and interview methods as appropriately. The data are summarized in table 01, table 02 and table 03 in the paper. The table number one shows the data relevant to The OT payment eligible employee population and the Number of employees claimed for OT payments in January, February and March, 2014. The table numbers two and three shows the time taken in each position of OTPP, and the OT voucher transportation Time. According to the table number one, the average OT payment number is 450 and the average first- OT voucher checking Points were 28. The second, third OT voucher checking Point and the Shrof counter took the same average number of OT vouchers that is of 450. The average time taken in each process viz., OT preparation, first, second, third and shrof counter indicated 6755, 1875, 1348, 1875 and 900 minutes respectively as indicated by the table number two. Finally, the table number three described the average time taken for transporting the vouchers in between each points of the OT payment process. The total average transportation time between employees to first checking point signposted 1801 minutes and 425, 67, 10 minutes indicated between First Point to Second Point, Second Point to Third Point and Third Point to Shrof Counter correspondingly.

Table 01: The OT payment eligible population and the January, February and March 2014 Number of employees claimed for OT

Description	Month			Mean
	January	February	March	
No of OT Claimed	468	456	427	450
First- OT Voucher Checking Points	29	28	28	28
Second -OT Voucher Checking Point	468	456	427	450
Third -OT Voucher Checking Point	468	456	427	450
Shrof Counter	468	456	427	450

Source: as per the observed data

Table 02: The Time taken in each position of OTPP

Description	Month			Total	Mean
	January	February	March		
OT preparation Time	468x15 min=7020 min	456x15min=6840min	427x15min= 6405 min	20265 min	6755 min
First- Points OT Voucher Checking Time	468x4 min = 1872 min	456x4=1824 min	427x4 min = 1708 min	5404 min	1801 min
Second Point -OT Voucher Checking Time	468x3 min =1404 min	456x3 min=1368 min	427x3 min =1281min	4053 min	1351 min
Third Point -OT Voucher Checking Time	468x4 min = 1872 min	456x4=1824 min	427x4 min = 1708 min	5404 min	1801 min
Shrof Counter Paying Time	468x2min=936 min	456x2 min=912 min	427x2 min=854 min	2702 min	900 min
	13,104 min	**12,768** min	**11,956** min	**37,828mi**n	**12,608** min

Source: as per the observed data

After observations and the discussions had with the employees it was decided the average OT voucher preparation time as 15 min. Similarly, 4 min, 3 min, 4 min and 2 min could be decided for the first, second, third cheking point and the shrof counter per OT voucher respectively. These scales were considered in the table no 2 above.

Table 03: The OT Voucher transportation Time

Description	Month									Average Time
	January			February			March			
	Time per employee	No. of Employees	Total Time	Time per employee	No. of Employees	Total Time	Time per employee	No. of Employees	Total Time	
Employee to First- Points	4 Min.	468	1872Min	4 Min.	456	1824 min	4 Min.	427	1708min	1801Min.
First Point to Second Point	15 min x 29 = 435 Min.			15 min x 28 = 420 Min			15 min x 28 = 420 Min.			425 Min.
Second Point to Third Point	10 Min.	6 times	60 min	10 Min.	7 times	70 min	10 Min.	7 times	70 min	67 Min.
Third Point to Shrof Counter	10 Min.			10 Min.			10 Min.			10 Min.
Total Time										2303 min

Source: as per the observed data

The figure 01 illustrates the voucher Transportation Process Map of the Existing OTPP of the University of Kelaniya, Sri Lanka. According to the University establishment code (E-code) employees are mandatory to claim for OT payment by the existing OT form and should submit them to the nearest staff officer concerned. The first staff officer's office will be check the form and then send to the Non-academic Establishment Division (NED) for further checking. After the second checking again the voucher will be send to the Loan and Payment Division (LPD) for advanced checking. Then the after final checking at the LPD the vouchers will send to the Shrof counter and a payment voucher prepared by them for making a cheque will send to the Accounts Division (AD)

Figure 01: Step one - voucher Transportation process Map of the Existing OT payment process of the University of Kelaniya, Sri Lanka
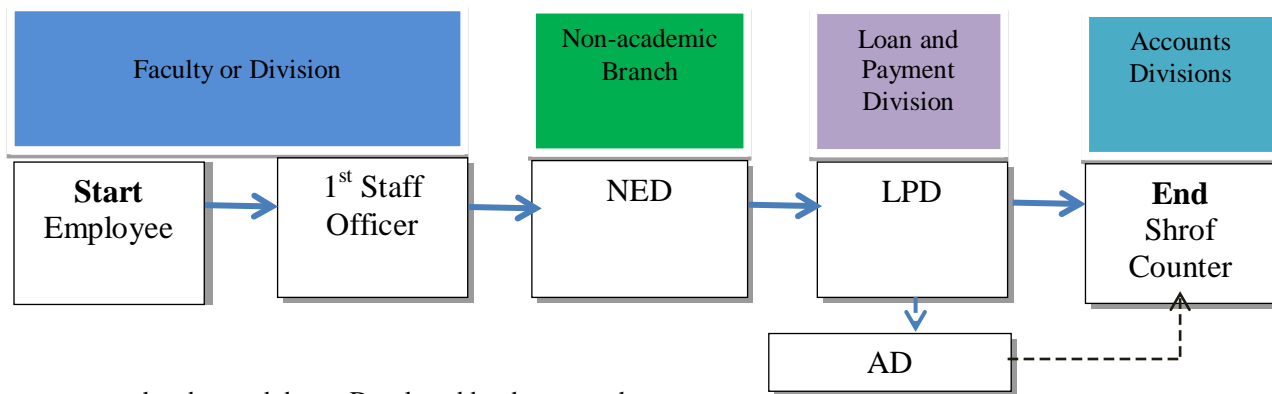
Source: as per the observed data – Developed by the researcher

2) To understand the bottle necks of the existing OTPP

A point of congestion in a system that occurs when workloads arrive at a given point more quickly than that point can handle them. The inefficiencies brought about by the bottleneck often create a queue and a longer overall cycle time (Investopedia). The freedictionary.com pointed out bottleneck as a point or an area of traffic congestion or a narrow stretch of road or a junction at which traffic is or may be held up or a something that holds up progress, asp of a manufacturing process.

There are seven types of bottlenecks or constraints. Bottlenecks are obstacles, which reduce the entire capacity of the system. Bottlenecks are always present in the system in different forms like constraints of management, people, material, equipment, process, policy, environment etc. Its forms can be different according to the type of business but the methods to identify it can be same. A number of approaches have been developed by several scholars; whatever may be the approach of identifying root cause for the prevailing problem is the only way to get rid of bottlenecks (Binod 2012)

This paper discusses the bottleneck in OTPP itself and the bottleneck made due to overtime payment policies. As per the definitions of bottleneck there are four bottlenecks could be identified in the process. The first bottleneck is befallen at the first receiving point of OT vouchers. Within one or two days 450 average numbers of OT vouchers come to 28 points and the average numbers of OT vouchers per point is 16. Twenty eight staff members assigning to checking in this points and take at least 3days to check with them in practice since the OT vouchers are most probably in-accurate. The second bottleneck in the process could identify at the point of NED. There is only one staff member for checking and this particular person has to check 450 average number of OT vouchers. The interview made with the particular person in these point needs 4 days in practice to complete checking the vouchers. The third bottleneck could identify at the point of LPD. There is a one checking person and all the vouchers are going through this point. As the elements to be checked at the point are higher, approximately 7 days needed to pass this point. The last bottleneck showed at the Shrof counter. 450 OT payees gathered here on one particular day and effortlessly made a huge queue rush there. At the point of studying rules and regulations relevant to the payment of OT, particular OT payment process is not essentially mandatory

requirement made by the University Grants Commission (UGC) but on the policies and procedures made by the University itself. The same voucher checking in three points, all the OT payments are doing in one place and one day, given authority to one person for checking OT vouchers in point two and three, ignore the chances to be mistaken in the OT voucher preparation stage are some of policy decisions that are lead to develop bottlenecks within the OTPP.

3) To understand the existing rules and procedures belong to the OT payment

As a government organization, the University System follows chapter ix of the University Establishment Code on paying OT for employees. Besides that there are some UGC and internal circulars which are related to the payment of OT. Among them the registrar's internal circular dated 15 May 2006 is very important since the University is still following its guidance and instructions to some extents. The empirical data pertaining to OTPP shows that the guidance given in the said internal circular cannot be followed strictly and then broken them by the authorities themselves as to fit them with the practical circumstances.

4) To identify ways and methods to overcome barricades leads to delays in OTPP.

Four types of barricades could identify in the OTPP viz., 1) waste (MUDA), 2) over Burden (MURI), 3) Unevenness (MURA) and 4) four Bottlenecks. According to the concept of MUDA waiting, transportation, over processing, was throughout the OTPP. MURI were found in three check points and Shrof counter. But the over Burden at the first checking point is shows lesser burden that it is in the other three points. The process itself is not balance (MURA) and also its compare to the other working processes. The first checking point shows a lesser bottleneck comparatively since its burden spreads over a 28 points, other three bottlenecks were indicated slightly heavy bottlenecks. There are possibilities to reduce the LT of the OTPP by eliminating the wastes (MUDA). MURI, MURA and bottlenecks can be eliminated or reduce by re-engineering the process. For this purpose some procedures need be changed but not the rules.

IV. RESULTS AND FINDINGS

According to the four objectives of the study data were collected and then for the analysis of the data, the data were summarized and is in the table number four. As per the table number four the Lead Time of the existing OTPP shows 14, 120 minutes and average cost is Rs. 23,,533.00. as it is mandatory requirement, the first step that is of preparation of OT voucher by the employee and the making the cheque and the payment stage are only value added steps in the existing OT payment process as per the concept of seven waste and described under the Methods and Materials. Accordingly, Non-value added time of the existing OT payment process is 9,620 minutes and it is similar to approximately Rs. 16,200.00. This non-value added time is consisted of unnecessary transportation, unnecessary processes and waiting time in the bottlenecks. The Value Stream Map (VSM) based on these data is shows in the figure 02.

Table 04 – The average Measurements: For Existing OTPP Map

Cost Component	The average Measurement	Hours	Value
No of OT payee	450		
OT Voucher Preparation Time	6755 Minuets	112 hours	x 100 = Rs.11,300.00
1st Staff Officer Checking Time	1801 Minuets	30 hours	x 100 = Rs. 3,100.00
Non-academic Division Checking Time	1351 Minuets	23 hours	x 100 = Rs. 2,300.00
Loan and Payment Branch Checking Time	1801 Minuets	30 hours	x 100 = Rs. 3,100.00
Shrof Counter Payment Time	900 Minuets	15 hours	x 100 = Rs. 1,500.00
Transportation	2303 Minuets	38 hours	x 100 = Rs. 3,900.00
Lead Time	**14,911 Minuets**	**248 hours**	**Rs. 24,800.00**

Source: as per the observed data

Figure 02: Step one - Existing OT voucher Transportation process Map of the University of Kelaniya-with VSM
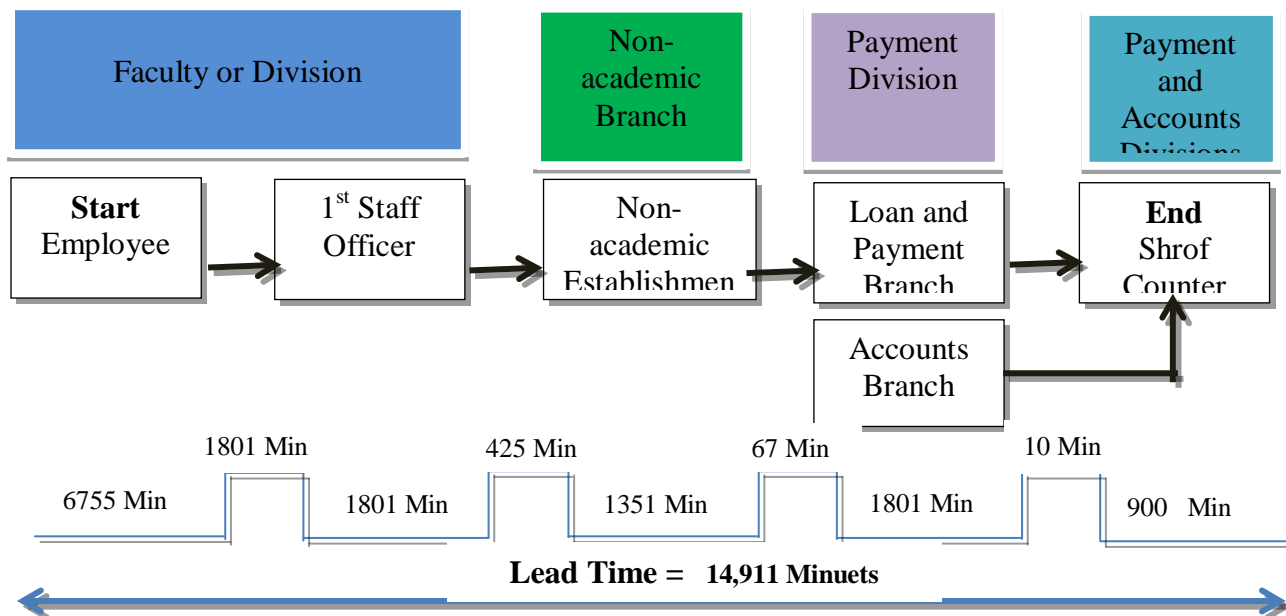
Source: as per the observed data

After brainstorming session the developed OTPP with VSM figure 03 and the average new measurement (table no. 05) are below. As the fingering machines are already installed and operating well since a long period of time the man-made OT voucher preparation can be removed from the process and instead of that the machine can be prepared them accurately and then significantly

reduce the checking time in the first checking point and no need to check it in second and third points. Reason of that the OT voucher can be send directly from first checking point to Shrof counter. As the same data base used by the entire university, there is a possibility to prepare the relevant voucher for OT payment from at the third check point which belongs to the LPD.

Figure 03: Step Three - The proposed OT voucher Transportation process Map of the University of Kelaniya- without VSM
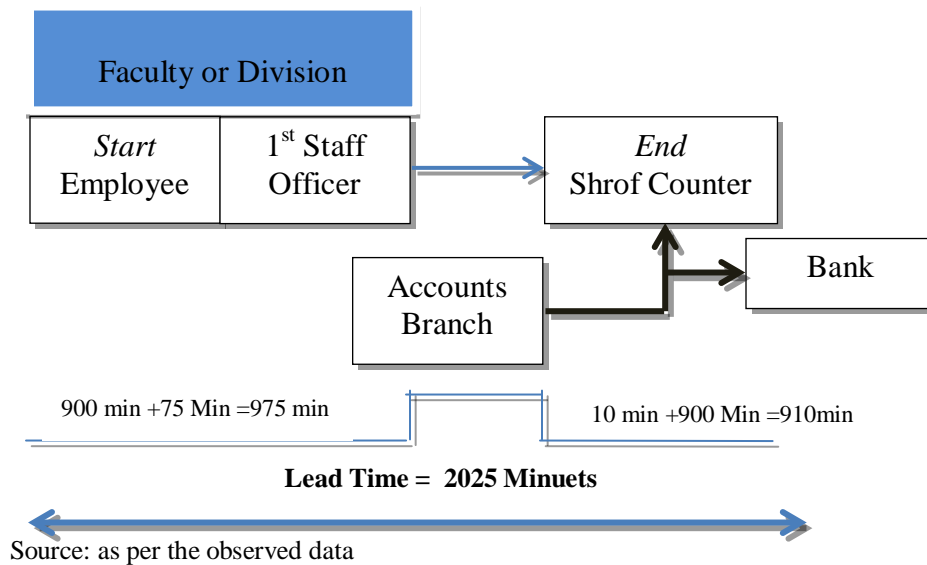

Source: as per the observed data

Table 05 – The average Measurements: For Developed OTPP Map

Cost Component	The average Measurement	Hours	Value
No of OT payee	450		
OT Voucher Preparation Time	450x02 Minuets = 900 Minuets	15 hours	x 100 = Rs. 1500.00
1st Staff Officer Checking Time	450x10 Sec = 75 Minuets	1.25 hours	x 100 = Rs. 125.00
Non-academic Division Checking Time	NOT		-
Loan and Payment Branch Voucher Preparation Time	10 Minutes	0.17 hours	x100 = Rs. 17.00
Shrof Counter Payment Time	450x02 Minuets = 900 Minuets	15 hours	x100 = Rs. 1500.00
Transportation	05 Minuets x 28 = 140 Minuets	2.33 hours	x100 = Rs. 233
Lead Time	**2025 Minuets**	**33.75 hours**	**Rs. 3,375**

Source: as per the observed data

The proposed OTPP is an automated system which is controlled by a central database. The existing prior approval process for doing OT also can proceed through the proposed system and then the hidden and non-value added activities that are beyond the considered process but relevant to this will be drastically reduced. Further to that stimulating employees to take their OT payment from the bank the bottleneck at the Shrof counter can be reduced. After discussion with union leaders, and or using managerial strategies like releasing bank OT payment two days prior to the Shrof payment date, employees may be stimulate for bank payments. However, as money based matters are very sensitive in the employees point of view, the employees should have freedom to choose their way of payment at any time without any difficulties. Keeping the system in the majority payment mode as default and the changing authority giving to the first checking point this matter can be solved smoothly.

However, before implementing such a change in the OTPP, the authorities should have taken policy decisions on that and few test runs to verify the accuracy of the new process for few months.

I. CONCLUSION

There are possibilities to reduce Lead Time and efficient the process significantly by eliminating the waste in the existing OTPP, and re-engineering the process with automation.

ACKNOWLEDGMENT

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