Simulation Model for the Maintenance of Government and Private Facilities in the Philippine Context

[1]Jesse S. Susada, [1]Marisa A. Mahilum and [2]Dionosel Y. Regalado

Abstract

The contrasting practices of private and public institutions affect individuals motivation to work on the maintenance of its facilities. This paper attempts to develop a model that could predict how many years a facility (private or government) would last based on the given number of assumptions and random data. The study used an experimental design using simulation modeling. Assumptions were formulated to measure different variables. Findings revealed that government facilities tend to deteriorate faster compared to its private counterparts. Government facilities would only last approximately up to six (6) years then reach its critical level. This is due to the assumption that only 40% of government institutions are effective workers. Low percentage of effective workers would translate to less motivation of the worker to pursue any transaction that could possibly help the current state of the facility. On the other hand, more than half of the Private facilities would last more than five years before reaching a critical level. This is due to the assumption that private workers are 20% higher compared to government workers in terms of percentage of effective workers. A highly motivated worker will always be willing to spend time, even extra time, to perform his job. Benign neglect of a less motivated workforce would result to non performance of his assigned task. Therefore, increasing the level of motivation of an employee is the primordial concern of every organization whether private or public because an increase of well motivated and effective workforce would encourage everyone to help maintain and to extend the life of every facility.

Keywords: simulation model, facilities, maintenance, motivation

1.0 Introduction

Governments all over the world sought to increase the involvement of private sector in the delivery of public services. The concept of public-private partnership represents a possible solution to the new circumstances (Krtalic and Kelebuda, 2010) in the modern world. These partnerships have taken in many forms such as but not limited to outright privatization of previously state-owned industries, or contracting out services (Li and Akintoye, 2008), or just an exchange of best practices for mutual benefits. The same is true in terms of practices in the maintenance of facilities. Puno (2003) averred that there are certain transactional processes that can be made more efficient if the public and private sectors exchange practices. This observation is validated by the preponderance of public facilities that have deteriorated in short spans of time as compared to its private counterpart. The maintenance practices of these two sectors are often in sharp contrast.

[1]University of San Jose-Recoletos
[2]Mindanao University of Science and Technology

Facilities consist not only the physical structure and the variety of building systems, but also includes furnishings, materials and supplies, equipment and information technology, as well as various aspects of the building grounds. Maintenance of these facilities poses a very great challenge to the top management of both public and private entities. The management will have to deal with employees who are directly involved in its maintenance. These people need the motivation (both intrinsic and extrinsic) so that they continue doing their job accordingly. Wahid and Corner (2009) revealed that reward system and understanding of performance and communication are all critical factors in the maintenance of a facility. Furthermore, Emanuel (2012) mentioned that you have to understand people that you are working with because people have different needs and more importantly, it is imperative to let people have trust in you (p. 1) as their leader. People have intrinsic and extrinsic motivation to fulfill, and the best way to have them help is by motivating them to achieve results, an achievement that depends on the ability of the leaders to motivate people to get results (Filson, 2003).

Government rules and regulations form the core of the policy framework of the State. This policy framework is anchored on the concepts of transparency and public accountability (Abramowitz et al. (2002), Drucker (1989) and others). Transparency and public accountability, as hallmarks of good governance, ensure cost effective and efficient government processes. In particular, Republic Act No. 9184 the "Government Procurement Law" requires that all government Procurement activities must undergo public bidding or canvass (RA 9184, S. 1998). The purpose of public bidding is to ensure that government obtains products and services at the least cost for the best quality.

The government's procurement process is a complex albeit long process. First, each agency of the government prepares an Annual Procurement Plan (APP) which specifies the products and services to be procured for the year. Second, a unit of the agency makes a Purchase Request, which is approved by the agency head. Third, the Purchase Request goes to the Bids and Awards Committee (BAC) which determines whether the transaction will be bidded out or canvassed. Fourth, if it is decided that a canvass is to be done, then the Supply Office is tasked to obtain quotations from at least three (3) suppliers. Fifth, the quotations are summarized in an Abstract and the winning supplier is determined. Sixth, a Purchase Order (PO) is issued to the supplier. Seventh, the supplier delivers the item, and the Agency makes an Inspections Report as well as Acceptance Report. Eighth, the supplier is paid by the Agency and the product/service is delivered to the end-user. The entire process could take within a week to a month or months depending on the Agency's efficiency.

Consequently, most government workers may feel discouraged by the long process and eventually decide to be passive. Benign neglect due to passive workforce is often a major reason for the fast deterioration of many government facilities. This negligence whether intentional or not cause a very big impact in the maintenance of a facility. Therefore, it is very important to have an understanding on what could be the possible effect of the employees' action towards the proper care of a facility. It is therefore the purpose of this simulation model is to identify the impact of benign neglect on the rate of facilities deterioration in both public and private agencies.

2.0 Conceptual Framework

The study is anchored on the principle that "motivation" determines perseverance and efficiency of workers which in turn translates into organizational productivity "(Herzberg, 1987; Drucker, 1981)". Workers' level of motivation is influenced, in many ways, by the organizational climate composed of the policies and framework for the operational processes of organizations. These motivation levels affect the commitment of an individual to perform the assigned task accordingly. Camilleri (2004) posits that when commitment reflects an emotional link to the organization, the organization may benefit through increased productivity and increase job satisfaction among employees. Furthermore, having a more committed workforce is likely to make it easier for organization to obtain cooperation in case of major changes (p.23). It is therefore of great importance that levels of motivation of a worker is high enough to make the person more committed and efficient in performing his duties and responsibilities.

The policy frameworks adopted by government entities are often in sharp contrast with the frameworks adopted by private entities. Public agencies operate under the principle of good governance which roughly translates into transparency and public accountability. The rules and regulations crafted for government operations are all slanted towards achieving greater transparency and public accountability. The notions of organizational effectiveness and efficiency are often compromised by the presence of such prescriptive rules and regulations (Puno, 2003). On the other hand, private entities highlight "Efficiency and Effectiveness" because their primordial concern is customer satisfaction. Customer satisfaction immediately translates into greater revenues and, thus, profit.

Unwittingly, government agencies, guided by the principles of transparency and accountability, tend to craft rules and regulations that are complex and highly bureaucratic. Government civil servants bound by these rules and regulations are, predictably, made less motivated to pursue projects or else, find ways of short-circuiting the process to be more effective and efficient. These conceptual ideas are schematically represented in the figure below:

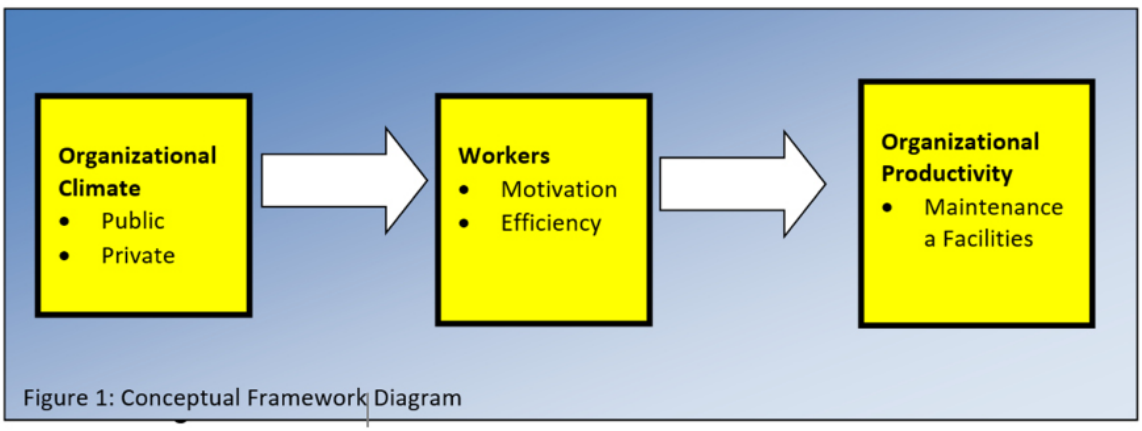

Figure 1: Conceptual Framework Diagram

3.0 Research Design and Methods

The study made use of experimental design using simulation modeling. The experimental criterion measure is the life span of the facility while the simulated experimental treatment is the X_i type of agency at two levels: Y_i: Public or Y_2 : Private. The factor that differentiates the two treatment level is the X_{i1}: Effectiveness of the worker, i=1, 2.

At the start of the simulation (t=0) one hundred facilities are assumed to be at the highest level of condition (y = 10). Each facility is assumed to have a random number of workers (W) between 1 to 10. For government facilities, the percentage of effective or motivated workers (% Eff. Workers) is assumed between 0% to 40% of the number of workers. The effective number of workers (Eff. Workers) is the product:

$$Eff\ Workers = \%\ Effective\ Workers\ x\ No.of\ Workers$$

The critical number of effective workers (CEW) is set as at 30% of the workers:

$$CEW = U\ x\ No.\ of\ Workers$$

where U is a uniform random number between 30% to 100%. If $Eff.\ Workers \geq CEW$, then the facility status is maintained: $Y = Y_{new}$; otherwise, the facility Status is reduced by 1: $Y_{new} = Y - 1$.

4.0 Assumptions

The simulation model is based on the following assumptions: 1) The status of the facilities are assumed highest (Y = 10) when the simulation began and either retain the status or degrade by 1 unit after each run; 2)The number of workers per facility are assumed to be between 1 to 10 workers uniformly distributed; Moon (2000) posits that public sector managers have a lower level of organizational commitment compared to private managers, and in a comparison of 474 Australian public sector employees and 944 private sector employees, Zeffane (1994) found higher commitment among the latter (as cited by Buelens & Van, 2007) which leads to the 3rd assumption that;(3) The effectiveness of a given worker depends on his level of motivation which can be between 0% to 40% for government workers because of the relatively long bureaucratic process of the government and between 0 to 60% for private workers; (4) To successfully undertake a maintenance procedure, at least 30% of the workers must be critically effective; and 5)each simulation run is assumed to equal to one year of maintenance operation.

5.0 Results and Discussion

The succeeding tables present the output of the simulation.

Shown in Table 1 are the series of run conducted in the simulation model of the 100 government facilities. Numbers indicated above (in column (5…10)) represents the status of each facility during the simulation run. A facility will have an initial status of 10 being new or in top condition. On the left side of the table is the simulation run repeated until the status of all facilities reaches a critical condition of 5.

Table 1. Simulation runs and the statuses of the government facilities

	Status						
Run	5	6	7	8	9	10	Total
1					98	2	100
2				93	7		100
3			91	9			100
4		89	11				100
5	88	12					100
6	12						12

A significant drop of the current state of most of the facilities was observed. During the first run, most of the facilities status was reduced by maintenance indicator of 1 as represented by the frequency of ninety-eight (98). Out of the 100 government facilities which had an initial status of 10, 98% of them deteriorated by 1 maintenance indicator during the first run. This would mean that only very few percentage of effective workers were observed which made more facilities incur deterioration. The trend continues until the 5th run of the simulation. On the 6th run, only 12 facilities were left considering that the other facilities reached the Critical value of 5 on the preceding run. However, It was also noted that as the run continues, the number of facilities being reduced by 1 maintenance indicator has slightly reduced.

A significant drop of the status of the government facilities every run would mean that the number of effective workers of most of its facilities were below the critical number of effective workers to maintain a good status of its facilities. Workers were not motivated to pursue their job considering the process and practices that they would face in dealing with procurement transactions. This is in congruence with Herzberg's theory that Workers' level of motivation is influenced, in many ways, by the organizational climate and operational processes of organizations. Furthermore, the result agrees to the result of Camilleri (2004) that in order to increase productivity and efficiency of workers, commitment and motivation of its workforce plays a very significant role. The streamlining of government procurement process could be the key to improve effective workers. The long waiting period before getting the needed material for the damaged facility would discourage employees to pursue the necessary repair. If this practice in the government agencies continues, most of its facilities will not last beyond six (6) years of operation, that is with the assumption that every run of the simulation model is equivalent to 1 year.

Table 2 shows the series of runs conducted in the simulation model of the 100 private facilities.

Numbers indicated above (in column (5…10)) are the status of each facility during the simulation run. A facility will have an initial status of 10 being new or in top condition. On the left side of the table is the total number of simulation until the status of a facility reaches a critical condition of 5.

Table 2. Simulation runs and the statuses of the Private facilities.

	Status						
Run	5	6	7	8	9	10	Total
1					86	14	100
2				74	25	1	100
3			65	30	5		100
4		59	30	9	2		100
5	50	37	10	3			100
6	33	13	4				50
7	10	4	1				15
8	3	2					5
9	1	1					2
10	1						1

During the first run of the simulation, private institutions showed a slightly higher number of facilities that maintained its current state compared to its government counterpart (14 to 2). Of the 100 facilities with an initial status of 10, fourteen (14) or 14% remained in top condition. However, the same continuous drop of the facilities' status were observed in the succeeding runs. The table further revealed that after the fifth simulation run, half of the facilities were on its critical level as shown with the value of 50 under row 5. On the sixth run, more than half of the remaining facilities reached its critical level as represented with the value of 33 under column 5. During the succeeding runs, the trend continuous until only one facility reached the 10th year of operation.

Private workers manifest a slightly higher percentage of effective and motivated workers compared to its government counterpart. The result proves that private workers were more effective compared to government workers. According to Moon (2000), public sector managers have a lower level of organizational commitment compared to private managers, especially in terms of their willingness to extend extra effort. In the study of Funk (2015), job satisfaction is not all about pay but on the belief that an individual can contribute to company's mission and feeling appreciated for contributing to that mission (p.20). Private workers may receive a little lower compensation and benefits compared to its government counterpart, but at the end of the day, it is the commitment of an individual worker that motivates him/her

to do his/her job well. The absence of a complex procurement process in private institutions, made private workers more motivated to work for the welfare of the organization and for the maintenance of its facilities. The well-being of employees should be addressed prior to providing quality service to customers - an unhappy employee is less likely to provide quality service (the straight times, 2015).

6.0 Conclusion

The contrasting practices of private and public institution in terms of procurement of materials affect individuals' motivation to work on the maintenance of its facilities. More often, private practices are better than its government counterpart. However, it is still best to share practices that would help each side achieve mutual benefits. This simulation depicts the outcome of a facility given the number of motivated and effective workers who are assigned to do the job. A highly motivated and efficient worker will always be willing to spend time, even extra time, to perform his job. A less motivated workforce would tend to neglect his/her duty which would then result to non performance of his assigned task. Motivating an individual is a continuous process. It comes from self-satisfaction and fulfillment that a person is motivated to do his job more. However, complex procurement process will discourage effective people to do his job. If this process will be streamlined, there may be an increase of motivated and effective workers. An increase of well motivated and effective workforce would encourage everyone to help more maintain and to extend the life of every facility.

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