A Final Year Project for the degree of Bachelor of Science in Information and Communications Technology

Effective Use of Information Technology for Performance Management in Zambian Government Institutions

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ABSTRACT

The literature reviewed suggests that, much as the concept of performance management systems has been in existence for a long period of time, as early as 1980s, it is only in the early 2000s that organizations begun to reap the benefits of implementing such systems. With Norton and Kaplan invention of the balanced scorecard (Kaplan R, 2010) organizations started to base performance by considering many aspects that constitutes performance of an organization such as Financials, Internal business processes, customer service and people management. Use of these performance parameters would assess both individual and business performance as a whole. Literature suggests that integrating Information technology into business processes for example, Enterprise Resource Planning (ERP) systems, Supply chain Management systems (SCM) and Inventory management, overlooking modernizing people management systems like performance management, could be a misdirected investment. This form of IT implementations in many public institutions and indeed privately owned entities has not yielded expected results. This is because regardless of how good a technology might be and how huge the investment could be, if the people working on such IT systems are not efficient, the business cannot be productive, and therefore, the efficiency of any IT system can only yield results when there is a high level of efficiency from people using such systems. Institutions that have implemented and automated their performance systems have benefited from such systems in terms cost savings, speed of service delivery, productivity and the quality of services being offered. To ascertain the impact of IT supported performance management systems in organizations; the research investigated use of performance management systems in Zambian public institutions and how such systems have impacted efficiency and productivity. Both secondary and primary data was used to evaluate performance management systems and also investigate available performance measurement systems used in public institutions and from the results obtained create a suitable software design model and also develop a prototype software solution capable of effectively improve productivity and efficiency in public institutions.

Keywords: Performance Management System; Government Institutions; Information System; Scorecards; Business; Efficiency; Web Application

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DECLARATION

I hereby certify that this thesis constitutes my own product, that where the language of others is set forth, quotation marks so indicate, and that appropriate credit is given where I have used the language, ideas, expressions, or writings of another.

Martin Mapoma
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Chapter 1. Introduction

Chapter 1 looks at the project scope, problem statement; being the basis for undertaking the project, the approach to be used and the ultimate outcome as a result of undertaking the project.

1. 1. Scope

As the world advances with the increased use of Information Technology and new discoveries; governments and businesses alike have also kept evolving in the way they operate and conduct business, this is in order to fit in the global village and therefore, increase efficiency, remain competitive and also raise levels of production. It is interesting to note that in the last three years the world over has recorded a rapid increase as regards use of Technology and there has also been a significant increase in innovations especially in mobile computing. Suffice to say, despite all these developments, third world countries’ have remained poor, productivity especially among public workers still remains low and levels of efficiency have also been low to sustain government, a situation that requires urgent intervention. Use of information systems such as ERP tools have to a greater extent helped to improve internal business processes, however, this has not been able to improve efficiency levels of workers and therefore rendering poor performance especially in public service.

In order to change the poor working culture in public institutions especially in third world countries, it is important that institutions such as government realizes the importance of Information Technology and how they can leverage on the use of information systems to help improve efficiency, productivity and service delivery and in turn accelerate economic development.

Performance management is one of the effective systems business entities use to improve efficiency levels and productivity of its workers and the same can be applied in government institutions. To learn more about how this can be realized in public run institutions, this project will therefore look at how IT supported performance management systems can be integrated in government institutions to effectively improve performance and productivity of its workers. This will be achieved by exploring several aspects of performance management systems and other factors such as:

- Application of performance management systems in organizations and availability of such systems
- Benefits of implementing a performance management system and explore available IT design models for performance management.

Further, after gathering enough information on the subject and the survey results, an IT performance model is designed and also an implementation of a prototype system capable of re-aligning workers to high levels of productivity and efficiency.

The beauty of information systems is that they work to model real-life objects and operations and their application have helped many organizations and businesses to save costs, improve efficiency, productivity and win competitive advantage in business, something government organizations can learn from to help manage public resources. Web technologies and its capabilities are also explored to find out how its rich features can help in automating performance management in government institutions.
1.2. Problem Statement

Zambia’s progress towards management of its economy has been slow, with a total area of 752,614 Km² only 5% of arable land has been utilized (CIA fact book, 2014) meaning 95% of is the land still remains unused.

While it is true that the government has employed over 60% of the total number of workers, the economy continues to dance back and forth with its currency weakening due to unstable economy. The performance of every country’s economy and companies largely starts with the workforce and management processes. An efficient workforce supported by information technology has the ability to lead any organization to productivity.

Like many other developing countries, Zambia finances its economy from taxes collected from workers and other business units, which is also the case across many countries in Africa. For many years Zambia has been struggling to develop, yet there is abundant natural resources. The major contributing factors to poor economic performance can be alluded to underperformance and poor work culture exhibited in public service. Many public workers fail to fully apply themselves and show commitment with their work because of job security that comes with government jobs, lack of clear objectives of what is expected of them when they report for work and thus affecting productivity and quality of services provided to the public, who are the tax payers.

Therefore, if Zambia is to develop, the work culture amongst public workers needs transformation, people must learn to have sense of ownership, show commitment and also be able to earn their income through clearly stated and tracked performance systems. It should be noted that, Zambia is a liberalized economy and as such the government may not be able to compete with the private sector and therefore in order to ensure prudent use of public resources and therefore improve operations, efficiency and productivity; it is important that the government adopts systems that can hold its workers accountable for the committed resources. This has potential to improve service delivery as well as raising the integrity of government operations as people are made to be accountable all the time. Information technology systems have capacity to speed up organizational work flow processes and ultimately improve efficiency.

With the technological evolution taking place worldwide, it is important that government operations through public workers are aligned as such to ensure improved service delivery. Information Technology and Information Systems in particular, have proved to be extremely important enablers for successful implementation of change management and subsequently productivity in any organization. If realistic efficiency and productivity is to be achieved in public institutions, adoption of IT propelled performance management systems, is the only guaranteed way through which such aspirations can be realized. Therefore, this project looks at how IT supported performance management systems can help improve efficiency and productivity in public service through implementation of a software prototype.

1.3. Approach

In order implement this project, it was necessary to gather enough information on the subject of performance management systems, their use in public institutions and how such systems could be supported by information technology to enhance performance and efficiency in public institutions. A two-phased approach was used to acquire enough knowledge about
the subject and also investigate available performance management systems in public institution through literature search and review and conduct of a survey.

1.4. Outcome

Upon completion of the project, the survey results obtained from surveyed public offices are presented and analyzed. A proposed design model for an IT supported performance management system is produced, further, a software prototype of the performance management system is implemented and results collected from the implementation presented. Further a Final project report is compiled to report on how the project was conducted. The snapshot in figure 1 below shows the project mind mapping diagram for the work required to be completed.

**Figure 1. Project Mind Map**
Chapter 2. Background and Review of Literature

Chapter 2 looks at the how much work has been done by others on performance management system and will take the following form as show in the mind map below:

Figure 2. Literature Review Mind map.

2.1. Background

According to Brignall et al (2000), use of performance management tools has in the recent past received a lot of coverage both in private and public sectors alike. Brignall et al (2000) further explains that companies competitiveness, no longer depends much on cost and price, rather, the focus is on the development of multidimensional performance measurement models (Brignall, 2000) which are regarded as efficient tools used to measure organizational performance. These models are more inclined to non-financial information, which is aimed at meeting the needs of all stakeholders such as employees and customers. This is in contrast with old financial-oriented business measurement methods and techniques which were more focused on meeting shareholder needs. Brignall et al (2000) reports that as results
of such developments, advanced countries like the United Kingdom and Scandinavia came under pressure to become effective and efficient in its business operations whilst placing more emphasis on maintaining the quality of services provided to the public, and ultimately reduce dependence on tax payers.

Koufteros et al (2014) reviews three performance management system models and discusses how each impacts the performance of an organization. The information provided, brings out each system’s capabilities and how each model impacts performance of an organization at operations level, strategic level and the organization as a whole. The diagnostic performance management technique looks at operational processes in terms of reporting, performance monitoring systems and communication of performance results and this systems is implemented at operations level. Further, Koufteros et al (2014), reports on the interactive performance management system, which is implemented at the strategic level to stimulate creativity and innovation in the organization and increasing interaction and information sharing between senior managers and executives. It is however, emphasized that a dynamic tension performance management system (Koufteros et al, 2014), which is a combination of the two performance management systems be considered as an ideal system for increased organization success. For an organization to remain competitive, it is important that whatever is being done by the top executives is replicated to the operations; this type of synergy is likely to lead into an efficient and productive organization.

Literature has so far reviewed that the subject of performance management has attracted a lot of attention especially in the private sector and some have already recorded positive results since implementation. However, the concept of performance management is still relatively new in developing countries, it should be noted however, that countries like Tanzania have already started appreciating such innovations. For efficient and productive use of these systems, there is need for IT system models that efficiently support use of IT supported performance management systems.

2.2. Literature Review

Wendell (2014) describes performance management as a system that integrates familiar business methodologies with technology. A lot of articles have been published on performance management systems, though there is little coverage on the application of information technology to such systems. Wendell (2014), reports that companies and organizations have invested huge sums of money into ERP systems to automate business processes. He however, argues that these operational and transaction based IT systems, for example; ERP, CRM and SCM systems have at the most, only helped to improve routine business functions and to a greater extent could be a distracted investment. Moving the argument along, there are a number of institutions that have implemented very expensive IT systems but have not been able to realize the true value from their investment, this entails that systems do not get the job done but application of well managed skills with the support of Technology, in this case an IT supported performance management system. In addition, with the speed at which technology is advancing, company executives should put as top priority IT solutions for managing their human capital. IT supported performance management system (ISPMS) plus operational and transaction based systems are a complete set of business information systems required to make any business to operate efficiently and utilize its IT resources cost effectively and profitably. Due to the competitive nature of business entities especially in the private sector, a
number of performance management systems have been developed and now the focus is on recruiting people that have the required skills to efficiently fit in their business strategies to help them meet business goals and remain competitive.

2. 2. 1. Need for Performance Management System

Business processes design and Technology are a core foundation of performance management systems (Angelita et al, 2014). Organizations that have top executives as champions of performance management systems (Angelita et al, 2014) have adequately benefited from other Information systems (ERP, SCM, CRM alike) and their businesses have correspondingly recorded a lot of success. This is something that should be replicated in public institutions to ensure that there is efficiency and productivity in these institutions.

For improved performance and productivity, it is important that before deciding on the implementation of ERP tools, the workforce is well prepared by having them aligned to the organization strategy. It should however, be emphasized that the best tools available for aligning workers to the company vision and mission is through implementation of an IT supported performance management system. Performance management systems enhance organizational communication (Patricia et al, 2014), help organizations to align systems in order to obtain desirable behaviors, create an environment where everyone is accountable for their actions and also plays a role in skills development, these are the benefits public institutions can leverage on to competitively position their public business operations.

Government institutions especially in third world countries do not however, pay particular attention to what constitute performance in terms of organization improvement and sustainability (Louis et al, 2000) rather the focus is on primary objectives as opposed to secondary objectives (Louis et al, 2000). With the current scenario, even where performance management systems have been introduced, government institutions focus more on compliance and controls (Louis et al, 2000) instead of focusing on incremental growth. This could be attributed to manually designed performance management systems which present a lot of weaknesses caused by external and environment factors not common to automated systems. To reduce on such effects, it is important that information system models for performance management are developed to compel people especially in public offices to become efficient and productive.

On the positive note, public institutions in some developed countries like Kenya and Tanzania have come to realize the importance of such systems and have begun to reap the benefits that IT enabled performance management systems brings to the organization. In his article Wang et al, (2008) discussed how loss making public enterprises in china transformed after the implementation of a decision support system performance evaluation model, a model that utilized web services and agent technology for performance data processing and analysis. This wave of change in the way enterprises look at business now should be replicated in government institutions especially in developing countries; adoption of IT enabled performance management systems create opportunities for organizations to improve performance results and also helps workers to remain focused on strategy (Patricia, 2013). In some developed countries IT Models have been implemented to support performance management.
2.2.2. Performance Management System Models – Design Considerations

Designing performance management system models comes with its own challenges; this is due to the fact that change management is an evolving process which implies that performance management systems should be developed taking into consideration factors such as organization culture and the ever evolving business strategies (Venkatesh, 2014). Another consideration in the design is creating synergy between product lifecycle, service relationship and customers (Visnjic et al, 2013), in incorporating each key performance area in the model, there has to be a relationship amongst these three key factors to ensure that the system provides the true benefits to the business and institutions. Creating an effective model for a public institution demands that the political atmosphere is also taken into consideration (Cooke etal, 2011), for positive results, the system should be designed in such a way as creating visibility in the way the systems processes performance results. Salem et al, (2012) explains that though a scorecard is more inclined to the financial aspects, the same has the ability to integrate other health factors of an organization such internal and external environmental factors, therefore scorecards are an active ingredient to the successful design of a performance management system. Other factors for consideration in the design of a performance management system are the type of industry and how to integrate the work processes to come up with an effective model. For example one performance model under review was the possibility of re-aligning health services to become business oriented (Walser et al, 2013) taking into consideration organizational integration, information technology integration and also business integration, these parameters were regarded critical to successful implementation of an IT supported performance management system.

Fu (2013), pointed out parameters such as resources, uses, practices and performance as some of the key factors that assures success in a firm’s performance. Kaplan et al (2010) highlights the importance of incorporating a performance management system in a partnership business, this is in consistency with the way public institutions operate, line institutions collaborate in the provision of services to the public and therefore as institutions move towards operating as business entities, Fu (2013’s considerations in the design of performance management systems are very important. Diagnostic performance management system, interactive performance management system and the hybrid of the two (Koufteros et al, 2014) as described in section 2.1 are a very good foundational design models for developing a robust IT supported performance management system.

Various development tools can be used to realize the abilities that information technology brings to the management of institutions through use of performance management system.

2.2.3. Performance Management and IT integration

As Melville et al, (2004) puts it, Information Technology enables industries to capture a substantive amount of value from their businesses. A demonstration of how IT tools have helped in transforming businesses and increase competitiveness as well as improving efficiency and productivity, lies in the systems design models and their ability to mimic manual processes efficiently and cost effectively. Integration of Information Technology into performance management systems demands that a study of business processes and other factors such as culture, behavior, internal and external environmental factors (Bititci et al, 1997) are put into consideration. (Bititci et al, 1997) suggests that Structure and configuration of the
performance measurement system becomes critical to the efficiency and effectiveness of the Performance management process”, this becomes even more critical in complex institutions such as state owned enterprises as well as public institution. Bititci et al, (1997) further highlights performance management processes as shown in Figure 3, providing necessary information required in the design of performance management systems.

Bititci et al, (1997) identifies Integrity of the performance management system and deployment as two critical design considerations and lists four critical levels of a performance management system such as Corporate, Business units, Business process and activities as being fundamental for a viable system. Further, five system concepts were identified such as system amplification which looks at objectives from higher levels to lower levels of the system, Transduction (Bititci et al, 1997), that is deployment of higher level business objectives to lower levels, attenuation which looks at the communication process from the lower levels upwards and recursion to take care of the repetitive aspect of the systems thinking (Bititci et al, 1997). Similar to such an implementation was a web based performance management also presented by Bititci et al, (2014), the system provided an interface between business processes and numerical data. The numerical data which was fed into the WePMS (Bititci et al, 2014) was obtained from other sources such as spreadsheets, databases and ERP systems. The strength of this design was that data from different business systems is presented to the quality analysis system which then aggregates the results which are then presented on the web page. It should however, be noted that human interaction with the system is not clearly defined, if the target is to improve worker performance, more emphasis should be placed on how workers interacts with the system, this model lays a good foundation for developing a high worker productivity centered system as opposed to the WePMS which focuses more on efficiency of business processes and partially fulfills human resource performance.
Automation of performance management systems has seen its application even in institutions such as prisons. A performance management system implemented at the Orleans Parish Criminal Sheriffs (Michael et al., 2005) is an interesting model that monitors performance of both inmates and employees, the system keeps a record of all inmates and is able to measure how each inmate is performing, further all jail operations are automated and staff performance is measured using the automated performance management system. The Performance-based Management and COMSTAT (Michael et al., 2005) collects large quantities of data which analyses and describes each department's performance on a daily basis. To support Mithat et al., (2009) arguments on performance management, key performance indicators are critical to the adoption of a design model for the performance management system implementation, these parameters allows workers to easily see their boundaries of work and expectations, it equally creates room for creativity and innovation. Another design consideration for performance management systems is integration with existing computerized business operations.

2.2.4. Integration of PMS System with other business

For an effective performance management system; organizational and performance system variables (Albento et al., 2014) should be given consideration when designing the performance management system for public institutions. Under organizational variables emphasis should be placed on information processing capabilities of the system (taking into consideration the organizational structure and decision making processes) (Albento et al., 2014) as well as the information processing requirements (Albento et al., 2014) that is the scope and size of the information to be processed. Albento et al., (2014), proposes a model that addresses these PMS requirements by segmenting organizational variables and performance systems variables which takes into consideration system’s factors such as system design and the quality of information to be processed, in this integrated model, Albento et al., (2014) looks at the technology requirements of the design taking into consideration technical properties such Internet use as well as use of the ERP applications. By paying attention to these variables in the design,
organizational performance is impacted positively. The model in Figure 5 by Albento et al, (2014) demonstrates how organizational systems variables are integrated into performance management system and its impact on business.

![Diagram of performance management system](source: [STRATEGIC PERFORMANCE MANAGEMENT SYSTEMS: IMPACT ON BUSINESS, Journal of Computer Information Systems, 54, 3, pp. 25-33])

**Figure 5.** An Integrated performance management system.

The need for IT supported performance management systems has received a lot of attention from software developers and already there are organizations who have developed off-the-shelf software applications to support performance management systems.
2.2.5. PMS Software Applications in Organizations

Many organizations that have implemented performance management systems have reported significant reduction in operational costs, increased profit margins, improved customer satisfaction, increased worker motivation and high levels of productivity. In a white paper “getting the most out of your performance management system” (Patricia et al, 2014), the report indicated that from a number of organizations that had implemented a DDI’s performance system, many companies recorded an “average dollar value of positive change” (Patricia et al, 2014), equivalent to $750,000 within a space of 3 years, which clearly shows how effective these systems are and their ability to modernize business operations.

Three critical questions also needs to be answered prior to implementation of a performance management system such as the organization’s need for performance management system and also the employees’ need as regards use of the performance management system. These are two critical success factors in the adoption of a performance management system. Public institutions, being faced with many operational challenges requires a complete systems overhaul to improve operations which if a cost effective IT supported performance management system is implemented could accelerate change management. Other critical considerations in the installation of a performance management system are ensuring availability of an effective communication system; thus communicating the business case or overall picture of what needs to be done, roles and responsibilities, skills, organization alignment, clear measurements systems. With all these parameters, an organization is expected to be highly efficient and productive. Organizations are adopting performance management systems to aid efficiency in other ERP systems, for example in supply chain management, such systems helps organization to select suppliers and distributors. Therefore, not only do these organizations look at resource capacity of their business clients but also their capacity to perform (Parthiban et al, 2013).

Macris et al (2014), explains that lack of performance management in public institutions has led to governments depending solely on non-governmental organizations for support, a notion that needs urgent redress and ensure that third world economies are sustained through re-enforcing worker performance by introduction of performance management systems. Notable countries to have implemented performance management system is New Zealand, whose concept was also adopted in the US and UK. In their model, a Manager is given enough powers and access to resources but then is accountable for results (Macris et al, 2014). In his article, Pollanen (2014) reported that as a result of introducing a complex performance measurement and control systems, by the Sarbanes-Oxley Act (US Congress, 2012), all companies in the United states trading on the Stock exchanges are required to comply to legislated control over financial reporting (Pollanen, 2014).

Demartine (2014), also explains that power and control should be viewed as an obstacle to organizational innovation, rather diagnostic use of the actual control systems, which emphasizes interaction between control leaders and the people being led. Lack of integration between strategic, operations (Mansor et al, 2013) and the very individual level is seen as a major hindrance to implementing effective performance management systems in public institutions and organizations.

If performance is to be assured in public run institutions, there has to be involvement of all stakeholders from the strategic level to the individual level and all given an equal platform on say what they think about their own performance and that of an organization in adopting a
particular performance management system. The model in Figure 6 provides the framework of how an effective organizational performance management system should look.

![Figure 6](image.png)

**Figure 6.** Control systems in diagnostic performance management system

To transform the work culture in public institutions, there has to be a mechanism which provides a clear communications channel for all stakeholders, this entails developing a system that allows for increased communication amongst workers. The following section

2.3. Theory

Almost every modern business including SMEs use web technologies, Daher (2014) reports of many web 2.0 technologies that have found their significance in educational systems such as collaboration tools, communication tools, social media networking tools, productivity tools and media sharing tools. Businesses are now able to hold meetings using communication tools and this has helped to manage operations cost effectively. Leveraging on this innovative development, can also help private organizations and public institutions to improve efficiency and productivity and in the long run lower the cost of doing business. Hramiak et al (2013), reports on how web logs have transformed the way teachers work in learning institutions making it easy to recruit anyone from any location in the global village. He further argues that despite many more challenges that exist in the use of web technologies, there has been an un-
preceded growth in the use and acceptance of such technologies. This has extended the reach and improved productivity along with the argument, a number of public workers do use web 2.0 technologies through social networks mostly at work, and therefore these social activities could easily be turned into productive tools that can eventually improve performance of public workers. At the center of web 2.0 technologies are server-side and client-side technologies are commonly implemented in what is commonly known as the three-tier Architecture.

The common technologies that have been employed in the development of server-side technologies include PHP, Java, C#, ASP.net, JavaScript, Python, Perl and many more and various communication protocols including web browsers are employed on the client side. With an increased easy with which these technologies can be used to develop applications in line with the concept of web 2.0 (to enable user to customize web content), it becomes relatively easy to develop applications like a performance management system to aid efficiency and productivity in public institutions.

This project takes advantage of the main features of web technologies to implement a performance management prototype system for public institutions. Following the review of literature, the second phase was to conduct a survey to investigate use of performance management system in public institutions in Zambia and the survey instrument was designed using sogosurvey.com development tools as shown in Figure 7:

**Figure 7.** Snapshot of sogosurvey.com website

More details of how the survey was conducted is in chapter three of the report.
2.4. Terms

**PMS**: Performance Management System  
**SME**: Small to Medium Entrepreneurs  
**APAS**: Annual performance Appraisal System  
**EFQM**: European Foundation for quality management  
**ISPMS**: Integrated Performance management system  
**ePMS**: electronic Performance management system, a web based performance management system for managing organizational and worker performance  
**WePMS**: web based performance management system  
**COMSTAT**: A system used for analyzing large quantities of data to come up with daily performance, it was implemented at the Orleans Parish Criminal Sheriffs.  
**DDI’s performance system:**  
**SMART**: this is an acronym used as a criteria for setting key performance areas and indicators, when expanded they mean that when setting objectives for performance, objectives should be **Specific, Measureable, Attainable, Relevant and Time bound**
Chapter 3. Analysis and Design

3.1. Introduction

This paper will strive to prove the statement below, “Productivity and efficiency in Zambian public institutions can greatly be enhanced by adopting an IT supported performance management system.” (Mapoma, 2014).

Chapter 2 reviewed coverage, applicability and many aspects of performance management systems. The researcher approached the subject from various angles ranging from subject coverage in academics, industrial application as well as IT design models and existing practical implementations. This was achieved through an online search aimed at gathering more information pertaining to use of general and IT supported performance management systems and also appreciating what other experienced authors have said about such systems.

This necessitated a balanced viewpoint and clear understanding of the subject matter.

This chapter aims to investigate use of performance management systems in public institutions in Zambia through use of available research methodologies. Various methodologies exist to aid information gathering, on the type of methodology used is solely dependent on the preference by the researcher and the type of problem being investigated. The researcher considered available information gathering techniques and methodologies such as the Delphi-technique (Davidson, 2013), quantitative and qualitative methods, regression analysis, Quasi-Experimental (Gough, 2014) and meta-analysis. However, the qualitative (Aleca et al, 2009) methodology was adopted and regarded as the most appropriate technique for information gathering requirements for the system being investigated as discussed in the following sections. The qualitative technique necessitated production of survey questions (Riedl et al, 2014) to help solicit for information from Zambian public workers on the use of performance management systems, systems effectiveness and IT integration in such systems.

With the qualitative method, it was possible to get an overview of how public institutions perceive performance management systems and the extent to which these systems if available have been exploited, the methodology also helped to come up with parameters and boundaries to form the basis for the design of a proposed IT supported performance management system.

3.1.1. Preparations prior to undertaking the Survey

After reviewing available methodologies, the next step was to design questionnaires using SoGoSurvey.com, an online survey design authoring tool. SoGoSurvey.com provides very nice interfaces and it is an easy development platform to learn and use.

The first set of questionnaires developed was piloted to 2 respondents within the writer’s place and questionnaires to one of the target groups (the government ministries) for feedback and the following are the observations which were made:

- Out of the 10 questionnaires distributed online, only 3 participants responded
- Feedback received from participants indicated that the subject of performance management was relatively new and was confused with performance appraisals
- The target group was hesitant responding to online surveys for fear of their contact details especially the email being misused despite assurance that the research was being conducted with high level of confidentiality

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Some participants felt questions were difficult to understand

3.1.2. Action taken to increase participation

Since some participants were skeptical using online questionnaires, a provision for printed questionnaires was made to allow for more participation. To ensure that participants understood the system under review, questions pertaining to performance management were clearly explained to ensure that respondents understood what they were responding to. A decision was made to distribute 150 printed questionnaires and 45 online and also interview selected individuals in addition to responding to printed questionnaires.

Though the process was time consuming, to ensure respondents understood the questionnaires requirements, a number of respondents were taken through questions deemed difficult and a number of them were able to respond. When the writer was satisfied that participants were ready to respond to the questionnaires; an online survey was activated and distribution of printed questionnaires launched. Detailed below are the results obtained from the survey.

3.2. Results obtained from survey

Of the 115 survey participants, 80.9% opted to use printed survey questionnaires, 18.3% online and 0.87% face-to-face interviews (Figure 8 and Table 1). This served as an indicator on the type systems being used in public institutions and also reviewed that in coming up with an IT supported performance management system, it is important to take such into consideration to ensure acceptance.

![Information gathering process](image)

**Figure 8. Information gathering process**

Owing to the high number of employees in the Zambian public institutions, it was important that a reasonable number of participants was targeted. Initially, 200 workers was considered to complete the survey questionnaires though only 115 successfully participated of which 21 was collected from online surveys and 94 printed survey questionnaires. Respond-
ents were required to provide information on their line ministries, departments, roles and also to find out whether respondents were in management or not and the level of operation in management. Further, it was also important to know who had permanent jobs, working on contract or any other form, the result obtained is as shown below in Figure 9.

Table 1. Information Gathering by Percentage.

<table>
<thead>
<tr>
<th>online</th>
<th>printed</th>
<th>face-to-face Interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>18.30%</td>
<td>80.90%</td>
<td>0.87%</td>
</tr>
</tbody>
</table>

| 21      | 93      | 1                       |

![Interviewed Public Workers](https://via.placeholder.com/150)

**Figure 9.** Category of people interviewed.

Table 2. Interviewed public workers

<table>
<thead>
<tr>
<th>Permanent</th>
<th>Working on Contract</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>83%</td>
<td>11%</td>
<td>6%</td>
</tr>
<tr>
<td>95</td>
<td>13</td>
<td>7</td>
</tr>
</tbody>
</table>

From the statistics shown in the table and graph above, it was discovered that out of the 115 respondents, 83% are permanently employed and only 11% working on contract, the remaining 6% fell in other categories.
Out of 27 government ministries, 14 participated with ministry of agriculture, labour and local government providing more responses, as shown in figure 10 below. Worth noting is that some ministries complement each other in the way they operate and having covered critical ministries, received responses would reflect the work culture in other ministries such as Ministry of health and Ministry of Community Development and child health.

**Figure 10.** Total Surveyed Government Ministries

**Figure 11.** Performance management system availability in public service
On the question concerning availability of a performance management system in public institutions, 56.5% of the respondents agreed that performance management systems existed in public institutions, 33.3% disagreed that such systems do not exist whilst 12.2% were not sure whether these systems are available. The Figure 11 shows the graphical representation of the results obtained.

To test user understanding of a performance management system, a question was asked to find out the type of performance assessment system in use. The results recorded indicated that 77.4% of responses received use a top-down approach implying that supervisors are the one who appraise workers under them, 7.83% uses the self-evaluation approach, 1.74% peer evaluation such as 360̊ degrees system; meaning the peers assess each other and 5.23% indicated that such systems do not exist in the respective institutions. Figure 12 shows the graphical representation of the results recorded.

![Performance assessment approaches](image)

**Figure 12. Performance assessment approaches**

**Table 3. Performance assessment approaches**

<table>
<thead>
<tr>
<th>Performance Management Systems</th>
<th>Top-down</th>
<th>Self-Evaluation</th>
<th>Peer-Evaluation</th>
<th>All three Systems</th>
<th>non</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>89</td>
<td>9</td>
<td>2</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>77.40%</td>
<td>7.83%</td>
<td>1.74%</td>
<td>7.83%</td>
<td>5.23%</td>
</tr>
</tbody>
</table>

Key to the proposed design of the IT supported performance management system was to know the effectiveness of existing systems. To that effect, respondents were requested to rate the effectiveness of the existing systems.
The results recorded indicated that 35% answered that systems are very effective, 9.5% said they are effective whilst 15.6% said they are fairly effective. 22.6% of the respondents were not sure about the systems effectiveness and only 16.5% said the current performance management systems used are not effective. Results are shown below in Table 4 and Figure 14.

Table 4. Effectiveness of current performance management system

<table>
<thead>
<tr>
<th>Effectiveness of the current performance management systems</th>
<th>very effective</th>
<th>effective</th>
<th>fair</th>
<th>not sure</th>
<th>not effective</th>
</tr>
</thead>
<tbody>
<tr>
<td>very effective</td>
<td>35%</td>
<td>9.50%</td>
<td>15.60%</td>
<td>22.60%</td>
<td>16.52%</td>
</tr>
<tr>
<td>40</td>
<td>11</td>
<td>18</td>
<td>26</td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>

On the mostly used performance management system in public institutions as according to the respondents is a structured system approached which scored 31.3%, the achievement of set performance parameters approach scored 15.7%, individual performance aggregated targets scored 2.61%, altitude and behavioral traits system scored 26.96% and systems not listed scored 23.50%, an indication that there is no standard performance management system in public institutions. Results are as shown in Figure 14.
Figure 14. Performance measurement systems in use

To probe further on the effectiveness of existing performance management systems, respondents were requested to rate their respective performance management systems. Respondents who said the current systems were very good scored 4.8%, good scored 14.3%, 28.6% said the systems were fair while 38.1% and 14.3% stated that the current systems were poor and very poor, respectively.

Figure 15 represents the results obtained and Table 5 shows raw data and the percentages.

Figure 15. Rating of existing performance management systems
Table 5. Performance management rating

<table>
<thead>
<tr>
<th>very good</th>
<th>good</th>
<th>fair</th>
<th>poor</th>
<th>very poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>16</td>
<td>33</td>
<td>44</td>
<td>6</td>
</tr>
<tr>
<td>14.30%</td>
<td>14.30%</td>
<td>28.60%</td>
<td>38.10%</td>
<td>4.80%</td>
</tr>
</tbody>
</table>

For an organization to see how it has been performing and encourage workers it is important to show performance results, therefore, the researcher posed a question to find out if results are made available to the workers and the corresponding survey results are shown in Figure 16 and Table 6. The responses received indicated that 45.8% agreed that performance data is made available, 16.6% indicated that data is not available and 37.5% were not sure whether data is made available.

If workers are allowed to view performance results, there is a high probability of improving performance through taking remedial actions and also rewarding high performers in times where productivity is high.

![Availability of institutional/department performance data](image)

**Figure 16.** Availability of performance data

Table 6. Availability of performance data in public institutions

<table>
<thead>
<tr>
<th>available</th>
<th>not sure</th>
<th>not available</th>
</tr>
</thead>
<tbody>
<tr>
<td>53</td>
<td>38</td>
<td>24</td>
</tr>
<tr>
<td>45.80%</td>
<td>37.50%</td>
<td>16.60%</td>
</tr>
</tbody>
</table>

Of critical importance to the investigation was how an IT supported performance management would improve efficiency and productivity, therefore, respondents were required to rate how such an implementation can assist in transforming the work culture in public service. From the responses, 42.9% strongly agreed that such as a system can help improve perfor-
mance, 33.3% agreed that efficiency and productivity would improve and 9.5% fairly agreed while 9.5 were not sure. However, 4.8% disagreed that such a system would not improve performance. The result obtained reviewed that over 70% of respondents are in support of an IT supported performance management system and are of the view that implementing such a system would improve worker efficiency and productivity. Figure 17 is a representation of the results obtained from rating the extent to which an IT supported performance management system would improve efficiency and productivity. To further solicit for more feedback from respondents, a provision was made to allow them to give general feedback regarding use of performance management systems. Table 7 shows the results representation in form a pie chart.

Figure 17. Rating of an IT supported performance management system

Feedback from high executives on the use of performance management systems in public institutions in Zambia

Table 7. General feedback on the use of performance management system

<table>
<thead>
<tr>
<th>General feedback regarding use of a performance managements system in Zambian public institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0 we need to modernize the performance management system</td>
</tr>
<tr>
<td>2.0 Performance management system is not institutionalized though it is very good</td>
</tr>
<tr>
<td>3.0 Access to these facilities to be broaden to lower levels</td>
</tr>
<tr>
<td>4.0 Although performance management systems are used, not so much credence is given to it because results of the performance appraisal rarely if at all have any impact on the job of a person deemed not to be performing well. Immediate supervisors cannot institute any punitive measures to an officer not performing hence the whole appraisal becomes redundant.</td>
</tr>
</tbody>
</table>
We use an annual appraisal system annually to evaluate performance. Performance management is just done because it is routine and not that it is supposed to be used to improve how work is being done.

## 3.3. Results Analysis

The previous sections of chapter 3 looked at various types of information gathering processes and ultimately adopted the mixed methodology to support creation of survey questionnaires and the actual conduct of the survey. Having laid the baseline under which the investigation should be conducted, a pilot survey was conducted and later delved into the actual conduct of the survey. The way public institutions operate in Zambia reviewed that no systematic performance management systems exist, or rather an effective system in place to support efficiency and productivity and consequently affecting service delivery and economic growth.

The results obtained from the survey indicates that each ministry may have one or more systems in use for managing performance making it difficult to manage workers. Another interesting part is that even when workers are appraised, no remedial action is taken to help improve worker performance or productivity neither is there a measure to show how much each worker has contributed to the overall performance of a government unit. It is therefore important that there is a standard way of managing performance of workers and organizations to guarantee productivity and efficiency. Information systems have proved significance in processes unification and can help with efficient management of public resources. It is imperative that workers are paid based on their contribution towards achievement of set goals and objectives. Having a system that allows for automated allocation of tasks ensures that everyone is able to show accountability and thus assure that public resources are put to good use.

## 3.4. Impact of the result obtained from survey

Arising from the results of the survey, and the understanding that current systems cannot assure efficiency and productivity in Zambian public institutions based on the responses received, this section looks at a possible software design model that can be implemented to support synergy in the way government institutions operates.

### 3.4.1. Development methodology

The prototype development approach will be used to come up with a proposed performance management model for public institutions. Due to the complexities that exists in public institutions, it is important that the proposed system is subjected to a number of system prototypes. The proposed design for the performance management system is required to have three core components, the client-side, server-side and the messaging system.

The robustness of web technologies, makes it possible to implement applications of similar functionalities using different programming languages such as pre-processor hypertext commonly known as PHP, java, JavaScript, Perl, C# and many other object-Oriented programming languages. The design adopted follows object-orientated programming technique.
taking advantage of the Unified Modelling language to model the system under development. The first step in this undertaking was to conceptualize how users will interact with the proposed performance management system through a graphical representation as shown in figure 18 below:

![Figure 18](image)

**Figure 18.** An abstract of client-side of the ePMS

### 3. 4. 2. Proposed System Design

The design model took into consideration routine operations in public institutions and the reporting matrix. And therefore, the assumptions made are that the managers include senior managers, line managers and operations managers are responsible for ensuring that members that they lead perform and to the expectations.

Critical to the success of the proposed IT performance management system is that every member should be accountable and also contribute to the performance expectations. And therefore, each employee should have access to the performance management system and report on work progress in line with their own individual targets as well as department expectations. The UML diagrams in figure 19, figure 20 and figure 21 all demonstrates the conceptualization of the proposed system, design and the actual model proposed for the implementation.

Having modelled the design for the proposed system, the next phase was identifying development tools for the prototype system. The next chapter (Chapter 4) discusses the actual implementation of the prototype system.
Figure 19. PMS conceptual model.

Figure 20. Design model for the proposed system.
Figure 21. PMS diagram for public service operations.

Shown below in Figure 22 is the proposed design model represented as UML classes:

Figure 22. UML class diagram for PMS
Chapter 4. Implementation

Chapter 3 looked at analysis of data collected from the survey by way of questionnaires (both online and printed) and information gathered from the literature survey that was conducted. Chapter 4 delves into an explanation of the methodology used for gathering data and analysis. The design of the study entails carrying out an investigation, analysis of gathered data, design and implementation of a system prototype for the performance management system. The conduct of the project comprised among other phases preparation of survey questions and distribution, study of online literature on performance management systems and construction of UML diagrams and identification of development tools. This chapter looks at the process of data collection, development tools and requirements, design and implementation, testing, the actual prototype system and changes made to requirements specifications.

4. 1. Data Collection

A) Stage 1: carry out investigations into use and availability of performance management systems.

![Figure 23. Methodology applied to collect data on PMS Systems](image-url)

This was a two phased process, the first one being an in-depth literature search and a survey (both online and printed). To ensure participants were adequately prepared to take part
in the survey, test questionnaires were sent out and feedback worked on before the actual survey was activated. Prior to activating the survey, and upon realizing that most people didn’t understand the meaning of performance management system, questions pertaining to the subject of study had an explanation on it to ensure that participants understood the questions before picking an answer. The other observation made was that very few participants were willing to respond to online surveys and therefore a provision for printed questionnaires was made which provided the researcher with an opportunity.

To interact with participants and where possible clarify some questions. Worth mentioning is the divergent views expressed by participants on the subject and overwhelming support during the conduct of the project. The public institutions come from different government ministries of which out of 27, had 17 of them participating. Critical information which was required of the participants was to find out the systems available for performance management systems, whether such systems were supported by IT and the extent to which such systems would support operations if they were supported by IT. The second phase of information gathering was searching and reading literature on performance management to learn more about such systems to ensure a clear understanding of performance management systems, applicability and how the same would aid analysis and design for the proposed system. Figure 23 is a graphical representation of the processes involved in data collection.

B) Stage 2: Analyze data collected from both literature search and from the conduct of survey.

![Figure 24. Technique applied to carry out data analysis](image-url)
This was the second stage, and it involved analyzing data received from the both online and printed surveys.

Received data was analyzed using a phased process as well, implying that data collected from the review of literature was used to understand the subject of performance management systems, application and also to learn the extent to Information Technology has been integrated into such system. Information gathered from the literature also reviewed the many benefits for adopting such systems and how IT could improve such systems even further.

4. 1. 1. Approach and identification of respondents

The proposed IT supported performance management system was targeted at public institutions and its employees, from the lowest ranking to the top, as such general staff, managers, senior manager were identified as the many participants and people who impacts performance of an organization. Therefore, the target for the ministries which participated was ensuring that per every ministry, participants should belong to each of the category in the organization structure (senior management, middle management and general staff). Further, from questions were designed in such a way as not to lead participants to provide leading answers rather they were structured so as to get the correct picture of what is obtaining in the public institutions. They were all provided with an opportunity to provide a criteria used to assess performance and from the parameters given, the researcher would relate with other information provided to measure the effectiveness of such systems.

Further, to ensure protection of respondent’s personal information and identity, all participants were assured of non-disclosure of personal information and identity and questionnaires were designed as such.

To access completed surveys, online participants were served with a link to an online questionnaire with a unique key and some were allowed to forward the survey link to friends working in public institutions. Out of 45 survey links which were sent out, only 21 responded and as such, printed questionnaires were distributed to allow for more participation. For the printed questionnaires, a participants identification list (in terms of ministries and departments) was created and the questionnaires were distributed and with each participant given three days in which to complete the questionnaire.

4. 2. Design Implementation

The design of the performance management had three core components; the main portal which contained all information about performance management system, communications portal and the MySQL database. The performance management systems portal is as shown below in Figure 25.
4. 2. 1. Accessing performance management system

For every software application, security is of utmost important, therefore the design took into consideration security of performance information, accessing the performance management system entailed logging into the system with valid credentials created by the administrator. Upon authorization, the employee was allowed to access performance management data and be able to perform tasks such setting goals, targets view performance related information as well as resources allocated to accomplish expected performance. Another very important system is a communication system. Organizations that have an efficient communication system have shown to be very productive and efficient due to faster information flow and decision making.

4. 2. 2. Communication System

To improve communication between employees, therefore, a communication system portal was implemented as shown in figure 26 below.
The communication system would allow interactive communication between employees to ensure that a conducive environment is created to support employee performance. With a communication system, a supervisor or manager would communicate targets to the subordinates, agree on the targets, mobilize resources and ensure that set performance objectives are met.

4.2.3. Database

Just like the conventional systems where information is filed in manual files, a MySQL database was created to allow for data storage, retrieval, manipulation and for future use in the prototype system.

4.2.4. Development tools and requirements

There are a number of tools available for developing software applications. Web applications could be developed utilizing any of the available technologies such as java, asp.net, JavaScript, PHP and many more. To implement the prototype system the following software development tools were used:

Requirements:

The prototype is not resource demanding and as such, any computer or laptop with a minimum of 1 GB of RAM, 40 GB Hard disk space would still support the application, the developer used a windows platform to develop the application, it should however, be noted that PHP is platform independent and can run on a number of available operating systems including Linux. Detailed below are the tools used to develop the application.
Development tools:

i. **Easy PHP:**
   This is a WAMP package that contains server-Side Scripting language PHP, Apache webserver, SQL MySQL server and the database manager php My Admin. Due to its portability, the tool was considered more appropriate to develop the application.

ii. **Dreamweaver:**
   An Adobe web development application, has rich features that support a number of languages including PHP, CSS, JavaScript (for Client Side Scripting), HTML, XHTML, ASP Action, ASP.net, java and many was considered an appropriate as it support many languages and web content.
   
   Other tools that used for modelling of the system include Microsoft Visio and smart Draw UML diagramming tool.

4. 2. 5. Testing

   To ensure that the e-performance management system produced desired results, the prototype was subjected to functional requirements tests to ensure that the program code executed correctly (unit testing) and also functional testing to ensure that the program produced desire results.
Chapter 5. Results and Evaluation

The literature review brought out many issues pertaining to use of performance management systems and the benefits that are associated with such implementations. (Angelita et al, 2014). Highlighted many benefits that come about as a results of having a PMS in place such as high efficiency, high productivity and improved service delivery. Other aspects such as available design models and implementations were brought out. The survey also brought out a lot of information from the 17 government ministries that participated in the survey. A lot of information came out regarding availability and use of performance management systems in public institutions. The greatest interest on the information gathered was availability of performance management systems, type of systems in use and IT integration in such systems and the following sections discusses the findings and evaluation of the results obtained. In order to keep the confidentiality of respondents, their personal information was withheld thus respondents are being identified by the ministries represented.

5.1. Results

From both the online and printed survey questionnaires, it was discovered that from the 117 participants, 56.5% respondents reported availability of performance management systems, 33.3% reported non availability of such systems while 12% were not sure. For an effective performance management system, Chiu, et al (2014), reports that people’s involvement, behavior, and attitude towards accepting an innovation is very important. Moving along with the argument, it is impractical to create a productive environment when drivers are not involved or not sure of what it is they are using or working with. Therefore, the results obtained from the survey clearly indicates non availability of effective performance management systems considering the disparities in the number of responses received.

The results obtained were a combination of participants working in different positions (senior Management, management up to the lowest level). This was to allow for a broader understanding of existing systems and to test understanding of performance management systems amongst public workers. The surveys also reviewed that in most cases, appraisals systems were confused with performance management systems, to which customized trainings lasting for 10 – 15 minutes was conducted in some instances to ensure that participants understood the requirements of the questionnaires. On the type of performance measurement systems in use, the responses received indicates that all the common performance measurement systems as listed in the questionnaires are being used. Further the responses showed that commonly used method to measure performance is the structured system; where performance is measured from individual up to departmental level. It is also important to note that 31.30% base performance measurement on the targets while 26.96% measure performance based on individual’s behavioral traits. If productivity is to improve, it is important that workers work output is quantified in terms of visible results as this is what brings about productivity. Further, use of efficiency enhancing tools such as information systems and information technology has high capability of increasing workers’ productivity if effective and common performance measurement system is adopted. With the responses received, it is difficult to aggregate performance results in public institutions as each ministry, department or office has got its own way of measuring performance making it difficult of see whether committed resources by the government are yielding results or not.
As a result of not having a standardized performance management systems, standardized performance measurement system, it was discovered that performance data cannot easily be generated and hence public institution cannot produce accurate performance data.
This was also clearly seen from the responses received on the type of performance assessment systems in place. The writer observed that having too many assessments systems which are not standardized cannot lead any team to become efficient and productive, but also noted that if all systems are standardized and applied to all ministries and departments could also help review other performance parameters to aid decision makers and in policy formulation.

![Diagram of Availability of institutional/department performance data]

**Figure 29.** Availability Of Performance Data

![Diagram of Performance assessment approaches]

**Figure 30.** Performance assessment approaches
A question was posed to find out the extent to which workers think integration of Information technology could help improve efficiency and productivity in public institutions and the results obtained as indicated in the pie chart below indicates that 76% of the respondents are in support that having an IT supported performance management systems can raise efficiency levels and productivity in public institutions.

![Pie Chart: Extent to which an IT supported Performance management system would improve efficiency](image)

**Figure 31. Support for an IT Performance management system**

The results are in support with the feedback collected from the sponsor and also the District administrator who also alluded to that the available system does not provide a clear indication of both department and individual’s performance and that an IT supported performance management system capable to providing global performance results facilitated by an efficient communication system could greatly enhance worker performance and productivity.

Further, the district administrator reviewed the existence of an APAS (Annual performance appraisal system) in public institutions but said it has not helped to improve performance due to a number of factors such as failure to adhere to development plan resulting from changes in government structures taking place from time to time and he further hinted on untimely provision or non-availability of resources to support workers once given targets. Compared to the results obtained, there is also a clear indication that with IT supported systems, increased accountability is likely to compel planners to work within what is attainable, reduce wastage and also allow for realistic budgeting that empowers workers to perform. Such dependencies can only be traced through an implementation of distributed performance management system.

5. 2. Prototype System Functionality

To ensure improved performance and productivity in public institutions, it is important that an IT supported performance management system is adopted. This is only possible in an environment where there is a fully integrated performance management system for all ministries and departments and clear definition of goals and objectives. There should be a central
organ responsible for communicating goals and budget requirements and approved financing of key performance areas. For the software prototype, a fictitious performance management system was developed to represent how a public performance management system should function.

The system and functional requirements of the prototype system include components such as authentication system to ensure that only authorized users are allowed to access the system and be able to carry out works pertaining to their performance.

As different workers will be required to access the system, it is important that access levels are established to different content so that managers can access the PMS system at different levels from that of general staff and the portal maintenance team.

A typical example of how the application works is as narrated below:

a) Public Service

- Having submitted performance requirements by each ministry to the public service. Public service summarizes and displays set goals for that particular year or period under which performance reviews are conducted shown in figure 32.

- It should be noted that each ministry could have more than 3 to four key performance areas so that all other departments and managers falling on that ministry are able to analyze the expectations so that they start segmenting and preparing performance plans for their members in readiness to communicate performance expectations.

Therefore, on the PMS application, the goals or targets are displayed as shown below.

The public service approves the budgets according to what they are able to support. With the current systems, budgets are prepared and projections made but results cannot be matched with the committed resources. To avert this, the public service should always ensure to budget in line with available resources to ensure that workers performance output is not compromised. Therefore, for this system, only available allocated resources are displayed so that user departments are equipped with the required resources. Non availability of systems to support such level of accountability has led to misuse of public funds and this can be reduced is change management is properly implemented.

Therefore, the public service is required to generate an approved budget and communicate to all ministries and departments to facilitate disbursement of resources up to the individual’s resource requirements to enable execution of given targets, the snapshot below shows resource allocation by public service.

Once the budgets are approved, the public service displays the results as shown below in Figure 33:
<table>
<thead>
<tr>
<th>Ministry</th>
<th>Department</th>
<th>Key Performance Area 1</th>
<th>Key Performance Area 2</th>
<th>Key Performance Area 3</th>
<th>Key Performance Area 4</th>
<th>Objective</th>
<th>Expected Performance</th>
<th>Deadline</th>
<th>Weight</th>
<th>Expected Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health</td>
<td>Health Care</td>
<td>reduce malaria infections to less than 5%</td>
<td>Build 300 health posts</td>
<td>Child birth mortality rate less than 5%</td>
<td>Recruit 200 nurses</td>
<td>Improve health care by ensuring that each hospital has less than 5% of contagious diseases</td>
<td>100</td>
<td>2016-01-21</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>Primary Education</td>
<td>98% pupils pass literature and able to read</td>
<td>Report of examinations clearing 80%</td>
<td>School pass rate of 70%</td>
<td>Teacher Availability 100%</td>
<td>Improve education quality at primary level</td>
<td>100</td>
<td>2015-04-18</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Tourism</td>
<td>Zara</td>
<td>Reduce poaching by 99%</td>
<td>Plant 63 elephants in all provinces</td>
<td>Remove 200 black lechwe in all provinces</td>
<td>Generate $100,000,000 in revenue</td>
<td>Improve tourism in the country</td>
<td>100</td>
<td>2015-08-28</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Commerce</td>
<td>Indeco</td>
<td>Construct 30,000 plants in all 10 provinces</td>
<td>Purchase 1,000,000 tons of maize from Farmers</td>
<td>Declare $10,000,000 in dividends</td>
<td>Employ 1000 workers across the country</td>
<td>Increase industrial activities in the country</td>
<td>100</td>
<td>2016-04-09</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Energy</td>
<td>Water Sanitation</td>
<td>Provide 40% population with piped water</td>
<td>Supply 60% availability</td>
<td>Install 3,000,000 prepaid meters</td>
<td>Open 50 new offices across the country</td>
<td>Improve water sanitation by 50%</td>
<td>100</td>
<td>2016-01-30</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Community</td>
<td>Child care</td>
<td>Carry out all 6 immunization</td>
<td>Maternal mortality reduced to less than 5%</td>
<td>Distribute 200,000 mosquito nets</td>
<td>Build 50 child wards across the country</td>
<td>Improve health care by ensuring that each hospital has a less than 5% of contagious diseases</td>
<td>100</td>
<td>2015-02-29</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Agriculture</td>
<td>Agriculture</td>
<td>Produce 5,000,000 tonnes of maize</td>
<td>Feed 200 fish species across the country</td>
<td>Build 500 state fish ponds in all provinces</td>
<td>Generate $1,000,000 from fish farming activities</td>
<td>Improve agriculture production through increased fish production</td>
<td>100</td>
<td>2015-02-29</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>
Figure 33. Budgeting and allocation of resource
b) Performance Managers
In this performance modal, managers carry the targets for the department and are responsible for setting targets for workers under them and carry out periodic reviews.

c) General staff performance
Once the targets are communicated to the general staff, work commences and progress reports are sent through the messaging system. Therefore, work hours wastage is reduced amongst public workers. Since system entails granting user rights to all workers, communication is made to be very efficient and workers are always alert to attend to assigned work and responsibilities.

Such an implementation has the ability to create trust amongst public workers and once trust is created in a work environment, efficiency levels are expected to be high which in turn culminates into high productivity.

The snapshot below shows a fictitious performance contract for one department. This provides an insight on the expected results from each department.

![Performance Contract Snapshot](image)

**Figure 34.** Setting of employee targets

The document which would otherwise take over an hour to be delivered by office assistants is received within a few minutes
Figure 35. Performance Data
Chapter 6. Conclusions

Having analyzed the results and implemented a prototype application for the IT supported performance management system for Zambian public institutions, Chapter 6 highlights the lessons learnt and knowledge acquired as a result of conducting the research, originality and the limitations of the project. The chapter also looks at the business application and the limitations of the project. In concluding the chapter, a recommendation is made on the future direction and prospects for future research on the work carried out.

6. 1. Lessons leaned

Use of information systems and technology has transformed the world in many aspects, and we have seen its wider application in almost all professional fields. As part of lessons learnt from undertaking the project, the research reviewed how information systems and technology is impacting business processes in the world and its impact on systems such as performance management systems and the details are in the following sub-sections.

6. 1. 1. Impact of Information Systems on Business Process

The research reviewed that information systems have played a pivotal role in transforming organizations in every business aspect. Web technologies have the ability to implement systems that imitate manual process and yet provide accurate results. It was learnt that understanding requirements for a systems requires a lot of effort and in order to implement a system that meets business requirements and therefore meets user requirements, it is important to plan how to collect information and have an understanding of the methodology for processing that information.

6. 1. 2. Business impact as a result of IT Integrated PMS

The concept of performance management is an old business concept of improving organizational performance through proper management of workforce and business processes. These systems have been adopted in many businesses especially the privately owned organizations. However, due to the many problems associated with manual processes, a lot more organizations especially the public sector have not benefited from such systems and therefore affecting efficiency and productivity. From the research conducted it was observed that each ministry or the same department could have different system for managing performance making it difficult to track performance and realistically monitor progress in public offices.

It was also learnt that an IT supported performance management system can benefit public institutions in many ways, for example, expenditure in public institutions is generally very high but may not be matched with the results obtained as a result. An IT supported performance management has the potential to reduce operational costs in public institutions as money spent to buy stationery could be diverted to other productive avenues. Having a messaging system for communicating performance information can increase efficiency as movements between offices and other places are reduced and information travels much fasters and responses are almost immediate.
The research reviewed that making performance data available to stakeholders through a performance management portal increases accountability, creates a sense of ownership in all responsible offices and individuals. It was also reviewed that once there is a platform that promotes efficient information sharing there is room for innovation.

Going by the way the world has revolutionized, there is need for Zambian public institutions to adapt in order to better manage its vast natural resources, which is only possible by first implementing an IT supported performance management system that has the capacity to quickly implement a change management especially now that the government is implementing an e-Government system.

6.1.3. Academic Application and Limitations

The IT profession entails interfacing with systems and people in order to solve problems of varying nature and improve the way things are done. Therefore, issues of performance management are critical and should be supported by Information systems. As companies and other organizations move towards implementation of performance management system, technologist should be working towards developing standardized IT model for performance management to ensure that public worker efficiencies are matched with operational processes and efficient applications such as ERP and CRM.

6.1.4. Business Applications and Limitations

Implementation of an IT supported performance management systems in public institutions is a sure way of improving efficiency and productivity, the system can also help reduce operational costs as all communications are electronically transmitted in a faster and efficient manner. This increases interactions in an organization and workers are made to transparently account for the resources committed to complete a task which tentatively promotes productivity in the public workforce. It should be noted that for this innovation to succeed there has to be support from the top executives.

It should however be noted that the prototype needed to take into consideration verifications of work output and to ensure that there is adequate integrity in the performance information produced through reports generated from ERP or other operations systems interfaces.

Therefore, the application should incorporate a framework for integrating with the already existing system to ensure that work generated from those.

6.2. Recommendations

Due to the complexity of public institutions in terms of operations, the proposed model needs to be enhanced to ensure that there is:

a) An Interface to marry the performance management to other information systems in the public institutions to ensure accuracy on the results recorded.

b) A systems that can capture real-time reports on the progress made

c) A system that can allow public workers to be able to work whilst they are not in the office but still capture performance data.

d) Able to allow worker to use mobile devices to communicate performance data
Once these considerations are implemented, efficiency and productivity will be assured not only Zambia but many other developing countries where the power of Information systems and technology have not been tested.

References Cited


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