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IT Governance Maturity in the Public Sector Organizations in a Developing Country: The Case of Tanzania

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ABSTRACT

Today in many organizations in the public sector, the use of IT has become crucial in sustaining and extending the organizations’ strategies and objectives. Such use of technology has caused a critical dependency on IT thus a call for specific focus on IT governance. Despite increased practice of IT governance in these organizations, little academic empirical research has been undertaken to investigate its maturity, which is even worse in a developing country environment. Therefore this paper, based on the 15 most important processes of the COBIT framework and a case study in five public sector organizations, establishes IT governance maturity in the public sector in a developing country like Tanzania. In addition, the study result is compared against a similar benchmark in the public sector in a developed country like Australia and internationally from a range of nations. The result indicates some IT processes to have scored relatively lower maturity but very important to the process of IT decision making and monitoring in the studied environment. In addition, it indicates the maturity to be relatively lower in the organizations with less established IT governance mechanisms. Moreover when compared with the public sector organizations from Australia as a developed country and internationally from a range of nations, the IT governance maturity pattern turned out to be relatively lower in all studied IT processes. Finally, based on these results, recommendations are provided to improve poorly performing processes for successful IT governance in support of better public service delivery in this environment.

Keywords
IT governance, Generic maturity model, Maturity level, COBIT, Public sector, Developing country

INTRODUCTION

Many organizations today rely on Information and Communication Technology (ICT) and continue to make significant IT-enabled business investments (ITGI, 2006). Public sector organizations are among them. This is due to, among other things, the constantly increasing demand for more efficient and cost-effective public service delivery (Mhayaya, 2003; Ali & Green, 2007). This dependency on IT in a dynamic and often turbulent multiservice provision environment requires prudent management of IT and its alignment with business goals. Such needs together with organizational and cultural issues in this environment call for IT governance.

IT governance is considered to be an integral part of enterprise governance and has the potential to provide mechanisms for leadership and organizational structures and processes that ensure the organization’s IT sustains and extends the organization’s strategies and objectives (ITGI, 2003). Its potential in the organizations is also due to the fact that the most significant IT issues to date, are not technology-related, but governance-related (Guldentops et al., 2002). For example, the MIT/CISR study on IT governance related issues indicated a 20% better return on IT-enabled business investments when effective IT governance is in place (Weill & Ross, 2004).

Effective IT governance requires IT resources to be properly managed by a set of naturally grouped IT processes that provide the information an enterprise needs to achieve its objectives (ITGI, 2003). Moreover IT processes include setting objectives, providing direction on attaining them and a measure on their performance (Korac-Kakabadse & Kakabadse, 2001). To improve the overall performance of IT, there is a need for IT processes to cover the IT investment life cycle from planning to monitoring (Ribbers et al., 2002; Peterson, 2003; ITGI, 2007).

Several standards and frameworks exist as best practices for managing various aspects of IT including control over IT processes. This encompasses policies, procedures and structures designed to provide reasonable assurance that IT delivers value to business (ITGI, 2003). These best practices include ITIL for IT service management and ISO 38500 for corporate governance of IT (OGC, 2008; ISO, 2008). However, a broader and most internationally used best practice in governance of IT is the COBIT framework (ITGI & PwC, 2008).
COBIT (Control Objectives for Information and related Technology) framework, developed by the IT Governance Institute (ITGI), provides a set of generally accepted global perspective best practices developed from 41 international source documents (Lainhart IV, 2001). These practices assist in maximizing the benefits derived from the use of IT and are vital for the increasingly required strategic alignment of IT and business, and ultimately IT value delivery. To date the COBIT framework has 34 IT processes grouped into four domains: planning and organization, acquisition and implementation, delivery and support, and monitoring and evaluation (ITGI, 2007a). It also has a set of management guidelines with tools to assess, implement and improve the management of IT consistent with business goals (Van Grembergen & De Haes, 2008).

One of these management guidelines is the Maturity Model that allows organizations to undertake self-assessment to measure the level of management processes for each of COBIT’s 34 IT processes. The maturity levels ranging from 0 to 5 provide an indication of the state for each IT process in the organization and what has to be in place to achieve higher level (Figure 1). In this way, these maturity levels contribute to revealing the organization’s state of IT governance and comparisons within an industry or geographical locations, which in turn allows development of strategies for improvement (ITGI, 2008).

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>0</td>
<td>Non-existent. Complete lack of any recognizable processes. The enterprise has not even recognized that there is an issue to be addressed.</td>
</tr>
<tr>
<td>1</td>
<td>Initial. There is evidence that the enterprise has recognized that the issues exist and need to be addressed. There are, however, no standardized processes; instead, there are ad hoc approaches that tend to be applied on an individual or case-by-case basis. The overall approach to management is disorganized.</td>
</tr>
<tr>
<td>2</td>
<td>Repeatable. Processes have developed to the stage where similar procedures are followed by different people undertaking the same task. There is no formal training or communication of standard procedures, and responsibility is left to the individual. There is a high degree of reliance on the knowledge of individuals and, therefore, errors are likely.</td>
</tr>
<tr>
<td>3</td>
<td>Defined Process. Procedures have been standardized, documented, and communicated through training. It is mandated that these processes should be followed; however, it is unlikely that deviations will be detected. The procedures themselves are not sophisticated but are the formalization of existing practices.</td>
</tr>
<tr>
<td>4</td>
<td>Managed. Management monitors and measures compliance with procedures and takes action where processes appear not to be working effectively. Processes are under constant improvement and provide good practice. Automation and tools are used in a limited or fragmented way.</td>
</tr>
<tr>
<td>5</td>
<td>Optimized. Processes have been refined to a level of good practice, based on the results of continuous improvement and maturity modeling with other enterprises. IT is used in an integrated way to automate the workflow, providing tools to improve quality and effectiveness, making the enterprise quick to adapt.</td>
</tr>
</tbody>
</table>

Figure 1. Generic Maturity Model (adopted from ITGI, 2003; ITGI, 2007a)

To date, several IT governance maturity assessments have been done mainly in developed countries. This includes the case of Australia’s public sector that identified IT governance maturity level and its implication in effective IT governance (Liu & Ridley, 2005) and the IT governance maturity in Swedish electric utilities that assessed the maturity of administrative and support systems (Simonsen & Hultgren, 2007). Similarly is the governance maturity survey that has established a reference benchmark among public sector and non-for-profit organizations (Guldentops et al., 2002). Such maturity assessments and their implications are vital for increasing the contribution of IT in the public sector in Tanzania, a typical developing country, that has not achieved a significant degree of industrialization relative to its population, and which has a medium to low standard of living (Walsham & Sahay, 2005). They are also vital to such a country in which various adjustments of regulatory and commercial policies, both macroeconomic and within ICT’s converging sectors have been made and the public sector in particular has experienced dramatic changes in the demand for and use of ICT (Tz-ICT policy, 2003; Bakari, 2007).

Today the Tanzanian public sector has a general use of computers, specific business applications and varied IT organizations in many of them. Moreover, the recent study on the state of IT governance in this environment (Nfuka et al., 2009) has indicated several IT governance mechanisms in place, ranging from structure and processes to relational mechanisms with major weaknesses in processes. Such weaknesses, more complex governance of IT in the public sector (Liu & Ridley, 2005), and the developing country’s constraints on IT resources, knowledge and culture (Ndou, 2004; Bakari, 2007) indicate further a need for such maturity assessments. This assessment will assist, for example, in showing the state of IT processes and specific processes and attributes to focus on for a deliberate and sustainable IT governance improvement in this environment.
Therefore this paper analyzes the IT governance maturity in the public sector organizations in Tanzania as a developing country. The analysis is based on a combination of the generic maturity model (Figure 1), the 15 most important COBIT IT processes (Table 1) and the maturity levels description for each IT process (ITGI, 2007a). The use of these 15 IT processes is due to the nature of the studied sector and previous studies that identified them as the most important IT processes for public sector and non-for-profit organizations (Guldentops et al., 2002). In addition, in order to strengthen the commendation for improvement, our research compares the results against a similar benchmark in the public sector organizations from Australia as a developed country (Liu & Ridley, 2005) and internationally from a range of nations (ISACA, 2003).

<table>
<thead>
<tr>
<th>No.</th>
<th>Abbreviation</th>
<th>IT Process Name</th>
<th>Domain</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PO1</td>
<td>Define a Strategic IT Plan</td>
<td>Planning and Organization (PO)</td>
</tr>
<tr>
<td>2</td>
<td>PO3</td>
<td>Determine Technological Direction</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>PO4</td>
<td>Define the IT Processes, Organisation and Relationships (earlier called DS10)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>PO5</td>
<td>Manage the IT Investment</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>PO6</td>
<td>Communicate Management Aims and Direction (earlier called AI5)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>PO9</td>
<td>Assess and Manage IT Risks</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>PO10</td>
<td>Manage Projects</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>AI1</td>
<td>Identify Automated Solutions</td>
<td>Acquire and Implement (AI)</td>
</tr>
<tr>
<td>9</td>
<td>AI2</td>
<td>Acquire and Maintain Application Software</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>AI6</td>
<td>Manage Changes</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>DS1</td>
<td>Define and Manage Service Levels</td>
<td>Delivery and Support (DS)</td>
</tr>
<tr>
<td>12</td>
<td>DS4</td>
<td>Ensure Continuous Service</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>DS5</td>
<td>Ensure Systems Security</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>DS11</td>
<td>Manage Data</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>ME1</td>
<td>Monitor and Evaluate IT Performance</td>
<td>Monitoring &amp; Evaluation (ME)</td>
</tr>
</tbody>
</table>

Table 1. The most important 15 COBIT IT Processes (out of 34) adopted from several earlier studies (Guldentops et al., 2002; ISACA, 2003).

Apart from this introduction, the paper includes the research methodology in chapter 2, followed by study results and analysis in chapter 3 and conclusion in chapter 4.

RESEARCH METHODOLOGY

The goal of this research is to assess the IT processes maturity level in public sector organizations in Tanzania as a developing country and its implication in the success of IT governance in this environment. In addition, our study compares results against a similar benchmark in the public sector in Australia as a developed country (Liu & Ridley, 2005) and internationally in a range of nations (ISACA, 2003).

We use the case study research method with the unit of analysis at organization level (Yin, 2003) of which five public sector organizations are selected and IT/Business people involved. The data are collected using structured interviews, mainly focus group (Myers, 1997; Yin, 2003), which has a high apparent reliability and validity (Marshall, and Gretchen, 1999; Lindlof & Taylor, 2002) and is typically rich in generating ideas and consensus (Kleiber, 2004).

Empirical Source

As indicated already, five public organizations were selected for maturity of IT processes assessment. The selection was based on the span and level of IT deployment in the organization and the multiplier effect on the services provided to related public sector organizations and the general public. Also the selection took into consideration the type of the organization, whether Ministry, Department or Agency (MDAs) thus ensuring varied practices across the public sector. By virtue of being public sector and in a developing country the obtained maturity state on the way they plan, implement, support and monitor IT represents fairly the maturity of IT processes in other organizations of similar set-up and environment.
The five organizations used as case studies are: Tanzania Revenue Authority (TRA), an agency that collect and administers central government revenues (TRA, 2008); Medical Stores Department (MSD), a department that procures, stores and distributes approved essential drugs and other medical supplies required for use by health facilities across the country (MSD, 2008); Prime Minister’s Office-Regional Administration and Local Government (PMO-RLAG), a ministry that coordinates regional and local government affairs (PMO-RLAG, 2008) and President’s Office-Public Service Management (PO-PSM), a ministry that ensures public service is effectively and efficiently managed through improved human resources management, systems and structures (PO-PSM, 2008). Last but not the least is the Ministry of Finance and Economic Affairs (MoFEA) that manages government revenue, expenditure, financing, and provides advice on broad financial and economic affairs in support of the government’s economic and social objectives (MoFEA, 2008). Both the agency and the department are autonomous government organizations that execute specific functions and each has its own management for day to day operations and a board to strategically oversee and provide direction. The ministries are less autonomous government bodies responsible for a sector of government public administration, each with management for day to day operations and subordinate to the government cabinet that strategically oversees and provides direction.

Research Process

In order to arrive at the best way to handle the maturity assessment, a literature review was undertaken to explore the IT governance related frameworks and maturity model to apply in the assessment process. In this process we specifically adopted a combination of the generic maturity model (Figure 1), the 15 most important COBIT IT processes (Table 1) and the maturity levels description for each IT process (ITGI, 2007a) as earlier indicated. Therefore the questionnaire for this assessment was prepared based on these aspects and a maturity measurement tool (ITGI, 2007) that we customised to fit our study environment and selected processes. The data collection was done through structured interviews, mainly using focus group session in each organization. These focus group sessions were conducted with about 6 people in each organization, comprising IT and business representatives, mainly directors and managers as in earlier related studies (Guldentops et al., 2002; ISACA, 2003).

Also we collected documents from each of these organizations including strategic and action plans, policies, reports and presentations, prior to the focus group sessions. These documents supported the focus group sessions decision during the assessment of the maturity level. This means apart from participant’s knowledge and experience they brought in another dimension of the practices on the ground as per each process maturity model requirements (ITGI, 2007a). In other words, it allowed the triangulation of different data sources, in this case the focus group participants and documented practices, thus adding to the credibility (Yin, 2003; Lindlof & Taylor, 2002) of the scored maturity levels.

At the beginning of each focus group session, we provided a brief description of the study purpose, maturity assessment and questionnaire. Also in each session, one person was taking the role of session chair and another on recording the agreed maturity level. The researcher remained as an observer, to note comments made and intervene where it was necessary. An example of the intervention is when a higher maturity level was scored while the documentation available did not support it. This was resolved after relevant reference was quoted, explanation made and consensus reached.

As earlier indicated, the questionnaire used was adopted from the IT governance maturity assessment tool (ITGI, 2007). Each maturity statement in a process was assessed by indicating ‘How much do you agree’: ‘Not at all (0)’, ‘A little (0.33)’, ‘To some extent (0.66)’ and ‘Completely (1)’. In average 28 statements per process were assessed leading to a total of 420 statements for 15 IT processes assessed. An example of a statement from ‘Define a Strategic Plan - PO1’ is ‘IT strategic planning is a defined management function with senior-level responsibilities’. This work normally was accomplished in four to five hours for a group to go through statements in all 15 studied processes.

The data collected were then analyzed using the maturity measurement tool (ITGI, 2007) and MS Excel. After analysis of the scored maturity levels a report was submitted back to the studied organizations for checking any oversights. Their comments were then obtained and incorporated accordingly. Finally, in the comparative study we have benchmarked our data regarding the maturity levels with the data obtained from previous studies: the public sector in Australia as a developed country and internationally in a range of nations (Liu & Ridley, 2005; Guldentops et al., 2002; ISACA, 2003). These comparison data were then analyzed and graphs made using Microsoft Excel.

STUDY RESULTS AND ANALYSIS

This case study based research has been conducted in five public sector organizations and in a number of IT processes as earlier described (Table1). This section therefore presents the results from each of the 4 domains and the 15 studied IT processes. It also provides the analysis across these domains and processes in the studied organizations and as compared to the public sector in Australia as a developed country and internationally from a range of nations.
Study Results

The results indicated diverse maturity levels for the 15 most important IT processes in the five studied organizations as presented in Table 2. As can be seen, the processes maturity levels range between 1 and 2.3 with most below 2 (60%) and an average of 1.95.

The variation in maturity levels among IT processes across the studied organizations is generally small. However, the difference between well and less performing IT processes is almost a full maturity level on the scale (0.8). This also applies to the maturity level of each process in each studied organizations found to be 1.11 for lower and 3.37 for higher performers (Figure 2) and is a variation of almost two maturity levels on the scale (2.2).

Presenting these results from a domain point of view i.e. Plan and Organize (PO), Acquire and Implement (AI), Delivery and Support (DS), and Monitor and Evaluate (ME) (Table 1) we found varied maturity levels.

For the Planning and Organizing (PO) domain, concerned with identifying the way IT can best contribute to the achievement of business objectives, the average maturity levels across the studied organizations range from 1.8 to 2.2. Define the IT processes, organization and relationships - PO4 is the process with the highest score while Assess and manage IT risks - PO9 together with Determine technological direction - PO3 has the lowest score (Table 2).

<table>
<thead>
<tr>
<th>No.</th>
<th>IT Process</th>
<th>Average Maturity Level</th>
<th>Domain</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PO1</td>
<td>1.99</td>
<td>PO</td>
</tr>
<tr>
<td>2</td>
<td>PO3</td>
<td>1.88</td>
<td>PO</td>
</tr>
<tr>
<td>3</td>
<td>PO4</td>
<td>2.19</td>
<td>PO</td>
</tr>
<tr>
<td>4</td>
<td>PO5</td>
<td>1.97</td>
<td>PO</td>
</tr>
<tr>
<td>5</td>
<td>PO6</td>
<td>2.00</td>
<td>PO</td>
</tr>
<tr>
<td>6</td>
<td>PO9</td>
<td>1.87</td>
<td>PO</td>
</tr>
<tr>
<td>7</td>
<td>PO10</td>
<td>1.98</td>
<td>PO</td>
</tr>
<tr>
<td>8</td>
<td>AI1</td>
<td>2.19</td>
<td>AI</td>
</tr>
<tr>
<td>9</td>
<td>AI2</td>
<td>2.00</td>
<td>AI</td>
</tr>
<tr>
<td>10</td>
<td>AI6</td>
<td>2.09</td>
<td>AI</td>
</tr>
<tr>
<td>11</td>
<td>DS1</td>
<td>1.53</td>
<td>DS</td>
</tr>
<tr>
<td>12</td>
<td>DS4</td>
<td>2.04</td>
<td>DS</td>
</tr>
<tr>
<td>13</td>
<td>DS5</td>
<td>1.45</td>
<td>DS</td>
</tr>
<tr>
<td>14</td>
<td>DS11</td>
<td>2.25</td>
<td>DS</td>
</tr>
<tr>
<td>15</td>
<td>ME1</td>
<td>1.91</td>
<td>ME</td>
</tr>
</tbody>
</table>

Table 2. Average Maturity Level for 15 most important COBIT IT Processes across Five Public Sector Organizations in Tanzania

Furthermore looking at this domain from an individual organization point of view, the results indicate similarities and differences in the process maturity levels attained (Figure 2). For example, TRA and MSD which are autonomous government organizations seem to have attained higher maturity levels from 1.5 to 3.5 as compared to the government ministries that mostly range from 1 to 2. Also, TRA has the highest maturity score, above 2, in all 7 studied processes led by IT Strategic plan – PO1 and Communicate management aims and direction - PO6. This is a difference of a full maturity level on the scale (1) in most processes of TRA compared to rest of the studied organizations. Moreover, lower performing IT processes in this domain seem to be the same across the studied organizations i.e. Assess and manage IT risks - PO9 and Determine technological direction – PO3, the lowest found in government ministries; PMO-RALG and MoFEA respectively.
For the Acquire and Implement (AI) domain, concerned with identifying, developing or purchasing IT solutions and integrating them into the business process, its average maturity levels across the studied organizations ranged from 2 to 2.2. In this case Identify automated solutions – AI1 is the process with the highest maturity score while Acquire and Maintain application software – AI2 and Manage Changes – AI6 have the lowest scores (Table 2). Also from an individual organizations point of view, the results indicated variations. For example, TRA and MSD attained the higher maturity levels ranging from 2 to 3.1 as compared to others ranging from 1 to 2. Also TRA has the highest score, above 2 in all 3 studied IT processes in this domain, which is a difference of about full maturity level when compared to others. In addition, in terms of the performance of the processes, it seems Acquire and Maintain application software – AI2 and Manage Changes – AI6 have performed relatively lower in each of them with the lowest scored maturity being MoFEA (Figure 2).
For the Delivery and Support (DS) domain, concerned with the actual delivery of the services and their support, the average maturity levels across the studied organizations ranged from 1.4 to 2.3. Manage Data – DS11 and Ensure continues service – DS4 are the processes with the highest score while Ensure systems security – DS5 together with Define and manage service levels – DS1 have the lowest score (Figure 2). Also looking at this domain from an individual organization point of view, the results indicate similarities and differences in the maturity levels attained. For example, TRA seems to have attained slightly higher maturity levels ranging from 2.0 to 2.7 as compared to others whose maturity level ranges between 1 and 2.4. The highest scored maturity level, slightly above 2.5, was scored by the TRA on the process of Manage Data – DS11. This is a difference of a full maturity level on the scale (1) in most of the processes in the latter organization when compared to others. Also in terms of the lower performing processes in them seems to be Ensure systems security – DS5 and Define and manage service levels – DS1. Moreover, the lowest scored maturity levels are in PMO-RALG and MoFEA respectively (Figure 2).

For the Monitor and Evaluate (ME) domain, concerned with regular supervision and assessment for quality and compliance, its average maturity levels across the studied organizations range from 1.5 to 3. This result is only for one studied process Monitor and evaluate IT performance – ME1 (Table 1). By looking at this domain from an individual organization point of view, the results indicate some interesting trends. For example, TRA attained a higher maturity level of about 3 as compared to the rest that scored around 1.5, the lowest being MoFEA (Figure 2).

Study Analysis

Comparison of IT Processes within the Studied Organization in the Public Sector

As we have noticed in the results presented earlier on the average maturity levels across the studied organizations (Table 2) and more detailed at domain level (Figure 2), there are diverse maturity levels.

For the Planning and Organization (PO) domain, as the results indicated earlier, at organization level, TRA (one of the autonomous government agencies), has the highest maturity score, above 2, in all 7 studied IT processes in this domain led by IT Strategic plan – PO1 and Communicate management aims and direction - PO6 (Figure 2). The explanation of this good performance could be associated with relevant IT governance mechanisms in place and the way applied in the organization. This is in accordance to recent study findings in this environment that indicated the case of TRA to have the best practices compared to other studied organizations (Nfuka et al., 2009). For example, for the process of IT Strategic plan – PO1, the practices in place include an IT strategic plan, several IT policies and an IT steering committee. For Communicate management aims and direction - PO6, the TRA has recently implemented a Balance Scorecard, a performance management system that cascades the corporate and IT strategies down to the department, sections and individuals. This means, for the rest of studied organizations the effort to institute and sustain such mechanisms could as well increase the maturity and eventually contribute to the improvement of governance of IT and the public service delivery.

Moreover, looking further the maturity levels in this domain by taking into consideration their average across all studied organizations, on the one hand we found that Define the IT processes, organization and relationships - PO4 is the process with the highest maturity score (Table 2). This is in fact a surprising result because a previous study in this environment indicated the major weakness to be on processes, especially the internationally recognized best practices (Nfuka et al., 2009). However, the result can be explained from the perspective of the locally applied practices and its second part which is about having defined IT organization and the necessary relationships. This is because in recent years and in line with the overall improvement of the public sector performance there has been an effort to restructure how IT is organized in many of these studied organizations (Mutagahywa et al., 2007). Due to these efforts, there is an increased focus on instituting IT directorates, departments or units to report directly to the Chief Executive Officer (CEO) and be part of the management team. On the other hand we found that Assess and manage IT risks - PO9 together with Determine technological direction - PO3 have the lowest maturity score. These results are not surprising given the relatively new culture on the use of IT, lower awareness of IT related security issues and immature IT development and management standards as indicated in different studies such as the management of IT security (Bakari, 2007) and e-government review and envisioning in the public sector (Mutagahywa et al., 2007; Miller, 2007). Improvement in these processes is therefore important given the security and standards required for the constantly increasing organization-wide IT applications.

For the Acquire and Implement (AI) domain, as the results indicated earlier, at organization level, TRA has achieved the highest maturity score. Different from other studied organizations, its maturity levels are higher by almost one full maturity level (1) led by Manage Changes – AI1 and Identify automated solutions – AI1 (Figure 2). The reason of this good performance could be associated with the relevant IT governance mechanisms in place. For example, on the way the need for new applications and changes are obtained and the solutions pursued using PRINCE2 project management framework that has a systematic way to conceptualize and implement a solution (Nfuka et al., 2009).
Furthermore, looking at the maturity levels in this domain considering their average across all studied organizations, we found that Acquire and Maintain application software – AI2 and Manage Changes – AI6 have the lowest maturity score. These results are not surprising given relatively less established IT standards and procedures, lower applications control and poorly developed strategies for the maintenance of software applications. This is also accorded by recent studies on IT governance practices (Nfuka et al., 2009), management of IT security (Bakari, 2007) and e-government envisioning in the Tanzanian public sector (Miller, 2007). However, improvements in these processes are vital due to the requirement for uninterrupted services in public service delivery like provision of tax payments and government employees’ payroll handling.

For the Delivery and Support (DS) domain, as the results indicated, looking at their average maturity levels across all studied organizations, we found that Manage data – DS11 is the process with the highest maturity score (Table 2). The reason could be associated to a great deal of attention over many years in these organizations as their IT departments/units were originally setup to manage numerous government data in an effort to provide better public service delivery. However, for the TRA its relatively high performance could be partly associated with the recently implemented ISO 9000, a quality management standard and ITIL, the IT service management framework.

In addition we found that Ensure systems security – DS5 and Define and manage service levels – DS1 are poorly performing processes (Figure 2). For DS5, it could be due to the inadequate security management in terms of standards, policies and procedures thus hampering corrective actions as also indicated by earlier security management study (Bakari, 2007).

For DS1, this could be due to the absence of internal Service Level Agreements (SLAs) in most of them, thus hampering timely interventions of services to the user departments and clients in general. However, for both cases: DS5 and DS1, the organizations with IT policies, standards and related procedures including security and internal SLA – had relatively higher maturity and vice versa. For example, DS5 indicated to be relatively lower on PMO-RLAG and DS1 in MoFEA (Figure 3). In both cases these are due to the inadequate security and SLA related standards/policies which indicate that a combination of IT governance mechanisms is essential to the improvement of governance of IT (Nfuka et al., 2009). Such essentiality is also as per other related studies (Peterson, 2003; Van Grembergen et al., 2003).

For the Monitor and Evaluate (ME) domain, as the results indicated the only assessed process is Monitor and evaluate IT performance – ME1. Looking at it from an individual organization’s point of view, the results indicate some interesting trends. For example, TRA, which is one of the agencies, seems to have attained a higher maturity level of about 3 as compared to the rest of the organizations whose maturity levels scored around 1.5. The explanation is that the studied organizations had some difficulties in setting up and enforcing systematic and formal best practices for monitoring. The exception of TRA is because it has recently instituted the Balance scorecard, a performance management system that allows efficient and comprehensive monitoring of activities. Moreover, TRA is having the IT strategic plan and steering committee that respectively guides and oversees the IT decision making and monitoring process (Nfuka et al., 2009).

Finally, looking at the maturity level results of all assessed IT processes (Figure 3) using as a reference the generic maturity model (Figure 1) it seems there are more issues required to be solved in some processes, domains and organizations than in others. At the process level, deliberate effort is required as the average for each process across the studied organizations is between 1.4 and 2.3. This means at the lower end they are still at the initial stage i.e. the enterprise has recognized that the issues exists and needs to be addressed but still with ad hoc approaches that tend to be applied on an individual or case-by-case basis. At the higher end, it means they are in a repeatable stage whereby different people undertaking the same task follow similar procedures, however, there is no formal communication of standard procedures and there is still a high degree of reliance on the knowledge of individuals and, therefore, errors are likely to occur.

At the domain level, it seems all of them have issues to be solved however; the first two domains (PO & AI) have an advantage due to many processes being tied to the generic corporate processes and therefore having relatively better performance (Table 2). Examples of these processes are Define a strategic IT plan – PO1, Communicate management aims and direction – P06 and Manage projects – P10 that are tied to the generic corporate strategic plan, a rigorous process in such public sector organizations. Another process is Define the IT processes, organisation and relationships- PO4 especially the part of organization and relationships that is tightly coupled with ongoing public sector reforms to improve organizations systems and structures. Lastly are Manage the IT investment – PO5 and Identify automated solutions – AI1, which are tied with the formal budget process and the Medium Term Expenditure Framework (MTEF). Also the latter processes are tied to generic corporate procurement procedures that ideally require rigorous analysis of the requirements, cost benefit and competitiveness among possible solutions. Furthermore, the processes, for example, in the PO domain like Determine Technological Direction – PO3 and Assess and Manage IT Risks – PO9 that showed the lowest maturity (Table 2) are particularly challenging for IT organizations. Each requires a systematic change including technical competencies, significant awareness among business and IT people and monetary investments to achieve higher levels of maturity.
At the individual organization level, TRA as one of the autonomous government agencies performed better than others in the studied IT processes mostly above maturity level 2 (Figure 3). Apart from its autonomous nature, this could be attributed to the implementation of many favorable mechanisms such as IT steering committee, IT strategic plan, IT service management framework (ITIL), project management framework (PRINCE2), Balance Scorecard - a performance management system (Balance Scorecard) and roles and responsibility including systems practices and security. Moreover, the MSD, which is another autonomous department, has performed relatively well after TRA with maturity level close to 2. This could be attributed to the implementation of IT policies, IT business plans and several IT committees.

PO-PSM, MoFEA and PMO-RALG are government ministries that have performed relatively lower. Apart from their non-autonomous nature, this could be attributed to the relatively less established and enforced IT governance mechanisms. However, we can also see that some of the processes scored higher maturity levels in these organizations (Figure 3). This can be attributed to IT governance and related corporate mechanisms in place. For example, PO-PSM scored better in Define and Manage Service Levels - DS1. This could be associated with the elaborate and active service level charter among IT and user departments. MoFEA scored better in Manage data – DS11. This is due to the handled sensitive data like government employees’ payroll and budget over many years. PMO-RALG scored relatively better in Define the IT Processes, Organisation and Relationships - PO4 and Monitor and Evaluate IT Performance – ME1. This could be associated with an objective in their ministry’s corporate strategic plan regarding information management among key stakeholders and recently established IT operational plan that includes the IS governance as a key result area and high-level ICT steering committee.

**Comparison of the IT Processes in a Developing Country (the case of Tanzania) with the Public Sector in a Developed Country (the case of Australia) and Internationally (from a range of nations)**

The comparison of the maturity level for 15 studied IT processes in public sector organizations in Tanzania as a developing country with the public sector in Australia as a developed country (Liu & Ridley, 2005) and internationally from a range of nations (Guldentops et al., 2002) is presented in Figure 4. As can be observed, the maturity levels for the public sector in Australia are the highest, ranging from 2.5 to 3.5, most beyond 3 (60%), while the public sector internationally ranges from 2 to 3, most beyond 2.5 (87%). When compared the maturity level obtained in the studied environment, the variation with the public sector in Australia is mostly 1 (a full maturity level) and internationally is above 0.5 (a half maturity level).

![Figure 4. Fifteen Most important COBIT IT Processes Maturity Levels: A Comparison among the Public Sector in the Different Countries (Developing, Developed & Internationally)](image-url)
Therefore, our results in the studied environment, seem to be relatively lower in both cases (Australia and internationally) but much lower in the case of Australia. For example, the higher difference in IT security (Ensure systems security - DS5 and Assess and manage IT risks - PO9), indicates that our systems are less secure and given the increasing use of ICT in the studied environment an improvement will be essential. Similarly, in the case of Define and manage service levels - DS1 the higher difference could be attributed to the less established service levels while very important to users satisfaction.

Other processes are Manage projects - PO10 and Determine technological direction - PO3, which we found to be less established and require improvements given the number and magnitude of IT applications and infrastructure projects to conceptualize, rollout, use and sustain in the studied environment. Furthermore Define the IT processes, organisation and relationships – PO4 and Manage the IT investment - PO5 are yet other important processes where the differences are quite high. This could be due to the less established IT processes and IT-enabled investment programmes together with the corresponding roles and responsibilities for governance of IT best practices. Finally, regarding Ensure continuous service – DS4 and Manage changes – AI6 that ensure daily IT-enabled functions in the studied environment, the difference we found is also high hence their improvement could increase internal performance and make the public service delivery more efficient.

The higher difference coming out of this comparison of our results with those from Australia and internationally is consistent with the facts found in a recent study (Nfuka et al., 2009). For example, very few studied organizations use best practices like PRINCE2 for project management (OGC, 2008), balance scorecard for performance management (Kaplan & Norton, 1992; Van Grembergen, 2000), use of ITIL for IT service management (OGC, 2008) and SLAs for service levels internally and beyond (Peterson, 2003). Similarly is the IT strategy for strategic alignment between business and IT (Luftman et al., 2004) and IT steering committee to oversee IT investments and operations (De Haes & Van Grembergen, 2008). This is very different compared with developed world and internationally, as their practices indicate the widespread enabling governance of IT elements (Guldentops et al., 2002; Liu & Ridley, 2005; Weill & Ross, 2004; Martin et al., 2005; Ali& Green, 2007).

Finally, these results indicate a consistency with the nature of the public sector and maturity in IT practices among the compared parties, which also affects the level of IT investments, management and availability of enabling frameworks (Bakari, 2007, Nfuka et al., 2009). Therefore, apart from these studied organizations learning among each other, they can also learn from such a developed country and international benchmarks. This will allow achievement of higher maturity level consistent with needed governance of IT and enablement of the business goals and strategies in the studied environment.

CONCLUSIONS

In this research, we have analyzed and unveiled IT governance maturity in public sector organizations from Tanzania as a developing country. In addition, we have compared these results to the ones for the public sector in Australia as a developed country and internationally in a range of nations. The findings from the studied organizations, according to the generic maturity model, indicated diverse maturity levels. At the lower end, these maturity levels were found to be at an initial stage i.e. The enterprise has recognized that the issues exists and needs to be addressed but still with ad hoc approaches that tend to be applied on an individual or case-by-case basis. At the higher end, it means they are in repeatable stage whereby different people undertaking the same task follow similar procedures, however, there is no formal communication of standard procedures and there is still a high degree of reliance on the knowledge of individuals and, therefore, errors are likely to occur. In both cases, these findings indicate the existence of some concerns and the need for improvement in some aspects for attaining higher levels of maturity and better governance of IT.

These findings when interpolated with a recent study on the state of IT governance in this environment indicate that having more IT governance mechanisms will likely lead to higher maturity level. In some cases, even relatively low maturity processes turned out to be very important for IT decision making. These processes include: Assess and manage IT risks - PO9, Define and manage service levels - DS1, Manage projects - PO10, Determine technological direction - PO3, Ensure systems security - DS5, IT investment - PO5, IT strategic plan - PO1 and Monitor and evaluate IT performance - ME1. In light of these observations, managers in organizations with poor IT maturity levels should attempt to identify and do things which will eventually lead to improvements of their IT processes.

Furthermore, when the maturity levels in the studied environment are compared with the ones in public sector in Australia as a developed country and internationally in a range of nations, the maturity pattern appeared to be relatively lower. This is by a difference of more than a half maturity level in all processes, and is even higher in the Australian public sector by a full maturity level. According to the generic maturity model, this means that for example Australia’s processes are relatively well defined with procedures standardized and documented in contrast to the case of a developing country. In addition, these differences in IT processes maturity in the public sector in Tanzania as compared to Australia and internationally from a range of nations indicate the maturity levels to be associated with state of governance of IT practices in these environments.
However having some organizations like TRA and processes such as Define the IT processes, organisation and relationships-PO4 and Manage data-DS11 performing relatively better than others and in some cases, closer to the developed country, prompts some recommendations. One is that even in such a developing environment, if suitable strategies regarding IT governance structures and processes are put in place and enforced, significant improvement of their maturity and governance of IT in general is likely to occur. The other is that while the studied organizations can learn from the best practices in developed countries, they can learn from each other’s governance of IT practices too.

Moreover, we have found that such research in assessing the maturity level using, for example, COBIT and based on the generic maturity model have been done in various environments worldwide but not in the public sector in Tanzania as a developing country. This means that little or no empirical research has focused in such an environment. In this context, the empirical research reported here contributes on one hand to establish a benchmark of IT governance maturity in a developing country in this case the Tanzanian public sector. On the other hand, this research will help the IT decision makers to improve the important but poorly performing IT processes in order to increase the IT performance in support of better public service delivery in this environment. In addition, as a recent study indicated, in most cases there are no deliberate IT governance projects and studies in the public sector organizations in a developing country like Tanzania, in contrast to the developed world. Therefore, these findings will also contribute to more focused studies and actions of specific or comprehensive improvements for successful IT governance in support of better public service delivery in this environment.

REFERENCES


