

DEPLOYMENT OF ENTERPRISE ARCHITECTURE IN THE NAMIBIAN GOVERNMENT: THE USE OF ACTIVITY THEORY TO EXAMINE THE INFLUENCING FACTORS

Irja Shaanika
Polytechnic of Namibia
Namibia
inshaanika@gmail.com

Tiko Iyamu
Cape Peninsula University of Technology
South Africa
connectvilla@yahoo.com

ABSTRACT

Government in both developed and developing countries strive to deliver effective and efficient services to its citizens. Hence the rapid increasing use of information technology to enhance service delivery. However, IT carries its own challenges, such as incompatibilities, lack of integration and lack of scalability. Many approaches, from both academic and professional domains have been employed to assess the challenges, for improvement purposes. Government of some countries have therefore introduced enterprise architecture (EA) to addressing IT challenges. Similarly, EA is influenced by many factors, making it not as easy as we are made to understand. Thus activity theory was applied to examine and understand how the challenges manifest into complexities, and in turn, have negative impacts on services delivery.

The use of the activity theory (AT) helps to reveal that non-technical factors were completely ignored or sometimes considered to be less significant to the technical factors. Based on the interpretation of the findings, process, communication, lack of awareness, roles and responsibilities, actors' relationships, policies and people were uncovered as some of the influencing factors in the deployment of EA, in the Namibian government-wide Ministries. The communication between various business units and IT unit was influenced by those in authority as they make use of their power for individual interest. These types of legitimate actions through roles and responsibilities, contributed to the misalignments of business processes and activities in the deployment of EA in the Namibian government-wide Ministries. If both technical and nontechnical factors are not considered in the implementation of systems and technologies governments' service delivery will continue to be hampered as depicted in the framework presented in this article.

1. INTRODUCTION

As is well-known and documented, in many organisations, IT is used to automate and support business processes necessary for achieving organisational goals and objectives. IT enables data and information to be rapidly processed and globally accessible (Zhu and Yan, 2009). The integration of IT and business processes supports an effective collaboration among organisational units, customers and its business partners. Kissimoto and Barbin (2010) have reasoned that process integration speeds up the overall flow of information within the organisation.

However, information technology on its own does not deliver success. According to Montealegre (1997) with massive benefits experienced from using IT, enterprises also face and encounter challenges when using IT. Kissimoto and Barbin (2010), explain that the implementation of IT is not a simple task because of its dynamics and complexity involving different components of the organisation. Hence approach, such as enterprise architecture (EA) is employed by many organisations including government sectors and agencies.

Enterprise architecture is defined as *"the organising logic for business process and IT infrastructure, reflecting the integration and standardisation requirements of the company's operating model"* (Ross et al., 2006, p. 9). One of the purposes of EA is to provide guidance

for business processes and their associated information systems towards achieving the organisational goals. Lankhorst (2005), states that EA captures the enterprise's business processes, IT, and its evolution. EA provides a holistic view which supports organisational design, business reengineering, systems design, technology infrastructure and data analysis (Kaisler et al., 2005).

EA is viewed as a tool for achieving the alignment between business and ICT (Saat et al., 2010). Business and ICT alignment is an important strategy for the realisation of organisational effectiveness (Flaxer et al., 2005). Wang et al. (2008) explain that such an alignment makes ICT fulfil the business needs. It is argued by Khan and Zedan (2010) that a lack of communication and understanding between business process and IT result in misalignments. EA facilitates communication between business and IT, creating an understanding necessary for supporting alignment efforts between business process and ICT.

EA is an important asset in positioning new developments within the context of the existing processes, ICT systems and other assets of an organisation (Hendrickx and Daley, 2011). Hence EA prepares and equips organisations with the capabilities needed for identifying and managing business and ICT changes. The changes occur due to markets, process changes and technological innovation. Rouhani et al. (2013) support the argument that a well implemented EA helps an organisation innovate and change by providing both stability and flexibility. Schekkerman (2009), explains that enterprises have been motivated by the simple reality that organisations need EA to be competitive and for future business continuity.

Thus, the primary aim of this study was to examine the factors which influence the deployment of EA in government. The computing environment of the Namibian government was used as the case study. The remainder of this article is divided into five main sections. The first section covers the research approach, which include an overview of the theory, activity theory which unpinning the study. The second and third sections present the data analysis and findings, respectively. The fourth section discusses the interpretation of the findings. Conclusion is finally drawn in the last section.

2. RESEARCH APPROACH

Based on the research objectives, a case study research approach was opted as the research design. A case study is a detailed study of a single social unit (Myers, 2013). The unit under study has characteristics that uniquely identify it. The Namibian government was used as the case study. As shown in Table 1, four Ministries, including the Office of the Prime Minister were selected to represent the government. Each Ministry provides unique services and products hence each Ministry has unique objectives. The selection of the cases was mainly because of their sizes and their roles in the computing activities within the government of Namibia.

The semi-structured interview method was used in the data collection, mainly because it allows for flexibility and richness of data. Based on the research aim, which was to develop an EA framework for the Namibian government, the following questions were formulated:

- (1) What are the factors that can impact the development and implementation of enterprise architecture in the Namibian government Ministries environment?
- (2) How can EA be used as tool for the integration of information systems and technologies within the government Ministries in Namibia?
- (3) What is the role of Enterprise Architecture in the government Ministries?

The questions were further expanded, and used in the semi-structured interviews. As shown in Table 1, a total of 19 employees were interviewed from the four Ministries that were used in the study.

Interviewees(Respondents)	Organisations			
	OPM	Ministry of ICT	Works and Transport	Ministry of Justice
Senior				
Director	2	-	-	-
Deputy Director	-	1	1	1
Chief analyst programmer	1	-	1	-
Chief system administrator	1	1	1	1
Junior				
System administrator	-	-	1	-
Analyst programmer	1	1	1	1
Technician	-	1	1	1
Total	5	4	6	4
Total Interviewees: 19				

Table 1: Case study

The interpretivist approach was applied as it allows the researcher to analyse the interviewees' subjective reasoning (Rowley et al., 2011). The core idea of interpretivism is to understand the subjective meanings of persons (Goldkuhl, 2012). To attain this, the researcher uses his or her skills as a social being to try and understand how others understand the world around them (O'Donoghue, 2006). The interpretive approach was used to understand how employees interacted in the selection, implementation, management, and use of systems and technologies across the Namibian government's computing environments.

2.1 Activity Theory: Overview

This study uses activity theory to analyse the collected data. Activity Theory (AT) is a socio-technical theory that is concerned with the development of social activities. As shown in Figure 1 below, AT consists of six main components. According to Golsorkki et al. (2010), the theory "conceptualises the on-going construction of activity as a product of activity systems comprising the actor, the community within which that actor interacts and those symbolic and material tools that mediate between actors, their community and their pursuit of activity" (p. 127). In activity theory, the actor is referred to as technical and non-technical things and beings. Both technical and non-technical actors have significant roles and contributions to an activity system. Actors use tools to pursue their goals, and perform their activities. Uden (2007) stated that tools can be physical entities, such as a hammer or psychological such as language, culture or ways of thinking.

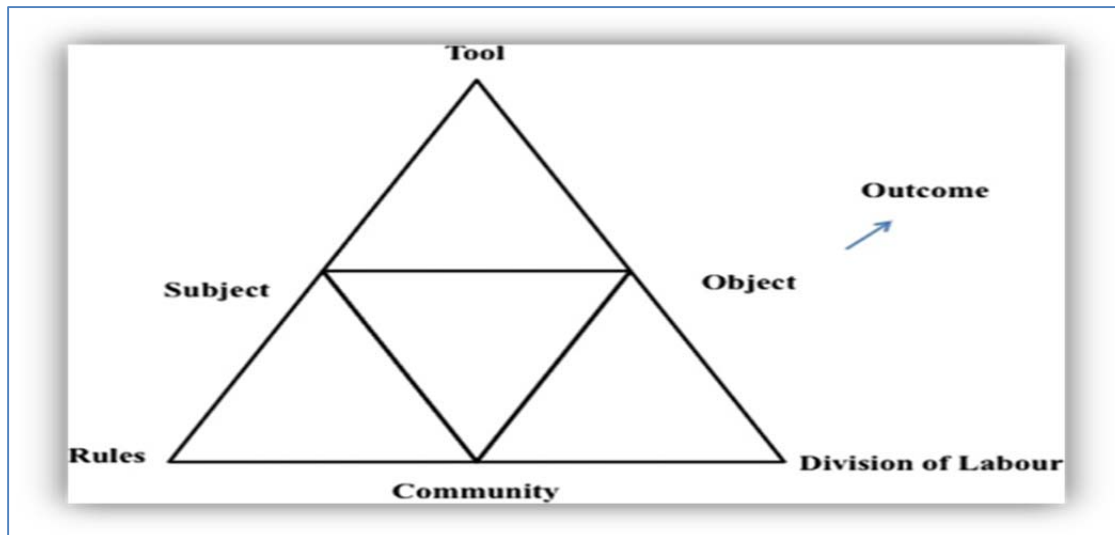


Figure 1: Activity Theory (Engestrom et al., 1999)

During the development and implementation of information systems and technologies in organisations (communities), many actors are involved, making division of labour as prescribed by AT critical. The actors' involvement is categorised and distinct into subject and object so as to ensure appropriate governance by the organisation's rules, cultures, values, and norms. The governance is mainly to ensure and enforce commitment, focus, and order; critical aspects that are needed in order to achieve organisational goals and objectives (outcome, as shown in figure 1). However, rules can come in varying degrees, and can constrain or liberate the activity (Yamgata-Lynch, 2010).

Also, information systems and technologies are developed and used according to the actors' knowledge and specialisations. AT defines specialisations as a form of division of labour. Uden (2007) stated that the divisions of labour are concerned with how tasks are divided between community members and also the division of power and status. Due to the powers that actors possess, they can enable or constrain systems and technologies' activities.

3. DATA ANALYSIS

As mentioned earlier, the Activity Theory (AT) was employed in the analysis of the qualitative data, which was collected from four Ministries of the Namibian government. They include the Ministry of ICT, Ministry of Works and Transport, Ministry of Justice, and the Office of the Prime Minister. The data from the Ministries were combined in the analysis. The six components of AT were followed in the data analysis, as presented in this section.

3.1 Activity Theory: Tool

Different types of tools currently (as at the time of this study) exist within the government environments. These tools include both technical and non-technical artefacts. The technical tools are information systems and technologies, which include business systems (such as Management Information System and document management systems), word processors, operating systems, servers, desktop, laptops, and networking, in the categories of software and hardware. The non-technical tools include processes, procedures and humans. Processes and procedures were the tools which were followed in addressing the organisations' aims and objectives.

Technical and non-technical tools were used in different business units across the government's Ministries. The business units were created based on their departmental activities, such as accounting and finance, marketing, information technology, and research

and development (R & D). Systems and technologies were designed and developed, or acquired based on the business unit's needs and requirements. One interviewee opined as follows: *"The selection of technology is in accordance to our business requirements"* (RS09, p. 36, 1229).

In most cases the information systems and technologies that were used in the business units of one Ministry were replicated in other Ministries. Also, some information systems and technologies were used independently in the different locations of the same Ministry. The government Ministries offer services country wide. As a result, most of the Ministries have branches and offices in different locations across the country. This has led to the replication of the use of information systems and technologies including processes and activities in the various geographical locations. As described by one of the Ministries' employees, *"we support the whole of Namibia wherever there is court, we are running windows 7, and we still have window XP running in some offices"* (RS14, p. 59, 2033-2035).

Also, the information systems and technologies used across the Ministries' business units and geographical locations were supported in different platforms. Operating Systems Platforms, such as UNIX, Linux, Oracle, and MySQL were used to support the information management systems and databases. A systems administrator briefly explained one of the platforms they were using in their Ministry (of Transport); *"our websites are hosted on the Linux system platform"* (RS09, p. 36, 1232-1233). Another interviewee who is a deputy director in one of the government Ministries noted, *"IFMs which is the integrated financial management system which is based on the oracle platform"* (RS03, p. 7, 233-234).

The government Ministries also make use of the different hardware and desktop platforms which include HP, Lenovo, and MAC. One of the interviewees asserted that *"it is not prescribed in government Ministries that you only use one specific brand or model of hardware"* (RS03, p. 8, 267-268). This means that any type of hardware could be selected, and could be allowed in operations as long as it suits the operators of the hardware. This approach is driven by the individuals' knowledge and understanding. It contributes highly to complexities and difficulties in the manageability of the computing environment.

The information systems and technologies that were in use in the government environments were based on the employees' knowledge and expertise of the systems and technologies. A Chief Analyst programmer from one of the Ministries expressed that *"the technology we mostly use depends on the skills available. We can't select visual basic and there is no one who can use visual basic"* (RS05, p. 26, 886-888).

In the use of these technologies, organisations sometimes encountered challenges, such as compatibility and obsolesce. These challenges could be attributed to different factors. The use of the systems and technologies were influenced by their life cycle, manageability, and integrations. Life span means when the technologies were manufactured (or developed), or deployed. Manufacturers define life span for each of their technologies.. According to one of the interviewed chief systems administrators from the Ministry of ICT, *"hardware is replaceable three to five years because they are quick to change and they keep evolving due to compatibility"* (RS01, p. 4, 137-138). However one participant expressed that, *"there is no standard within the computing environment of the government Ministries which specifies that software or hardware should be replaced after three years. We therefore continue to make use of the technologies as long as they are considered to be functional for usage"* (RS03, p. 14, 498-500). This has resulted in some Ministries having both old and latest systems and technologies in their computing environments.

Integrations challenges were caused by factors such as a lack of systems and technologies compatibility. Integrated systems and technologies provide a unified technology environment which leads to real time communication across the business units. One of the interviewees shared her views as to why they needed system integrations in their ministry *"So*

if I am running a system and the police department is also running a system and these two systems are not integrated it will still cause that delay as information is not shared on time “(RS16, p. 87, 3027-3030). In an attempt to have compatible technologies and systems, the government Ministries are advised to develop their systems using one programming language such as Java enterprise and to use certain technology platforms such as Linux.

Some of the challenges arose because of the uniqueness of the technology tools being used. Other challenges that the organisations encountered were because of the business nature of the Ministries. One of the interviewees who manage systems development for the government Ministries expressed his views on the challenges they encountered when it came to integration, as it was influenced by the business’ needs, as follows: *“Various applications are governed by different legislations, you cannot just integrate them. Take a typical example of home affairs with the Identity (ID) part of their system. They cannot combine ID information to other systems, primarily because it was a constitution written to protect privacy. So I cannot integrate another system, if I do that it will be a privacy violation”* (RS04, p. 22, 773-776).

3.2 Activity Theory: Subject

Subject from the AT perspective encompasses technical and non-technical actors. They both depend on each other in the fulfilment of goals and objectives. Technical factors include information systems and technologies such as financial systems, biometric systems, servers, databases, different types of networks and computers. The technical actors could also be referred to as tools, in that they are used to achieve objectives. This implies that an actor could be used by another actor in the same environment. The non-technical actors are the employees within the computing environments of the Ministries, including other stakeholders, such as Executing Managers, vendors and consultants from different organisations. Some of the human actors included systems analysts, programmers, accountants, IT directors, IT administrators, chief executive officers and business directors.

Actors that were involved in different types of projects did so through negotiations across the Ministries’ business units. The forms of negotiations were in two ways processes: the process to willingly participate or contractually participate. One of the interviewees who deal with systems administrations opined as follows, *“to sit with companies that have tendered will take us up to six months just to come up with a mutual understanding between us and them”* (RS01, p. 2, 37-39). Some employees participated in projects willingly. This was attributed to factors such as personal interest to the project and relationships with the colleagues who were involved in the project. Others participated mainly because of their contractual obligations. Majority of the interviewees agreed that this was the case and one of the interviewees pointed out, *“I was told by my supervisor that it is the standard of the government and they prefer it”* (RS0, p. 46, 1583-1584).

Similar to human-to-human interactions, there were technology-to-technology interactions within the computing environment. For example, some technologies such as servers and middleware, including operating systems, were used to enable and support various management information systems. This was not done in a vacuum. They were operationalized and managed by the IT specialists.

Non-technical actors were referred to by their roles (e.g. programmer, business analyst) that they undertake in the various business units. Through the assignment of roles, all actors acquire responsibilities and therefore they can be held liable for their actions and interactions. The roles were defined in accordance to the organisational structure. The organisations’ processes, activities and procedures were carried out through the structure, so was the channel of communication by employees including the managers. An employee stated: *“We have a decision making, the project committee, and then we have a project*

control and we have consultants and the users. And these are the people making the decisions” (RS14, p. 63, 2179-2180).

The various Information systems and technologies implemented in business units interacted with each other through various means, such as sharing of data, accessibility to information and procedures, even though they were centralised. Integrations of different types systems and technologies enabled an ease of interactions and collaboration amongst processes and activities in the Ministries. Technologies such as hardware (e.g. server) interact with their other hardware through their compatibility and connectivity. When it came to the selection of technologies in their computing environment, one of the IT deputy directors stated, *“the different technologies must be able to communicate and be compatible”* (RS13, p. 53, 1797).

In the Ministries, technical actors also interact with the non-technical actors. Systems and technologies interact with the various employees to reproduce other systems and technologies. For example, Systems and technologies such as programming languages (e.g. visual basic) were used to develop systems (for business units), and implemented through servers and networks. This means that during these activities the technical actors were used by the non-technical actors as tools for carrying out their tasks. A senior programmer from one of the Ministries enlightened on the tools they used for the applications development, *“For web development, we are using open source content management systems and on the software development we are using java net bean 7.3 .1”* (RS01, p. 27, 394-395).

Process and procedures were used by the technical actors during their interaction with both technical and non-technical actors. The various processes and procedures outline the steps undertaken by the systems and technologies when interacting with each other. However, the processes and procedures were not always followed or adhered to by the employees. The reason being that some employees were not aware of the procedures in place; as such it was never communicated to them by their management. An analyst programmer’s response to the policies she applies was, *“honestly I don’t know. I am just an ordinary employee, I have people above me that sit in those management meetings”* (RS14, p. 62, 2131-2132) and others felt that the use of procedures was not always rewarding. One of the analysts’ programmers who felt otherwise about her job procedures stated, *“Of course they are boring, every time you have to install something you have to put the password”* (RS02, p. 7, 223-224).

In many projects, some actors encountered challenges. This happened primarily because there were no guiding principles and standards. Challenges encountered by the technical actors include systems and technologies getting obsolete, as well issues with integrations and compatibilities. Technologies obsolete occur when the systems and technologies do not support the business units’ functionalities. In the view of one of the Ministries’ senior analyst programmer, *“In most cases when you are developing a system, you make sure it is supporting the business then later you see that the business is growing, then the system is no longer satisfying the needs of organisation”* (RS10, p. 42, 1441-1443) These have led to organisations acquiring new technologies that can effectively and efficiently support their business processes. Within the government Ministries’ computing environments, new as well as legacy systems and technologies coexist. This was the view of an interviewee; *“if the system is working and technology is still supported, we only improve it”* (RS13, p.57, 1962-1963). Legacy systems are part of the Ministries’ computing environment because of their capability to support the various business needs.

New and legacy systems and technologies encountered communication challenges due to various hardware incompatibilities. Due to incompatibilities, various databases and systems applications encounter challenges of integrations. The IT director asserted that, *“It makes sense to have integrated systems overall than systems that are stand-alone items where they do not speak or work in unison”* (RS03, p. 17, 579-578). Having un-integrated systems

and technologies across the business units lead to challenges such as data inconsistencies. A chief systems administrator briefly explained systems challenges that they encounter; *“you can get a system that can be interoperable, however when it comes to data, the system cannot capture certain types of data”* (RS01, p. 1, 23-25).

Non-technical actors encountered various challenges as well. Systems and technologies are constantly changing due to technological dynamics and business requirements. As a result, the organisations are always challenged by how to improve and maintain their employees’ skills and knowledge to be at the same pace with the latest technologies. The deputy IT director who was concerned about the availability of skilled employees explained that *“There is a lack of knowledgeable people and secondly is the skill structure that never happens the way it was supposed to. By the time the IT personnel is at the same pace with the company that implemented the technology, there is something new on the market so the IT personnel never catches up with the new technology”* (RS01, p. 3, 102-103). Due to the lack of a skilled workforce within the Ministries’ computing environments, some have outsourced part of the systems and technologies’ activities as they were not capable of performing. An analyst programmer interviewee elaborated why their Ministry considered outsourcing; *“sometimes we don’t have the know-how and the projects are really big”* (RS12, p. 47, 1708). Where outsourcing was viewed as not being the best solution, Ministries had their employees sent for skills development trainings or new skilled employees were recruited to fill the skills gap.

3.3 Activity Theory: Object

From AT perspective, an object is the motive or goal to which an activity is directed to, and from which an outcome is expected. An Object motivates actors’ actions as they carry out their activities. The Object can be technical or non-technical. Technical Object includes Systems and technologies. Humans and their ideas are examples of non-technical Objects. The goal is shared by the actors participating in an activity. It is urged by the theory not to confuse the object-oriented aspect of the activity with the object-oriented term that is used in the computer programming field. The term is primary used to describe and discuss why the activity is in existence.

The activities, processes and the general operations of the government were considered to be of importance and sometimes critical. Those were the basis of the motive for selecting, developing and managing various information systems and technologies, such as management information systems, operating systems, and servers across the Ministries. Primarily, the information systems and technologies were used to support and enable the government’s activities and processes aimed to improve services. An analyst programmer expressed her views on why their Ministries acquired certain information systems and technologies as follows: *“Some of our activities and processes are currently executed manually, and in order to improve on efficiency and effectiveness, we chose to deploy information systems that could help us achieve that goal”* (RS14, p. 60, 2071-2072). Another motivation for the deployment of certain technologies, such as the E-Government, was to support and enable ease of information dissemination across the government Ministries’ computing environments.

Government motivations for its businesses were articulated by both the technical (IT) and non-technical (business) directors, managers and other stakeholders, such as technologists. One of the employees responsible for systems maintenance at the Ministry of Justice cited an example where non-technical and technical aspects, together had to motivate for a system as follows: *“in our organisation, the Magistrate, Prosecutors, and the IT directors were the ones who motivated for the deployment of the Case Management System*

(CMS)” (RS01, p. 62, 2133-2135). Such motivation was done in accordance with the Ministries’ business needs.

The selection, development, implementation and management of information systems and technologies were guided by both the strategic and operational goals and objectives. In the selection, development, implementation and management of information systems and technologies, the motives were communicated and shared among technical and non-technical people in the Ministries. A systems programmer briefly explained how such information was communicated in their Ministry: *“Before a system is implemented we have a regular meeting, which happens every Friday, until the implementation of the system is complete. During these meetings we revisit the motives, and discuss the various challenges which could affect the system”* (RS14, p. 62, 2150-2151). The regular meetings were to get buy-in and encourage the employees’ participation in the projects (system implementation).

Both the technical and non-technical employees were always involved in systems and technologies deployment in the Ministries. For example, the non-technical people defined the systems and technologies’ functional requirements which were translated into the technical requirements by the technical people in order to support and enable business needs. The systems and technologies were developed (bought), implemented and managed by the technical personnel so as to achieve the expected outcomes from the information systems and technologies. According to one of the interviewees who was a Chief systems administrator (as at the time of this study) at the Office of the Prime Minister, *“The users present their demand or requirements, which were intended to enable and support efficiency and effectiveness in their activities, and we as the technologists respond to such requirements”* (RS07, p. 32, 1101-1103).

The goals and requirements motivated and influenced the employees’ actions when carrying out their activities. The goals guided the employees’ operations towards the activities’ outcome. Without such guidance it would have been challenging or impossible to motivate the employees towards achieving the Ministries’ desired outcomes. However, within the Ministries’ computing environments, not all information systems and technologies’ goals were compelling to the extent that some projects were terminated and others abandoned, for various reasons, such as lack of track, trace, and accountability. A system programmer from the Ministry of Justice shared her frustrating views as follows: *“There was a consultant working on this system but the contract was terminated by the Ministry so as a result there is no proper documentation to follow”* (RS17, p. 64, 2208-2210). The lack of track and trace was due to the lack of commitment from the employees that were involved in the projects. Another contributing factor was a lack of resources, such as finance and skills which were required to support and enable the organisational activities.

3.4 Activity Theory: Rules

In AT, rules are used to guide actors’ performances in their activities. Rules are therefore the policies, regulations, norms, and cultural practices that guide and govern actors in their activities, within context and overtime. This is an interaction amongst actors during the execution of their individual and group tasks.

Rules in the government Ministries’ computing environments included policies, regulations, and legislations. Without these rules it would be difficult for the Ministries to govern and manage their activities towards achieving their goals and objectives. For example, without the policy that regulated the technology platforms, the Ministries would have various types of hardware, such as compatible and non-compatible hardware. Some policies were viewed either from the business or IT unit’s perspectives, meaning that they were used to govern the specific unit activities. The IT policies focused on the governance and management of activities, such as e-governance deployment, hardware selection and

implementation, and software development and replacement. The business policies governed the various Ministries' business units on strategic and operational activities. Both policies were applied within the computing environment.

The IT policies were formulated and developed by IT directors at the Office of the Prime Minister (OPM) in collaboration with the deputy IT directors and other managements from the various Ministries. An interviewee explained about the Ministry's IT structures as follows: *"The IT in the Ministries is made in a such a way that all the IT directors are at the OPM and the different Ministries are only seconded with deputy IT directors"* (RS09, p. 37,1257-1260). The policies entailed the types of software and hardware that can be developed and implemented in Ministries and how they should be implemented and maintained. The policies were drilled down to the employees at operational levels through different communication channels such as weekly business unit meetings.

Policies and regulations were applied in the selection, development, implementation, maintenance and usage of the information systems and technologies. The policies and regulations governed and regulated the employees' actions when carrying out such activities. According to one of the Ministries' IT deputy directors; *"We do not just select information systems and develop. There are legislative and other international laws that we must consider. The laws guide us when we are carrying out our duties"* (RS13, p. 55, 1814-1818).

When a need for information systems and technology arises within a Ministry, it was first communicated to the OPM for approval in terms of whether the required systems and technologies complied with the defined policies and standards. A Chief Systems Administrator from the Ministry of ICT stated that *"the users, managers and IT technical persons developed the information systems and technologies requirements. This was done with the guidance of the OPM, because for all of the information systems and technologies in the Ministries, they should be approved by the OPM"* (RS01, p. 2, 56-59). In cases where the specifications were not conforming to the policies and regulations, they were either considered for amendment or they were not approved at all.

Policies and regulations were intended to govern and regulate employee actions. However, not all employees acted in accordance to the rules and regulations. Some rules were viewed as not applicable to the business needs. These types of rules were rather developed to benefit those in power, meaning to protect the executive management in their decision making, regarding IT activities. According to an IT Director who was responsible for the Ministries' systems development, *"because many of the Directors were appointed based on their political affiliations, a majority of the policies are driven by political principles. When policies are not implementable at the specific time because we are at the specific stage that will not allow the implementation, many politicians complain. What they don't understand is that we technical people do sometimes have challenges with implementation"* (RS04, p. 24, 844-849). Other employees did not use the policies because they were not aware that certain policies were in place. The lack of awareness could be attributed to the employees' arrogance (attitude), which made them careless to check or explore which policies were available. Another factor that was attributed to the lack of awareness was communication. Some of the employees claimed that their superiors did not communicate the available policies to them. One of the interviewees who was asked about the policies that were used in her Ministry respondent as follows: *"I do not follow rules and I don't know if there are rules in place, I am just an ordinary employee"* (RS14, p. 70, 2402-2405).

Some regulations and policies enabled and at the same time constrained activities in the selection (development), implementation and management of information systems and technologies in the Ministries. For example, due to the policy that stated that all hardware and software acquisitions should first be approved by the OPM, most of the time the process took long before feedback was communicated back to the respective Ministries, thereby

hampering service delivery. As a result, the activities were put on hold while the users waited for the supporting desktops. It was emphasized by one of the system analysts that *“sometimes when we want specific applications such as AUTOCAD software for the engineers; when we consult the OPM they do not always approve the procurements as they were not the usual software applied by the majority within the government Ministries”* (RS12, p. 47,1596-1598).

In the computing environment, the promulgation of Policies and regulations was intended for to maintain order and consistencies, including the standardization of processes, systems, and technology. Human actors were tasked to enforce and apply the policies and regulations in the various units. An IT director for quality assurance explained the role of policies as follows: *“Policies are there to regulate and to enforce the performance of organisations’ activities. They need to be in place so that people may know what to do as well as what not to do”* (RS08, p. 35, 1204-1206). The application of policies was intended to promote the standardisation of activities. According to the director of Systems Development, *“policies give directives from which standards are implemented. For example the policy may state that the information systems must be made interoperable and then interoperability standards will be followed”* (RS04, p. 24, 828-832). Due to the standardisation of activities, employees carried out activities and interacted with each other according to the defined and documented processes. In the absence of activities standardisation, there will be disparities of activities and processes. One of the interviewed Senior Systems Analyst who shared his views on standardisation of activities stated; *“The standardisation of activities ensured formality within the government Ministries. “Without standardisation, everyone will act in their own respective ways, which will cause disorderliness”* (RS10, p. 43, 1479-1481).

However, standards were not always adhered to in the computing environment of the Ministries. For example, Java programming language was selected and used for system development because they had the skilled personnel in the organisation. This is irrespective of the fact that many of the employees, including the executive management subscribe to standardisation. An employee who is an IT director also shared her view on standardisation of activities: *“It is always a good thing when there are standards involved because there will always be certain quality that will come up. It doesn’t matter who the people involved are that work on that project”* (RS06, p. 27, 926-928).

Policies and regulations were viewed to be an important aspect of the Ministries’ computing environment. Emphasising on the importance of policies, an IT director from the Ministry of ICT explained as follows; *“Policies are the frameworks of operation, they build the boundaries in which information systems should operate, be procured, implemented and maintained. There is not a working environment without policies as policies are the guiding document”* (RS03, p. 53, 484-587). Not complying with the existing policies was viewed to be a serious offence and responsible parties were held accountable through various ways, such as suspension or contracts of employment terminated. The measures were to enforce employees to comply with the defined rules and regulations.

The various rules and regulations were not often replaceable. Policies were not often replaced, this was due to the various reasons such as that management felt the policies in place were still applicable to the current situations and therefore there was no need to change. Others viewed the replacement of policies to be a costly process. An IT director opined as follows; *“Our policies don’t not change very often. If the policies in place are still applicable, we just amend to add the new aspects”* (RS17, p. 86, 3054-3056).

3.5 Activity Theory: Community

Community refers to a group of interdependent individuals to which actors belong when carrying out activities. The various government Ministries made up the computing

community. The government Ministries' computing environment community was made to serve the entire government.

Various communities existed within the government computing environment such as IT directors, systems analysts, systems administrators, analyst programmers. The communities were formed according to the organisational structures. Also the employees' skills and knowledge of the activities that were performed within the communities played a role in how the communities were formed. A Systems technician from one of the Ministries shared his views as follows: *"The chief systems administrators have higher qualifications and much more experience, so they know the most appropriate software and operating systems to use and which ones would be appropriate for the whole ministries"* (RS16, p. 80, 2778-2780).

The selection, development, implementation and management of the information systems and technologies were carried out within the various communities. Employees that performed the activities belonged to at least one of the communities. According to one of the Ministries' System Administrators; *"When users identify a problem, it is given to people under different specialisations. If it is a network or software development, they are assigned accordingly"* (RS09, p. 37, 1272-1278). Due employees' specialisation in various areas, some of the employees belonged to more than one community at a time. For example, one of the IT Directors responsible for the Ministries' systems development belongs to the IT directors' community as well as to the programmers' community, so as such he also did applications development.

Different types of tools existed within the various communities. The tools were used by the employees in the selection, development, implementation and maintenance of the information systems and technologies. Each community had policies and regulations that guided and governed the employees' actions. An IT director from the OPM stated; *"Various applications are governed by different legislations and this has influenced the way the information systems are implemented and integrated across the Ministries"* (RS04, p. 22, 771-772). Tools, policies, goals and objectives were shared among the communities as they interacted.

The various communities interacted differently. For example the directors' community did not interact very often as compared to the other communities. The directors' interaction was done at a strategic level. The strategic level informed operational levels where you have communities such as analyst programmers and systems analysts. These communities at operational level mostly had weekly meetings to discuss matters of significance with regards to the information systems and technologies in their Ministries. This promoted collaboration, unification and information sharing among the operational communities' members.

The communities were not independent of each other. Therefore the importance of each community was taken into consideration. An interviewee opined as follows; *"When we want a system, we consult all the units for their views, because different units handle things differently or they have different criteria and we need to incorporate all that in our development"* (RS09, p. 37, 1275-1278). One community has an impact on the rest of the communities during the selection, development and implementation as well as in the maintenance of information systems and technologies. Within the government Ministries' computing environment, many employees take for granted the influence and dependency between the different communities. According to a Systems Administrator; *"When it comes to upgrading and the replacement of technologies, it entirely depends on the networking people, not the users. It's the networking people that keep up to date with what is new in the market and what are the security issues in the market"* (RS07, p. 32, 1097-1101). As such, some communities were neglected and not involved in the selection, development and

implementation of the information systems and technologies. This attributed to the complexities of disjoint and lack of business units and IT alignments.

The Communities also encountered challenges. Challenges influenced the way the hardware and software were selected, developed, implemented and maintained. One of the interviewees, an IT director shared his views as follows: *“When it comes to standards, our biggest challenge is finding knowledgeable people who understand how the standard works and who can evaluate the technologies to determine if they best fit the standards”* (RS04, p. 20, 702-709). Challenges such as shortage of programming skills among the programmers’ community led to the government Ministries outsourcing some of their information systems development activities. Outsourcing was viewed to be a costly process. In most cases there was a lack of skills transfer from the consultants to the various communities. Communities such as the programmers and systems administrators required skills transfer in order to be able to re-use and support the systems applications, servers and hardware. Due to the lack of skills transfer, government Ministries are dependent on the consultants throughout the information systems and technologies lifespan. One of the interviewees who felt the same stated; *“When we make use of consultants it’s not guaranteed that we will be able to fully take over a certain system and be able to support and maintain it after the consultants are done. Hence we always rely on the consultants to be around to offer support because they know and understand how the system operates”* (RS17, p. 85, 2951-2954).

3.6 Activity Theory: Division of Labour

Division of labour is concerned with how the tasks are divided among the individuals or groups within the community. It represents task specialisation and the sharing of activities among the actors.

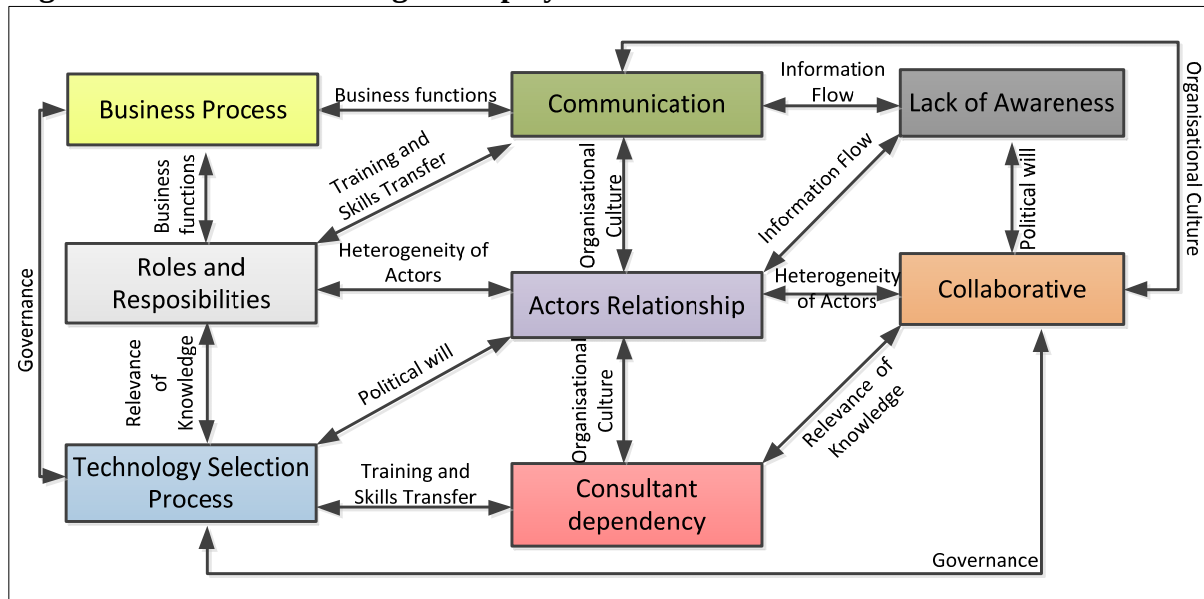
Within the government Ministries’ computing environment, employees were allocated various tasks such as project management, systems analysis, systems administration and application development. Based on the task allocation, the employees assumed different roles in the selection, development, implementation and maintenance and usage of information systems and technologies.

Division of labour was viewed to be crucial in the government Ministries’ computing environment. It allowed for the sharing of activities within the business units and for every employee to have responsibility when performing activities. A Chief Systems Administrator shared his views as follows: *“Our responsibility as IT people is to be part of the selection process and ensure that whatever is being selected conforms with the network standards and it is compatible and able to be integrated with other technologies”* (RS17, p. 85, 2931-2933). Task allocation was done according to the employees’ competency in relation to what the activities entailed in the various projects. According to an IT director; *“The IT staff are skilled. When a new system is implemented, it is just a matter of sending them on training to ensure that they will be able to support the system”* (RS17, p. 85, 2921-2923). Employees were allocated tasks by their superiors (managers). Through the tasks allocated, employees gained power and status as well. Information Systems and technologies depend on factors such as efficiency and effectiveness to succeed. These factors are driven by the power and status that employees hold. One of the employees responsible for system maintenance stated; *“We are the ones implementing the software and doing systems troubleshooting, but the Chief systems administrators are the higher authority and they choose the most critical systems and do major decision making”* (RS16, p. 80, 2782-2784). To some extent, because of the power the employees possess, they take away some activities from certain individuals and groups within the Ministries.

4. FACTORS INFLUENCING THE DEPLOYMENT OF ENTERPRISE ARCHITECTURE

Based on the analysis of the data as presented in the section above, some factors were found to be of significant influence in the development, implementation and management of EA within the context of the Namibian government-wide environment. The factors include business process, communication, lack of awareness, roles and responsibilities, actors' relationships, collaborative technology selection processes and consultant dependency. Figure 2 illustrates the relationship, interconnectivity and dependence of the factors on each other.

Figure 2: Factors influencing EA deployment in Namibian Government Ministries



The factors are discussed below and they should be read with the figure to get a better understanding on how the factors influence EA.

4.1 Business Process

Business processes define how the activities are executed and by who. They are used as guidelines by employees. Processes are of significance to the organisations' effective operations. How processes are communicated and interpreted by employees impacts the selection, development and implementation of technologies in the organisations. When not well defined, the business process leads to inconsistencies and the duplication of efforts.

Processes are defined based on the various business functions. Business functions define the individual business's daily operations. These operations are the activities that uniquely differentiate the business unit within the organisation. Due to business functions' interdependency, processes are interconnected across the organisations. Interdependency calls for an understanding between the various business functions and processes. Not considering and a lack of understanding of business functions interdependence during the selection, development and implementation of information systems and technologies leads to process misalignments.

4.1.1 Communication

Communication plays a vital role in the selection, development and implementation of information systems and technologies. How business process, needs and technology needs are communicated to the employees impacts their involvement in the organisational activities.

Communication is done according to the policies and standards defined. This ensures a governed interaction among the employees. The communication process is influenced by the organisational structure. Employees at the operational level communicate on a daily basis as they interact with each other when carrying out their tasks.

Communication can promote a positive environment where there is sharing of information and knowledge. This leads to employees' full participation in organisational activities and as a result, new and fresh ideas are brought on the table. On the other hand, a lack of communication among the employees can hinder organisations' development. When the organisation's processes and activities are not well communicated, employees are reluctant to participate. Reluctance leads to conflicts and demoralisation among the employees.

4.1.2 Lack of Awareness

To achieve the organisation's objectives and goals; business processes, principles and standards are communicated to the employees. The communication process is not always constructive. As such, in some cases it results in a lack of awareness among employees. Due to the lack of awareness, activities are not always carried out as per defined standards. Awareness is impacted by the information flow in the organisation.

Information flow is done from top-down, from management to operational employees as well as from bottom-up, from the operational employees to the management. Effective and efficient information flow enables rapid business decision making and information sharing. The design, development and implementation of information systems aims to establish the value and importance of using information effectively across the various units of the Ministries, as well as the need to attain collaboration with customers.

4.1.3 Roles and Responsibilities

Employees participate in projects according to their roles and responsibilities. Roles and responsibilities are defined to ensure that employees carry out the tasks allocated to them. The roles and responsibilities are discussed between the employees and the management. The negotiations between the employees and management is to ensure that both parties are aware and understand what is expected of them and to resolve roles and responsibilities conflicts.

Roles and responsibilities are assigned to employees according to the relevance of knowledge. Some employees are knowledgeable in more than one business function. As a result, there is heterogeneity of actors within the organisations. Due to the heterogeneity of actors, an actor can partake in various projects relating to the development, implementation, maintenance and usage of systems and technologies. The involvement of the actors within a project leads to the creation of actors' network. In actor network theory, a network is an interconnection of both technical and non-technical actors. Actors can belong to more than one kind of network. The actors' performance in a network impacts their involvement in other networks. As such, due to the commitments in other networks, they might not fully participate in other networks.

4.1.4 Actor Relationship

Technical and non-technical actors depend on each other through their interaction. This could hold to the symmetry argument by actor network theory, which says that human and non-human actors are equal, and should be treated as such. Even though ANT has been criticised for such philosophical assumptions, the argument seems to reflect from the empirical evidence. Technical actors are used as tools to enable and to support employees when carrying out their activities. This is to promote efficiency and effectiveness within the organisations. On the other hand, the technical actors were selected, developed and

maintained by the non-technical actors through the means of other technical actors. Actors' relationship is of importance for the organisations' operations. Without their interactions, it would be impossible to achieve the organisational goals and objectives.

4.1.5 Collaborative

Actors in relationships collaborate. Collaboration is done by means of information technology, such as the E-Government. The technology was viable and feasible from two different perspectives; to eradicate duplication and enact synchronisation, including support and the enabling of real-time data across the Ministries. Collaboration is crucial as business units are dependent on each other when carrying out their activities. Through collaborations, employees share ideas and resolve disagreements. This is seen as an effective way to support employees within the organisations.

4.1.6 Technology Selection Process

Technologies are selected according to the employees' relevance of knowledge about business functions and information systems and technologies. The selection process involves actors from business and IT settings. This promotes understanding and collaborations between business and IT units within the organisations. The lack of cooperation between the two teams leads to conflict within the various projects. Rivalry on many issues during the selection, development and implementation process results into misalignments among business and IT processes.

The selection process needs to be controlled and managed accordingly. This was done through governance. Governance helps to maintain the scope and boundaries within which employees carry out their activities. Through governance, the principles, policies and standards are developed. Principles are guiding statements that guide employees' actions on a daily basis. Employees' interactions are done according to the defined organisational principles. Good principles lead to good professional work ethics and a collaborative working environment.

The purpose of standards is to ensure uniformity and consistency across the organisation. Process uniformity and consistency leads to ease of interaction among the employees as they are able to relate to one another about the processes in place. This ensures that the developed and implemented information systems and technologies are fit for supporting business processes. Additionally, the technology selection process is influenced by politics. Politics is a manifestation of actors' relationships. Because of their roles and responsibilities, employees use their power to influence the selection process. In most cases it is carried to satisfy individuals or groups' personal interests rather than the organisation's business interest.

4.1.7 Consultancy Dependency

Technologies selected are either developed in-house or are outsourced. The rationale for outsourcing is due to the lack of technical know-how within the organisations. Outsourcing enables the organisations to acquire technological artefacts from other organisations that have the necessary skills and competencies. This allows the employees to focus and concentrate on other projects they are capable of managing.

Outsourcing entails the process of skills transfer by the consultants to the organisations' employees. In an attempt to acquire such skills, during the development and implementation process, employees are often involved and trained on how to use and maintain the technologies. Due to the specialised nature of information systems and technology, in most cases skills transfer does not always take place as expected. This can be

due to the systems complexities, and as such there is limited time for the employees to learn, adopt and acquire the necessary skills about the technologies.

Also the consultants feel that they are the custodians of the application hence they should be the ones responsible for applications and systems maintenance. This has a serious influence on the collaboration among the organisational employees and the consultants. As such, some actors do not fully collaborate and this negatively impacts skills and knowledge transfers within the organisation. As a result, the organisations constantly depend on the consultants for support as they are more knowledgeable about the implemented technologies.

5. DEPLOYMENT OF ENTERPRISE ARCHITECTURE

Interpretation is primary carried out to gain a deeper meaning and understanding of the findings from the analysed data. The findings presented are interpreted into factors, namely the Enterprise, Ministries, Information Systems and Technologies, and Society. The factors are depicted in figure 3 and are regarded to be crucial for the deployment of EA in the Namibia government-wide Ministries' environment. The factors are discussed below.

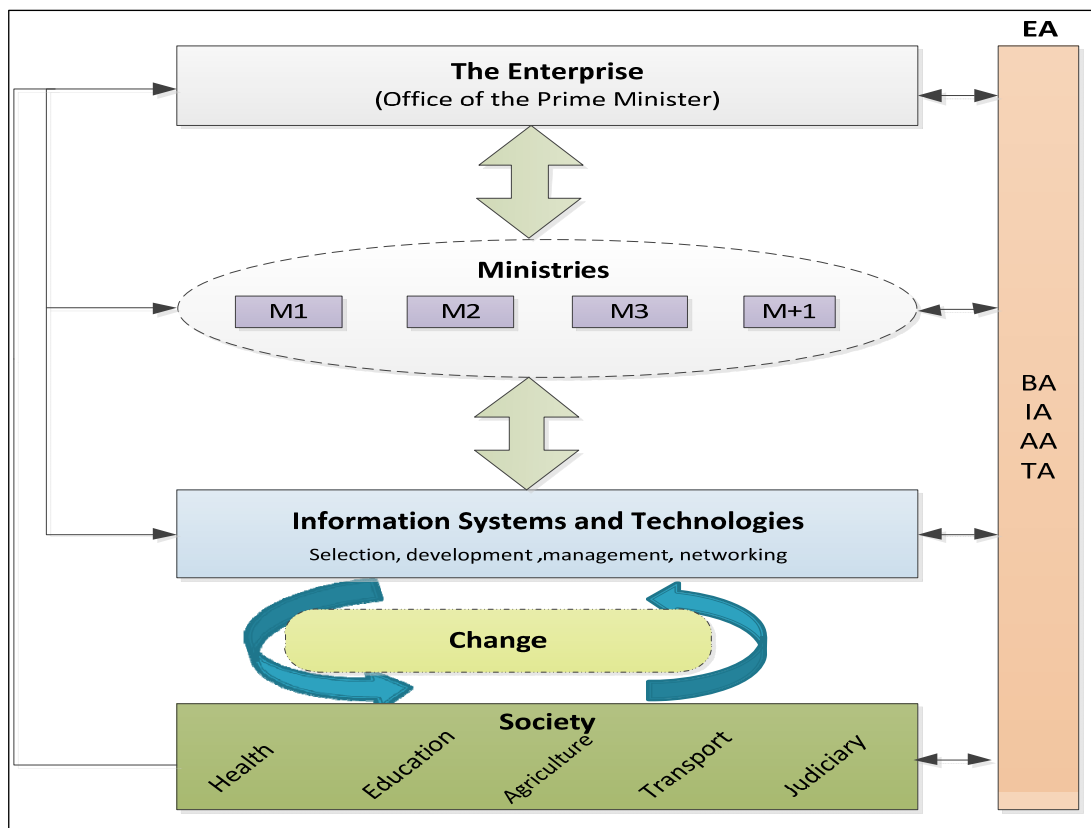


Figure3: Change driven by EA

5.1 The Enterprise

The enterprise represents the bigger organisation with all the connections to the external environment which includes business partners, suppliers, debtors, stakeholders and customers. In the Namibian government Ministries context, the enterprise is represented by the Office of the Prime Minister (OPM). The OPM is mandated with the power to manage the selection, development and implementation of information systems and technologies across the entire government Ministries. Its responsibility is to ensure that the required IS/IT complies with the defined ICT policies and standards and to advise the concerned Ministries on the best practices and strategies to deploy and manage their supporting technologies.

As ICT needs arise within the individual Ministries, the Ministries communicate such needs to the OPM. The communication is carried out by the Ministry's IT deputy director. However, not every employee was satisfied with the communication channels used to communicate the Ministries' ICT needs. Some employees felt that management discussed matters without involving them from the very beginning. This resulted in the deployed IS/IT not being fully supported by many employees in the organisation and as such some employees became resistant towards the organisation's projects.

Within the OPM, the selection, development and implementation of technologies involved actors from different backgrounds. Depending on the actors' roles and responsibilities, some used their political power to influence and manipulate decisions. As a result, some decisions were not made for the best interest of the whole organisation but rather to serve personal interests.

5.2 Government Ministries

The Namibian government Ministries are defined according to the various sectors they are involved in. Some of the sectors include health, education, transport, agriculture and defence. Each Ministry has its own goals and objectives, hence their own resources in terms of process, technology and people. In an attempt to achieve their goals and objectives, the various Ministries have adopted information and communication technologies (ICT) to support and enable their organisational activities and processes. However, Ministries are often challenged with their ICT's operations. Some challenges include the development and implementation of the supporting technologies, compatibility and integrations issues. Such challenges prohibit the Ministries from obtaining maximum ICT's benefits.

Each IT division within the Ministry is headed by the IT deputy director. The director over sees the whole IT division and ensures that employees carry out their responsibilities accordingly. The different employees in the IT division perform different activities according to their knowledge and skills. In some instances, the employees specialised in more than one area. As a result, some employees belong to more than one network within the Ministries. Their participation in the organisation's projects was therefore influenced by their involvement in other networks.

In the Ministries, not all business units were aware what their IT division was doing. Some employees from the business settings indicated that IT is supposed to support their activities but they are not always aware of what they are doing. This was due to the lack of communication between the units (business and IT). Each unit felt that they were more superior to the others, so as a result there was often competition between the units rather than working together. Through negotiations with various stakeholders, the Ministries aim to select and implement the best supporting technologies.

5.3 Information Systems and Technologies

Ministries make use of ICT for various reasons such as to collaborate and share information from Ministry to Ministry, Ministries to citizens and Ministries to business partners. Such collaborations ensure that the Ministries have real time information required by employees and society at large to make informed decisions.

The selection, development and implementation of EA require knowledge and skills to succeed. As such, the employees interpret and understand the technologies based on their knowledge and skills. Skills in the organisation were acquired through formal schooling or through on-the-job training. However, knowledge and expertise was a major concern among the Ministries. In an attempt to resolve this challenge, the Ministries often outsourced activities and processes they were unable to deliver.

Also the deployment of IS/IT depends on both technical and non-technical factors for efficiency and effectiveness. However, in the Ministries, the technical factors were glorified more than the non-technical factors. Non-technical factors such as organisational culture and structure needed to be represented and understood across the organisation such as that employees' roles and responsibilities are formulated and communicated according to the structure influenced by the culture. Depending on the organisational culture, the activities and processes are legitimised.

The selection, development and implementation activities and processes are guided and informed by the business rules, policies and standards. The use of standards and policies must be well acknowledged among the IT and business units. Standards and policies enable uniformity and order necessary for achieving organisational objectives.

5.4 Change

Organisational processes and activities are constantly changing. The changes are caused by the internal and external factors such globalisation, new markets and international laws. These changes impact the way society lives and conducts businesses. The impact can be both negative and positive. The organisation's survival and competitive advantage depends on how fast and effective it manages and responds to the changes.

Information systems and technologies operate according to their life span. Hardware such as servers, printers and computers function effectively for a period of three to four years. Due to the fast changing technologies, organisations often find it hard to keep up with the latest technologies. As a result, most organisations are operating with obsolete technologies. The application of obsolete technologies is often a challenge and as such, the technologies are not compatible and *integratable* with others.

As activities and processes within society change, they have an impact on IS/T. As such, IS/T need to be re-engineered and re-designed to support new processes and advancements in the society. Changes in the society are communicated to Ministries by different stakeholders. Based on the availability of resources (finance, business and technical skills), Ministries deploy the supporting technologies.

5.5 Society

Society is a collection of actors that share common interests. The society is comprised of actors with various needs such as health, transport and education. To offer better and improved services to society, the Ministries make use of information and communication technologies.

The application of ICT within society requires awareness. The awareness helps the society to understand the technological concepts and their applications. The communication channels used between the Ministries and society influences the ICT awareness.

5.6 Enterprise Architecture (EA)

The development and implementation of information systems and information technologies is a challenging process. The process involves IT specialists, stakeholders and business staff with diverse and often conflicting goals. Enterprise architecture (EA) provides approaches and strategies to deal with such challenges. Through its various domains which include business, information, application and technical architecture, EA provides a holistic view of the Ministries' operations. In general terms, EA specifies how information systems and technologies are related to the overall business processes and organisational activities. The deployment of EA enables the Ministries to manage and govern their information systems and their supporting technologies to achieve and increase effectiveness, efficiency and minimise risks and inconsistencies via standards and governance of technologies. Due to

environmental trends, business processes are constantly changing, causing changes such as obsolescence in IT. EA enforces change from current to the future at different levels and across its architectural domains. These changes help to identify redundancies and obsolescence across the IS/IT infrastructures.

6. CONCLUSION

The study contributes to the society, from two perspectives, theoretical and practical. The study also provides a practical guide which can help researchers and management in their attempt to employ Activity Theory as a lens in information systems.

The application of Activity theory (AT) as a lens for data analysis enabled the study to highlight non-technical factors that impact the deployment of technologies in the Namibian government-wide Ministries environment. The factors included processes, skills and knowledge, policies and people. Interviewees from all Ministries shared their concerns about these factors. The significance of non-technical factors was according to individuals' relevance of knowledge in the area of specialisation. In some cases these factors were underestimated or rather ignored. The study contributes to the understanding of the social relationship between technology, people and process. The study elaborated about the significance of these factors.

Similar to the theoretical contributions, the theory helped to unpack how both technical and non-technical factors interacted and was applied in the computing environment of the Namibian government-wide Ministries. From IT specialists, it was evident that technologies changed constantly. As a result, there was a lack of alignment between the employees' skills and knowledge and the latest technologies in the government's providing service to the Namibian citizens. For employees to be competent in their roles and responsibilities, organisations invested in employees' training and seminars. Information systems and technologies effectiveness and efficiency calls for communication and understanding between IT and business units. The study identified that the business units' participation was not considered significant within the Namibian government-wide Ministries.

7. REFERENCES

- Engeström, Y., Miettinen, R. & Punamäki, R.-L. (Eds.). (1999). *Perspectives on Activity Theory*. United Kingdom: Cambridge University Press.
- Flaxer, D., Nigam, A. & Vergo, J. (2005). *Proceedings of the IEEE International Conference on e-Business Engineering*. New York.
- Goldkuhl, G. (2012). Pragmatism vs Interpretivism in Qualitative Information Systems Research. *European Journal of Information Systems*, 21, 1, 135-146.
- Golsorkki, D., Rouleau, L., Seidl, D. & Vaara, E. (2010). *Strategy as Practice*. New York: Cambridge University Press.
- Hendrickx, H. & Daley, S. (2011). Defining the Business Architecture Profession. *IEEE Conference on Commerce and Enterprise Computing* (pp. 325-332). IEEE.
- Kaisler, S., Armour, F. & Valivullah, M. (2005). Enterprise Architecting: Critical Problems. *Proceedings of the 38th Hawaii International Conference on System sciences* IEEE.
- Khan, M. & Zedan, H. (2010). Alignment Strategies and Frameworks in co-Evolution of Business and Information Technology. *International Conference on Information Networking and Automation* (pp. 133-136). IEEE.
- Kissimoto, O. & Barbin, J. (2010). *Information Technology as an Enabler for Mass Customization Strategy: Integrating Customer and Organization*. São Paulo: IEEE.
- Lankhorst, M. (2005). *Enterprise Architecture at Work: Modelling, Communication and Analysis* (3rd ed.). Germany: Springer.

- Montealegre, R. (1997). The Interplay of Information Technology and the Social Milieu. *Information Technology & People*, 10, 2, 106-131.
- Myers, M. (2013). *Qualitative Research in Business and Management* (2nd Ed.). London, Sage.
- O'Donoghue, T. (2006). *Planning Your Qualitative Research Project: An Introduction to Interpretivist Research in Education*. New York: Routledge.
- Ross, J., Weill, P. & Robertson, D. (2006). *Enterprise Architecture as a Strategy: Creating a Foundation for Business Execution*. Harvard Business Press.
- Rouhani, B., Mahrin, M., Nikpay, F. & Nikfard, P. (2013). A Comparison Enterprise Architecture Implementation Methodologies. *International Conference on Informatics and Creative Multimedia IEEE*.
- Rowley, J., Jones, R., Vassiliou, M. & Hanna, S. (2011). Using Card-Based Games to Enhance the Value of Semi-Structured Interviews. *International Journal of Market Research*, 54, 1, 93-110.
- Saat, J., Franke, U., Lagerström, R. & Ekstedt, M. (2010). Enterprise Architecture Meta Models for IT/Business Alignment Situations. *14th IEEE International Enterprise Distributed Object Computing Conference* (pp. 14-23). IEEE.
- Schekkerman, J. (2009). *How to Survive in the Jungle of Enterprise Architecture Frameworks: Creating or Choosing an Enterprise Architecture Framework*, Trafford Publishing.
- Uden, L. (2007). Activity Theory for Designing Mobile Learning. *International Journal of Mobile Learning and Organisation*, 1, 1, 81-102.
- Wang, X.Y., Ma, F.C. and Zhou, X.W. (2008). Aligning Business and IT Using Enterprise Architecture. In *4th International Conference on Wireless Communications, Networking and Mobile Computing*. IEEE.
- Yamgata-Lynch, L.C. (2010). *Activity Systems Analysis Methods: Understanding Complex Learning Environments*. London: Springer Science.
- Zhu, X.W. and Yan, Y. (2009). Does IT Matter in China? Empirical Study on Information Technology, Organization Structure and Performance of Chinese Firms. *International Conference on Information Management, Innovation Management and Industrial Engineering*. IEEE.