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Understanding the Complexities of Enterprise Architecture through Structuration Theory

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ABSTRACT

Even though the interest in enterprise architecture (EA) has in recent years tremendously increased across industries, many organizations continue to encounter challenges, which affects the development, implementation, and practice. As a result, different approaches have been employed to ascertain the challenges, yet they persist. Thus, the objective of this study was to develop a framework, which can be used to examine and understand how various events and factors manifest in their natural settings to cause complexities, during development and implementation of EA in organizations. The qualitative research methods were employed, within which qualitative data were gathered. The interpretive approach was followed, using the Structuration Theory as a lens, to guide the analysis of the data. Based on the analysis, organizational structure, technology, social context, and process-oriented factors were found to be of critical and significant influence in the complexity of EA, from which a framework was developed.

KEYWORDS

Duality of structure;
enterprise architecture;
information technology;
structuration theory

Introduction

Within organizational complexity, there exists a dynamic interplay between requests and demands for better services, which in turn are enacted by competitive advantage and sustainability. Demands for growth, service, and competitive advantage set the agenda for architectural development and implementation within organizations [7]. Enterprise architecture (EA) is a tool and an approach that can be used to enhance an organization's processes and activities. The approach can also be considered or referred to as an actor, primarily because it has the capability to make a difference, as a change agent within an organization. Callon defines an actor as an entity that is able to connect texts, humans, money, etc., to build more or less effectively, and have the capacity to make a difference [6].

Many organizations, including government administrations and agencies, have in recent years realized the significance of EA. As such, governments of many countries have initiated and adopted EA programs to manage their vast number of information systems and technologies (IS/IT) [17]. Some organizations now rely on EA to addressing their business design, information flow, and technical challenges and complexities. This includes the fact that EA can facilitate and manage information systems and technologies from one state to another. EA facilitates the integration of strategy, business, and IS/IT toward a common goal, through the development and use of EA domains [24]. The domains consist of a set of processes, tools, and structures that are necessarily needed to implement an enterprise-wide coherent and

consistent information technology architecture, and to support enterprise's business operations. However, the deployment and practice of EA has never been easy and straightforward, it is engrossed with complexities.

In spite of the growing interest in the concept of EA, it is difficult to find an organization that has successfully designed, developed, implemented, and institutionalized the EA phenomenon [15]. Some of the complexities could be attributed to different understanding, as opposed to what EA actually contributes to its complexities that are encountered by many organizations. Niemi and Pekkola explain how EA can be employed as an approach to facilitate organizational competitiveness [24]. Based on the studies that have been carried out, it is clear that there will continue to be challenges in the development, implementation, and institutionalization of EA in organizations. Some of the challenges are fairly covered in literature, such as [20, 30] and [18]. Due to the growing challenges and complexities, many studies have been conducted on EA in recent years, which include [29, 33, 9, 11]. What has not been explored or covered is where the challenges manifest from or into.

Thus, it was necessary to employ a different and fresh approach, using structuration theory (ST) as a lens to examine and gain a better understanding of how some of the challenges manifest into making EA a complex concept for individuals and organizations. ST focuses on how agents' actions enable and at the same time constrain processes and activities; and how the actions are produced and reproduced within a system. ST focuses on social processes that involve the interaction between actors and structural properties of a

system [26]. The key tenets of the theory are therefore agent and structure. In ST, agents are both technical and nontechnical and structure is rules and resources. It must be emphasized that the word “structure” must not be confused with its obvious connotation of organizational hierarchy in the English language [16].

The primary aim of this study was to examine the factors, which manifests into complexities in the deployment and practice of EA in organizations. Thus, the research question was: What are the factors that cause the EA to be complex during deployment and practice in organizations? This question informs and guides the study. The remainder of this paper is divided into five main sections. The first section presents the literature review, from EA and ST perspectives. The second section covers the research approach that was employed in the study. In the third section, the analysis of the data is presented. The results and framework that were developed from the analysis are presented and discussed in the fourth section. Conclusion is drawn in the last section.

Literature review

A review of literature was conducted from the two perspectives, EA and ST, within the context of this study.

Enterprise architecture

The complexities of some information systems, their enablers, and supporting technologies are the primary reason why many organizations employ EA. The emphasis on EA is mainly because of the premise that the concept can assist organizations to develop strategies and as well incorporate them within existing processes, IT infrastructure, and other organizational modules [37]. However, in achieving the anticipated benefits of EA, an organization needs to be committed to strict mechanisms during analysis and planning in the development, implementation, and practice. Also, EA provides organizations with the capacity to identify and make appropriate changes, thereby providing stability and flexibility within the environment [31]. The scope of EA has influences and impacts on its development and implementation in the organization that deploys it. In defining the scope of EA, emphasis is put on processes, people, IS/IT, and as well as the relationships between them [18].

With the extensive spread of EA, from business logics of processes and activities to IT operations and strategies, there is bound to be complexities and challenges with its deployment. The complexities of EA are not drawn or encountered from one particular angle or perspective. The complexities can be found across the domains, which include business, information, application, technology, infrastructure, and service-oriented architecture [19]. Also, within the domains other activities take place, which can have different dimensions of influence in the deployment of EA [3]. EA organizes the logics of the business processes and IT infrastructure, reflecting the integration and standardization requirements of the organization's operating model [28]. The development and

implementation of EA domains are done separately, but they do depend on each other, toward a common goal [32].

Based on the complex nature of EA, different EA Frameworks, such as The Open Group Architecture Forum, Gartner Inc. [5], and the Zachman Framework [38] are employed in its development and implementation, in different organizations. As illustrated in Figure 1, the domains of EA are interconnected and dependent. Each domain has a distinct area of focus, with a set of deliverables. The deliverables inform the dependency and characteristics of each domain. For example, the business architecture informs the development of the information architecture. Some of the characteristics of the dependency include information and technology categorization, business objective variables, and structures [4]. As exemplified in the development stage, the relationship among the domains is also evident in the implementation of EA.

- The development and implementation of EA are process oriented, which are done through the following domains: business, information, application, and technical architectures [9,12]. The domains of EA are linked and interrelated [19], as shown in Figure 1. Thus, a challenge with one domain influences and affects others. However, the challenges are not always clear or obvious, as the agents of complexity include nontechnical factors such as inconsistency of procedures, principles, and standards. In order to gain better understanding of why things happen in the way that they do in the deployment of EA, the ST was selected and used as a lens to examine the processes and activities of influence.

Structuration theory

ST is a socio-technical theory, which focuses on both technical and nontechnical factors. ST is a constructivist theory, mainly because it focuses on humans as social constructs and that institutions are constructs, which are sustained by how humans act in reality [13]. In many areas of academics and practices, structuration is considered as a process that continues between structures and human action, in a duality rather than two separate entities [27]. The theory has agents and structure as its main tenets. Structure in the theory of structuration enables and at the same time constrains agencies [22]. In ST, technologies can possibly change social structures while at the same time social structures shape how humans develop and use technologies [23]. Giddens describes agents not only as persons, but anything that has the capability to exert power and can have influence over others in a social context, such as an organization [8]. This means that agents are associated with some form of power. Structure is rules and resources in ST, as opposed to organizational hierarchy in the English language [16].

Power is viewed as a representative of subjective actions, to govern and monitor, from which results make a difference in various contexts. Power is therefore a manifestation of actions of individuals or groups to influence a desired or intended outcome in an organization. The theory explores power and control within social context, purposely to explore how

Enterprise Architecture

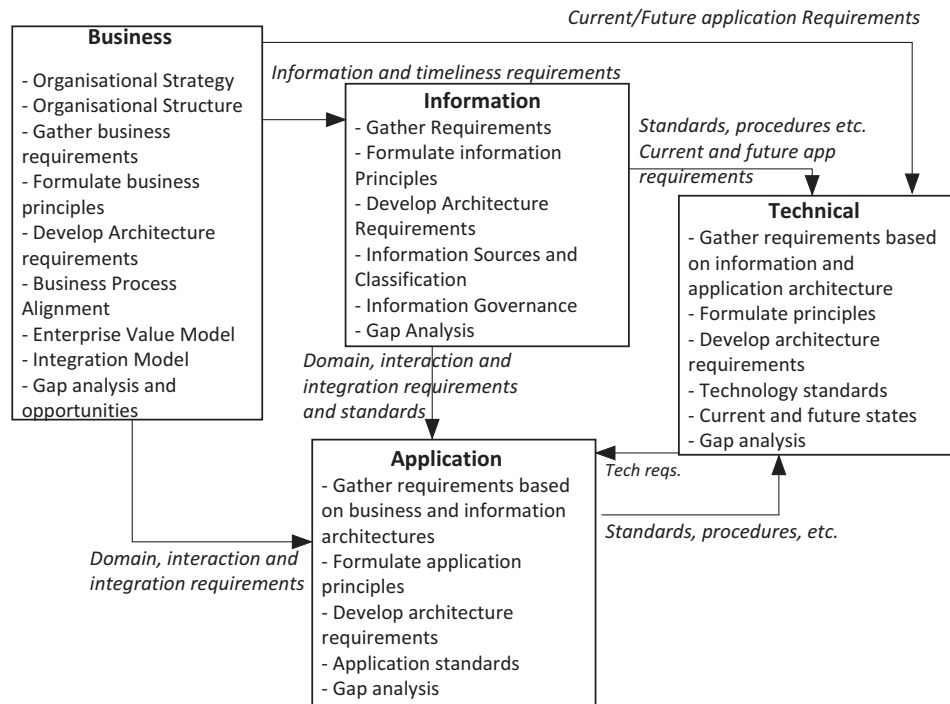


Figure 1. Enterprise architecture domains [37].

exercise of power manifests in a dialectical interplay between agents and structure [12]. This is often a two-way approach. As described in ST, power is the capability of actors to encourage decisions to favor them and the capability to mobilize biasness [8]. Giddens further argues that power is not a resource, but resources are used mainly as a media for power [8]. Also in Giddens' argument, human agency represents the capacity to make a difference in a social context. In such a case, structures are the means and medium through which power is exercised, during interaction and legitimate actions.

Structures do not exist independently of agents, rather structures exist as they are enacted by human agents, and thus the actions of human agents continually produce and reproduce structures [8]. According to MacKay and Tambeau, "structuration theory offers insights into how social relations are reflexively structured across time and space within pluralistic and overlapping social systems by drawing on virtual rules and resources"

[22]. The recursive (repeated) relationship between people and structures, whereby structures shape human action, which in turn constitutes (forms) the structures, is defined as Duality of Structure [8]. The duality of structure therefore is a process through which legitimating structures evolve and are reconstituted by actions.

Duality of structure

The duality of structure as shown in Figure 2 depicts the relationship between interaction and structure, to produce and reproduce actions, through modality, which consist of interpretative scheme, facility, and norms. The duality of structure constitutes opposition to continuity and transformation of activities within an environment [34]. Through this duality, structure enables and constrains, but does not wholly determine human actions [8]. Therefore, human actors have the ability or power to act according to their

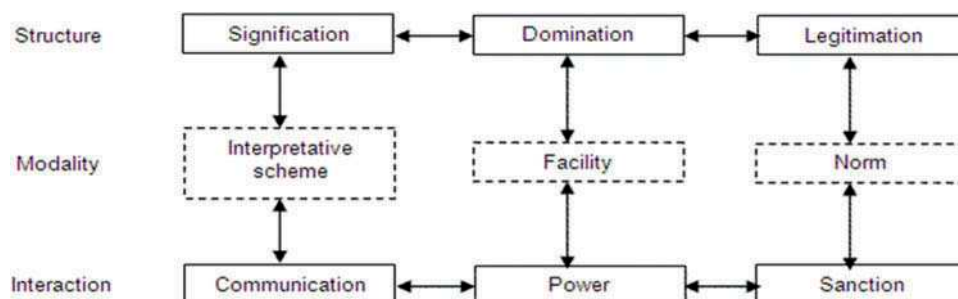


Figure 2. Duality of structure [8].

free will within a social structure, which Akaka and Vargo describe as composition of two interrelated layers, of structures and systems [1]. Thus, if a person acts differently and their actions are institutionalized as a broader and acceptable pattern, other actors such as people follow the pattern of action. This acceptance is based on their interpretation of the action. The new pattern becomes the norm and a new operating structure emerges from the changed structure. This means that actions of human agents have the ability to produce and reproduce or reengineer the social structure. This is referred to as reproduction of human actions, which is essential recursive of social life, in which structure is both medium and outcome of the reproduction of practices [2].

When human actors interact, they explore the interpretative scheme to construct a logical framework from it and make differences through their interactions. According to Giddens, “all human beings are highly ‘learned’ in respect of knowledge which they possess and apply in the production and reproduction of day-to-day social encounters” [8]. Thus, the interaction of human actors facilitates the modification and reproduction of the interpretative scheme. This informs the structure of significance in dualistic form.

The interpretative scheme outlines the structure of promoting significance or meaning [26]. In an attempt to gain better understanding of the factors that influence EA complexity, I explain that the structure of significance in its turn represents the rules that facilitate and ground the communication between actors [15]. Resources are facilitated using power, thus informing the structures of domination among actors [25]. The structure of domination can be altered or changed by agents, based on the ability to do so, which in a way applies to how people carry out actions in the deployment of EA in different organizations. This type of change to dominance by agents is referred to as dialectic of control [8]. Norms facilitate constructive human actions and inform the structure of legitimation through sanctions. Norms, therefore, present rules that catalyze legitimate or acceptable behaviors within organizations [26].

Research approach

Qualitative methods were selected in this study as they allow learning about the meaning that participants associate with phenomena being studied [21]. Through the different viewpoints, a framework can be developed, following inductive approach [10]. Within the qualitative research methods, the case study approach was employed in this study. This is mainly because, in a natural setting, the case study approach has in recent years proven to be reliable in conducting empirical studies [36]. A South African organization was selected and used as case in the study, on the basis that: (i) it attempts to deploy and practice EA and (ii) that the organization was having challenges due to EA complexities, which were preventing it from achieving its objectives.

Data were collected from both business and IT units, using the semi-structured technique. As shown in Table 1, a total of 13 employees at various organizational levels were interviewed at a point of saturation, which is described as a point where

Table 1. Interviewees.

Respondent	Level	Business unit	IT unit
Enterprise architect	Senior		1
Technical architects	Senior		2
Application architect	Senior		1
	Junior		1
Business architects	Middle	1	
	Junior	1	1
Business manager	Senior	2	
	Middle	1	
IT Manager	Senior		
	Middle		2
Total		13	

no new information was forthcoming during an interview process [14]. A set of criteria were used in the identification of the employees: (i) the participants has been in the organization for at least three years; and (ii) participant must have served in any capacity, directly or indirectly participates in EA activities in the organization. The data were interpretively analyzed using ST as a lens.

The duality of structure of ST was employed as a lens, from an interpretive perspective to guide the analysis of the data. This is mainly because the theory provides a useful method for analysis in studies where both humans and technology interact [22], which is critical to gaining insight into the complexities of EA in organizations. ST is often applied in studies that employ the interpretivist approach [36]. The use of ST as a valuable method in carrying out empirical studies has long been established [35]. It is within this context that duality of structure was applied as a lens to examine and understand the complexity of EA in an organization.

Analysis: Structuration view of EA complexities

The duality of structure from the perspective of the ST was employed as a lens to examine and understand the factors, which reproductively manifest into complexities in the deployment of EA in organizations. The theory was interpretively used to guide the analysis of the data. Table 2 presents a summary of the analysis, which should be read with the discussion that follows, to gain a better understanding. The analysis includes interconnection and how actions were reproduced during the development and implementation of EA, in a recursive manner.

Structure: Signification/domination/legitimation

The concept of EA is considered significant due to its focus on synergy, strategy, and operations of the organization that deploys it. First and foremost, EA is aimed at achieving a synergy of elements that help to formulate and articulate the goals and objectives of an organization that deploys it. Based on requirements, EA drives strategic and operational activities, which are executed by people, through processes, and using technology, to enhance competitiveness.

Despite the importance of technical aspects of EA, the nontechnical factors are highly significant and have influential effects on the deployment of EA in organizations. Thus, some architects consider some domains to be more important than others, therefore using them to dominate. According to one of the architects that participated in the study, “we rely on the

Table 2. EA Complexity.

Structure	Signification	Domination	Legitimation
	Organizational requirements drive and determine the selection, deployment, and practice of EA, which in turn determines its importance. This influences employees' interest about the concept within an organization.	On the one hand, managers make use of resources, such as technologies and processes, to control activities in the deployment of EA. On the other hand, architects employ their stock of EA knowledge to influence processes and activities.	The deployment of EA in an environment including allocation of its tasks, from development to practice is based on approval by relevant authorities within the organizational structure.
Modality	Interpretive scheme	Facility	Norm
	Employees' subjective interpretations of EA requirements are based on their understanding, which in turn influence and impact processes and activities in the deployment and practice in the organization.	Different resources, which include organizational rules, regulations, and technologies, are employed as facilities to guide the deployment and practice of EA in an organization.	The architects define the processes and procedures that are used for the deployment and practice of EA in the organization.
Interaction	Communication	Power	Sanction
	Communication is carried out based on an understanding, which is influenced by interest and knowledge. An understanding is based on how communication is delivered in both deployment and practice of EA in an organization.	Rules and regulations are used as sources of power to manipulate processes and procedures in the deployment and practice of EA. Technology and know-how or stock of knowledge are also used as sources of power during EA deployment and practice.	Both IS/IT and business units' managers approve the deployment of EA, including the processes and procedures that are involved.

technical architects to give us direction in what we have to do". The detriment of this type of action is that it affects the domains' dependence on each other. Based on its significance, EA encompasses strategic and operational plans, for modeling, governance and management of business logics, information exchange, applications (information systems), and technology within an environment. This is an iterative process, which includes relationships and connectivity among applications and how agents relate and interact with each other.

The development and implementation of the domains are based on how the organization defines the concept, which shapes the overall outcomes of the EA. The definition manifests in the relationship and connectivity between the agents, which influence EA's focus and deliverables through the domains. One of the business architects says that "both the application and technical architects defines the EA, with little or no input from us (other architects), and they expects us to implement it". This is complex in that the relationships and connectivity have no guiding principles or formula. As a result, they are subjectively defined, based on personal interests rather than organizational objectives. This situation is hugely influenced by lack of clear definition of roles and responsibilities.

Thus, the development of the domains that are supposed to contribute toward the development and implementation of another domain becomes disruptive, and negatively impacts the process and outcome. This happens mainly because of the ways roles and responsibilities are interpreted and carried out within the organization. This type of action is enacted by significance that is associated with them, through which they are legitimized by the structure of the organization. According to one of the participants, *our policies allow managers and architects to exhibit certain functions with little or no input from us as junior employees.*

Modality: Interpretive/facility/norm

Many of the employees saw the concept of EA differently, subjectively so. The differences in understanding come from the fact that processes and procedures were defined for them.

Also, this was based on various factors, such as the quality of information that they could access as well as their knowledge of the concept. The lack of common understanding among the stakeholders makes the deployment and practice of EA to be more difficult and complex. One of the business architects explains as follows: "we as business architects struggle to understand our deliverables and how it links with the overall objectives, which is somehow caused by the ways the architecture is defined and scoped in the organization". Thus, some of the employees employ different facilities, causing them to act in their respective ways, which creates more complexity in the deployment and practice of EA in their organization.

Some of the facilities that were employed by many of the stakeholders include stock of knowledge, roles and responsibilities, architecture standards, and policies and principles. In an attempt to redefine and reposition themselves in the midst of challenging complexity, some of the employees made use of available facilities as a source of dominance, through which they pursued personal interest as opposed to EA objectives. As a result, the practice of EA became more confusing to many of the stakeholders, in terms of understanding the values. According to one of the employees, "the more we try to extract and understand the values of EA in our organization, the more complex it becomes".

The different understanding of the concept was based on how the requirements were understood, which in turn shapes how requirements were gathered in the organization, which in structuration is described as recursive. This enables and at the same time constrains, but did not wholly determine how employees behave in the deployment and practice of EA in the organization. One of the employees explains, *without an understanding of the requirements we couldn't possibly develop the EA towards enabling the organizational strategies.* Another participant describes the constraining effects as "the way in which the EA has been developed, using the unclear requirements negatively affects the strategies of the organization". This type of complexity could be attributed to how interaction was carried in the environment.

Interaction: Communication/power/sanction

Interaction is fundamental to shaping the outcome of EA in an organization. This includes interactions between human-to-human, human-to-process, human-to-technology, process-to-process, process-to-technology, and technology-to-technology in the development and implementation of EA in an organization. This is mainly because human actions have the ability to produce and reproduce or reengineer structure, such as process and technology, in the context of EA deployment and practice. “Technologies’ implementation and application are based on how we define and develop the EA,” an architect explains. This becomes more complex as one domain depends, and has impact on another.

However, some stakeholders continue to take for granted the influence and dependence, which the domains have on each other. The dependency is often used as a source of power by many domain architects. The elements of dependence manifest in the actors’ interactions and actions, which are reproduced in the development, implementation, and practice of EA. According to one of the participants and echoed by some domain architects, “the technical architects are fully aware that we rely on them for the final products and solutions, as a result, they take advantage, to claim superiority over us, who are not in their team”.

EA is intended to enable organization’s events, processes, and activities. But when it becomes complex, it is seen as constraint to the same activities that it was meant to support and enable. This is attributed to power that is exerted in the course of dependency between tasks and domains. This type of dependence is enacted by roles and responsibilities, which is sanctioned in accordance to the organizational structure, purposely to ensure and drive solution. However, it does at the same time contribute to the complexities in the deployment of the EA in some organizations, as they manifest from conscious and subconscious actions of the focal actors and other stakeholders that are involved in EA deployment process. Some of the actions are sanctioned and therefore considered to be norm, which influence EA success or failure.

Results and discussion: Understanding the EA complexities

Based on the analysis as presented above, I found that the factors that can critically and significantly influence EA complexity the most include organizational structure, technology, social context, and process oriented. From the findings, a framework as shown in Figure 3 was developed. The framework is aimed at understanding the complexity in the deployment and practice of EA in an organization. As shown in Figure 3, formulation of requirements is influenced by other factors, which include roles and responsibilities, strategies, resources, interpretation, communication, solution, and values.

As shown in Figure 3, the key factors that influence EA complexity in organizations include organizational structure, technology, social context, and process oriented. Table 3 presents a summary of the influence of the factors in the deployment of EA, and their implications for both business and IS/IT managers in an organization. Thus, Figure 3 and

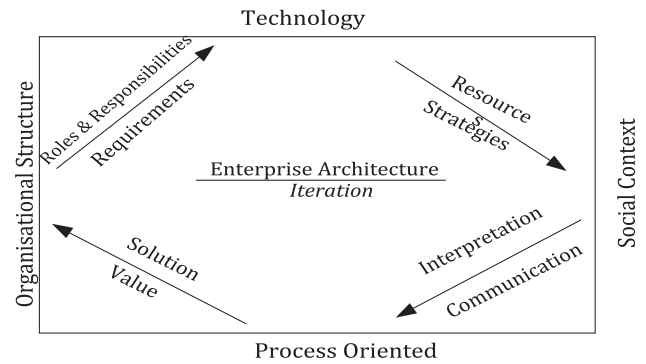


Figure 3. Factors complexity in EA deployment.

Table 3. Implication for managers.

Factor	Influence	Implication
Organizational structure	Used as source of power, and to define: (i) relationship between employees and structures; (ii) allocation of roles and responsibilities in the deployment of EA.	Enables and constrains activities at the same time: (i) in the gathering and interpretation of requirements; and (ii) allocation of tasks in the deployment of EA.
Technology	Guides how interactions are carried out among employees during the deployment of EA. Also, it determines the outcome of the goals and objectives through strategies.	How the deployment and use of various technologies manifest, derail and enable activities at different levels and organizational units, from EA perspective.
Social context	The use of rules and resources to guide communication and interpretation toward EA deployment.	How to apply rules and available resources in objective manner for the benefit of strategies.
Process oriented	Processes are used to recreate itself through rules and regulations. Iterative	Managers need to understand that: (i) EA processes are not stagnant; and (ii) employees will continue to subjectively interpret the processes, which then have impact on EA deployment.

Table 3 should be read in conjunction with the discussion that follows in order to gain a better understanding of how each of the factors interconnect, manifest, and influence EA complexity, and can impact managers in an organization.

Organizational structure

The organizational structure (sometimes referred to as hierarchy) defines the different units and departments within which an organization operates. Each unit or department is bestowed with certain mandates, within which roles and responsibilities are defined. Also, each unit has its own requirements toward achieving their organizational mandates. Thus, in the gathering of EA requirements, departments focus seem to take priority, which causes conflict of complexity. In the midst of such conflict, power is exerted normally along organizational structure. These types of actions are reproduced through development, implementation, and practice of EA in the organization.

Employees are responsible for enabling processes and activities reproductively in their organizations. Their attitude,

behavior, and actions directly define and shape organizational events and norms, which are thereby sanctioned and legitimized over time. The organizational structure could also have embedded attributes that the people make use of, to dominate and exercise power in their organizations. These attributes partially determine the significance, which people ascribe to EA within their respective organizations. This becomes even more critical because it is on the basis of significance that the requirements are gathered and applied in the development and implementation of the EA, which fundamentally determines the outcome, success, or failure of the concept within the organization.

Based on the mandates that are accorded to roles and responsibilities within organizational structure, employees enact power and political intent during the development and implementation of EA in their organizations. Power and politics as resources promote how individuals and groups flourish through self-enrichment, such as recognition, financial reward, job security, and career development. The actions of employees which are enacted by the power they consciously, unconsciously, or practical unconsciously possess, to make a difference and add to complexities during the development and implementation of EA in an organization. Thus, organizational structure has a significant influence on the development and implementation of EA in the organization that deploys it.

Roles and responsibilities represent some form of seniority or rank in many organizations. Within such an organizational structure, individuals' ranks are associated with authority, which results in the power to make a difference, virtue of dominance, and legitimization of mandates that are bestowed upon the roles. The act of domination could, however, essentially be used to instill order and as well reinforce the relationship of subordination through which power is manifested.

Technology

In this section, technology is discussed in the context of EA, as shown in Figure 3. The arrows in Figure 3 indicate that roles, responsibilities, and requirements influence technology through organizational structure, within an organization. This is primary because employees have the power to decide whether to use or not use technology. However, the actual selection, implementation, use, and support of technologies are guided by strategies that are embedded into EA domains. Actualization of this is more complex than it seems, in that it entails interaction with resources such as processes and employees. This is one of the primary reasons why some strategies are formulated but not implemented, or partially implemented in many organizations. Interaction with resources is never easy or straightforward, even when there are procedures to do so.

In many quarters, EA is seen as an approach that could be used to deliver both the IS/IT and business strategies. This is done across the domain of the EA, from business to technical architectures. The strategies are products of human actions, which are produced and reproduced over time to make a difference in the organizations that deploy them. The difference could be negative or positive, which could benefit the

organization or be geared toward self-interest and personal gain. Such differences typically arise from the use and manipulation of processes and technologies in the course of the development and implementation of EA in an organization.

Thus, human agents are often tasked to manage events and activities within boundaries as defined by themselves or for them by the focal actor. The outcomes from the use of technologies are based on, or influenced by, two main factors: (i) the interaction—how well a technology is understood and used; and (ii) connectivity—how the technology is connected with other technologies and accessed. Technology interaction and connectivity are engineered through the domains of application and technical architectures. The engineering results from human recursive actions, which are often influenced by knowledge (skills) and interests. This is implicative in that the techniques and tools that are used to develop and implement EA are selected by individuals and groups in the organization. The selection is based on the interest of individuals, the organization, or both, which is often biased if there is no structured procedure.

Thus, the involvement of people in the development and implementation of EA in organizations can be summarized as: (i) the enablers and facilitators of EA and its processes; and (ii) accountability and responsibility of the outcome of EA. The roles of people are therefore critical to the outcome, success, or failure of EA. Also, human expertise is responsible for the sustainability and competitiveness that EA is intended to advance, secure, and promote for an organization that deploys it. This is done periodically and within a social context, from the technical and nontechnical perspectives.

Social context

Typically, organizations are founded on and within social context, which consist of rules and resources, such as employees and technologies. Employees are considered to be the main actors of properties within social context, which recursively produce action during the development and implementation of EA in an organization. The actions are based on how information and activities relating to EA are communicated, which in turn influence the development, implementation, and practice of the concept within an organization.

Based on subjective interpretation, which is enacted by significance, individuals and groups make use of technologies and other available resources to advance their domination and authority, which is to enhance their positions and protect their interests rather than the organization's objectives. This manifests into political know-how, which employees make use of, to enrich their power as they influence processes and activities within the organization, during the development and implementation of EA. Thus, the outcome of EA is sometimes crowded by complexities.

Employees' involvement shapes and guides the processes, from development to implementation stages of EA; hence, communication and interpretation of activities are critical. However, it is complex, in that people have different feelings, thoughts, which are demonstrated through conscious and unconscious actions. The activities, which include selection of techniques and tools, are often communicated to the

stakeholders, using different channels and processes. The stakeholders apply their own interest and understanding to interpret the significance of the activities to them or the organization, or both. They respond to the communication through their actions, whether they agreed, or did not agree to the activity. Based on employees' interpretation and the meaning that they give to an activity, they begin to consciously or unconsciously influence processes and activities in the development, implementation, and practice of EA, through their actions. This makes communication and interpretation of activities very significant components in understanding the complexities that are associated with the development and implementation of EA in an organization. These actions are recursive, making it process oriented.

Communication can be used to strengthen the survival or derailment of EA deployment and practice, hence its criticality in an organization. This is mainly because architects use periodic communication as a platform to interact and share information among themselves and with other stakeholders. On the one hand, lack of or poor interaction among architects and stakeholders can lead to the downfall of EA development or implementation. On the other hand, communication can promote positive alliances in the organization, where best practices and knowledge can be shared and incorporated into processes and activities of EA. This increases the intellectual capacity within the organization to formulate good approaches and techniques, to develop and implement EA. This is primarily because individuals interpret the requirements and components that are associated with EA, subjectively. Hence continuous communication over a period of the development and implementation of EA is required.

Process oriented

EA is process-intensive through its numerous procedures, extensive consultation with stakeholders, and allocation of various technical and business tasks. Each process is intended to deliver solution of value. Within this premises, each process produces and reproduces results, positively or negatively, as influenced and shaped by communication and interpretation, using available resources and rules. This makes process an important component in the development and implementation of EA in any organization. Processes are used to recreate themselves through rules and regulations within the organizational needs. However, processes by nature enable and constrain activities legitimately. This happens at various levels and carries different impacts, depending on the size and complexity of the organization and the phenomena that are concerned, such as the different domains of the EA.

Process is significant to EA, primarily because it is used as guidelines to identify: (i) critical tasks which are required in the development, implementation, as well as practice of EA; (ii) planning and management of stakeholders' requirements; and (iii) different approaches which are required to perform the development and implementation of EA. This is purposely to provide solution of values, which enables and supports goals and objectives of the organization.

Thus, solutions are proposed based on results from the deployment and practice of EA, through governance. This is

intended to add values to the organization through organizational structure. IT governance is often used for decision-making, particularly for the selection, deployment, support and maintenance of information systems and technology artifacts, processes, and activities. Governance is based on the value of the end product (solution) of the development and implementation of EA in the organization that deploys it. It helps to manage and monitor the scope and boundaries within which the EA is developed, implemented, and practiced, using the available resources over time and space.

However, each of these artifacts is encompassed with various challenges, which has impact on the EA solution and values as they are recursively enacted. Through governance, EA policies, standards, and principles are formulated. The policies organize the rules and regulations. The standards guide the selection of appropriate-fit of approaches and frameworks for EA solution. Activities and procedures of EA are guided by principles. Some nontechnical factors such as process and people continually have influence on EA as the process is carried out through governance. The influence is enacted through interpretation and communication of the organizational objectives, including the stock of knowledge and resources which are relevant to the deployment of the EA in an organization.

Conclusion

In the quest to examine and understand why and how EA is deployed in organizations, ST was employed to guide the data analysis. Based on the analysis, this paper presents the different factors which can enable and at the same time constrain the development and implementation of EA in an organization. This includes: (i) how various facilities can be used to influence activities and events of EA, and (ii) how various influences are legitimized and sanctioned through the enactment of power, which could have been ignored or taken for granted. Thus, this paper should be of importance to business, and the use of ST as a lens can be of interest to academia.

Through this study business managers will gain better understanding on how some factors, which include political rules, resources, people, and processes, can influence and impact the development and implementation of EA. Also, it will be of benefits to some organizations to understand the relationship that exists in a societal context, from different perspectives, when EA is problematized, before development and implementation are embarked upon. Another important factor that can be of interest for organizations is the interaction between actors, which has always been complex to understand. Thus, this paper's contributions are from three perspectives: First, it contributes theoretically through its addition to existing literature on how ST can conceptually enrich the practice of EA in organizations. Second, it methodologically advances the use of structuration in IS studies. Finally, the paper practically contributes to operationalization of EA through construction of exploratory of relationship and interaction between agents, to an understanding of its complexities.

However, there is more research and development work to be done toward EA advancement for organizational development. This paper therefore triggers further studies on complexity, but from individual domain perspective. This is

mainly because without in-depth and extensively addressing complexity, EA will continue to be challenging in many organizations. Also, other socio-technical theories, such as actor network theory (ANT) and diffusion of innovation (DoI), should be considered in such studies. ANT can assist in investing the roles of heterogeneous networks in the complexities of EA. Through the use of DoI, the impacts of complexities on EA deployment can be assessed and measured.

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