

IMPLEMENTATION ISSUES ENTERPRISE ARCHITECTURE IN THE PROVINCIAL GOVERNMENT OF THE WESTERN CAPE, SOUTH AFRICA

Andre C de la Harpe and Bongiwe Mtongana
Cape Peninsula University of Technology, Cape Town, South Africa

ABSTRACT

The implementation of Enterprise Architecture (EA) strategies in the Provincial Government in the Western Cape (PGWC) of South Africa did not result in the expected benefits for service delivery to the public. The aims of the research were to explore and understand the challenges the organization faced when implementing an EA strategy. The identified challenges were mapped to a proposed conceptual framework in a structured manner in order to propose a guideline for the implementation of business strategies. The lack of a unified vision, goals and objectives, poor communication and training in both business as well as the IT department resulted in a poor implementation of EA and the misalignment of business and IT strategies and outcomes. A conceptual framework and guidelines is proposed to evaluate and enhance the implementation of the EA strategies and alignment of business and IT strategies and outcomes.

KEYWORDS

IT Strategy, EA Framework, Alignment, EA Implementation

1. INTRODUCTION

The Provincial Government of the Western Cape (PGWC) attempted to implement Enterprise Architecture (EA) as a strategy in order to achieve the goals and objectives as set out by the national government of the Republic of South Africa. Efforts to implement EA in the PGWC did not deliver the expected benefits. The implementation of EA as a strategy is not only a technical challenge but depends on bridging the nontechnical challenges as well. The issues lie within the socio-technical environment where in many cases the wrong or ill-equipped people are chosen to do the implementations of such EA strategies. Flowing from the implementation is a lack of post implementation strategy, leading to the EA being experienced as a failure. The purpose of the paper was to explore and understand why EA implementations are not delivering to business the expected benefits.

EA addresses the purpose, structure and functioning of organizations, and embraces the systems and technologies that support their work. According to Zachman (1987) EA is a mechanism for defining and controlling the interfaces and integration of all the components of a system. EA as a strategy is defined as “an integrated set of actions aimed at increasing the long term well-being and strength of the enterprise relative to the competitors enabling the IT part of an organisation to bring change and makes the organisation more effective and efficient in order to drive business benefits” (Ward & Peppard, 2002).

According to The Open Group (2007), Polgreen (2010), Bernard (2010) and Bytheway (2011) EA is a *process*, rather than just a *framework* or a *method of thinking* that includes the formulation of business strategy, strategy implementation planning, information systems analysis and design, operations research and project management. EA contributes towards the future success of a business by providing rules and guidance for organisational change (Henderson, J.C. & Venkatramen 1989, 1990; Lankhorst & Lars, 2005). It involves the logical and analytical procedures that are used in the development of business processes, information systems specifications, and infrastructure requirements, of which are directly related to information management (McKeen & Smith, 2008). EA also allows for flexibility and adaptability in the organisation, by recognising and accommodating the fundamental aims and objectives of the business (McKay, 2008).

The challenges facing EA strategy and implementation are not only technical but also nontechnical (Chuang & van Loggerenberg, 2010). It is these non-technical challenges such as the role of the human factor in the alignment of business and IT strategies that hinders the forming of linkages between business needs and technology opportunities (Bytheway, 2004; 2012). The nontechnical challenges are emphasized in an organization such as PGWC. The nature of the organisation is one of diverse services with added complications such as the external political environment which sets the broad strategies for provincial government. The provincial level of politics where politicians are in a constant battle with each other and then the internal politics adds to the complexity, creating an unstable external environment.

In South Africa, according to Iyamu (2009), some EA implementation successes have been reported in the private sector. Although serious attempts to implement EA have been made in, for example, the Provincial Government of the Western Cape, no successes have been reported for the public sector. The Zachman's framework since its implementation in 2006 did not deliver the expected outcomes as PGWC claims that the Zachman framework does not cater for the needs of the business in practice. Further EA implementation was placed on hold until 2009 when it was decided to change to The Open Group Architecture Framework (TOGAF) methodology because it followed specific governance practices and practical approach to implementation of the EA strategy. Currently the TOGAF approach is still being used.

The aims of the research were to explore and understand the challenges the organization faced when implementing an EA strategy. This is due to the fact that EA implementations have not yet delivered on the benefits as expected by the stakeholders of the organization. The research question therefor is: Why do EA implementations at PGWC not deliver the benefits as expected by the stakeholders of the organization?

The layout of this paper is as follow: A short description of business and IT strategic alignment follows the introduction. The research methodology is shortly described followed by the findings of the research. The paper concludes with the conclusions and recommendations.

2. ALIGNMENT BETWEEN BUSINESS AND THE IT DEPARTMENT

By aligning business and IT, the organisation can utilise the capabilities within IT to improve the business outcomes (Burn, 1996; CognITech, 2002). The motivation for alignment appears from a focus on strategic business planning and long-range IT planning in the previous years (Luftman, J. & Brier, T. 1999; Symons, 2005). There are several EA frameworks to achieve alignment such as the Zachman , Gartner , The Open Group Architecture Framework (TOGAF) and the Federal Architecture Framework (FEA). A fifth framework namely the Information Management Body of Knowledge Framework (IMBOK) is also added (Bytheway, 2004, 2012). Sessions (2007) groups EA into four different types of methodologies and representing them with their attributes: (i) Zachman consists of six columns of what, how, where, who, when and why that design artifacts between the roles of design process (Zachman, 1996), (ii) Gartner creates the process for enterprise architecture vision to ensure that everybody understands the nature, the scope and the impact of the changes (Gartner, 2005), (iii) TOGAF consists of Architecture Development Method (ADM) component consisting of four consistent sub-architectures which are business, information, application and IT (The Open Group, 2002), (iv) FEA can be seen as the deployment of EA methodology and (v) IMBOK includes consideration of the movement of value by means of IT projects, business change management, improved business operations and performance management (Bytheway, 2004). The management areas of the IMBOK framework are Information Technology, Information Systems, Business Process, Business Benefit and Business Strategy, and the processes are projects, business change, business operations and performance management (Bytheway, 2004). None of these frameworks addresses the role of the human in the business and IT alignment process.

The framework as presented by Bytheway (2004) also omitted the important role of the vision in unifying an organisation. To include the vision, the framework is adapted to include the vision. The proposed framework starts a process from the business vision, strategies, business processes, information needed, to technology to support the processes and *vice versa*. It follows an iterative flow that gives the organisation the opportunity to evaluate, and if need be, rectify specific issues due to challenges or opportunities that may arose. Six entity domains are used to implement the EA strategy, showing the flow with the arrows, while it's linked to the four pillars namely business strategy, planning and implementation, information system analysis and design and operations and project management.

3. RESEARCH METHODOLOGY

An interpretive ontological structure was followed due to the social construct of EA. The chosen research approach is inductive in nature (Creswell, J.W. 2007; Saunders, Lewis & Thornhill, 2009; Neuman, 2011;). The research strategy is a case study at the premier's office of PGWC in the Ce-I (Yin, 2009). The data collection methods used was semi-structured questionnaires, literature, interviews and internal documents. For the interviews, the sample included the group (5) of Application Development Managers, Technology Managers (2) and employees for the Planning and Development Directorate which includes some of the IT department senior managers (2) and employees (3). The Planning and Development Directorate consists of twenty staff including the managers. Twelve key role players were interviewed. The unit of analysis for this research was the employees of PGWC.

4. FINDINGS

4.1 The Case Study

The Centre for e-Innovation (Ce-I) is a branch within the Department of the Premier in PGWC, managing the ICT needs all thirteen departments (PGWC, 2010). The Ce-I's vision is to *"facilitate the direction of effort in such a manner that it meets the concerns and requirements of the relevant EA stakeholders within PGWC"* (PGWC, 2010).

4.2 The Interviews

There are different versions of the vision of PGWC within Ce-I. This can pose a potential problem for the successful implementation of any EA framework, strategy, methodology or process, as these visions do not always support each other. These individual visions running in the DotP is a rather strange way to manage a "company" as the main vision must be the overarching vision, with the other departmental visions supporting the main vision. The different visions lead to different agendas, resulting in a confused and complex IT environment. *"Most departments or sections are operating independently, it is difficult to see PGWC as one organization or enterprise"* (Interviewee 5). *"We are looking for business to buy in. There is a lack of a vision for the business"* (Interviewee 4).

As a result of the confusion of the vision, business and IT strategies are not clearly defined and aligned. From the interviews it also become evident that top management is not involved or at least perceived not to be involved in the EA strategies. This can be an important reason for the different versions of visions that crystallised during the research. *"Top management needs to speak to the staff"* (Interviewee 3). *"To bind top management on business"* (Interviewee 2).

All of the interviewees indicated that the lack of communication is one of the most important reasons for the difficulties in implementing an EA strategy in PGWC. This was a refrain throughout all the interview sessions held and could explain the many visions going around, the confusion on business and IT strategies, and the lack of training of employees.

Interviewees also mentioned that not all the employees at PGWC understand what EA is and the benefits and value it could offer to the organisation. Some of the interviewee's definitions of EA show a lack of understanding of EA. The lack of understanding is not only on a lower level evident but includes senior managers in the IT department. This surprise finding places any attempt to implement an EA strategy at risk. *"PGWC employees do not understand EA"* (Interviewee 8).

Business processes are also an area of concern. Interviewees are of the opinion that business processes are not clearly defined. There are business processes with no systems supporting it and more than one system supporting one business process.

The organisation at large had little to do with the implementation and only a small group was responsible to implement the chosen EA frameworks. The absence of top and senior management in the implementation process is also problematic. These factors lead to a culture of mistrust, disinformation, and unrealistic expectations. From the interviews it became clear that no best practices were followed in terms of EA deployment. Table 1 represents a summary of the findings.

Table 1. A Summary of the Interview Findings at PGWC

Findings	
1	Business and IT strategies are not clearly defined and aligned
2	There is only a limited understanding of the benefits of EA to PGWC
3	The Zachman framework and FEA methodologies did not fulfill the expectations of PGWC
4	Employees lacks knowledge of EA as a strategy, method and tool within PGWC
5	Employees and stakeholders see EA as a change agent for PGWC
6	It governance is lacking at PGWC
7	There is very little communication between the stakeholders of EA within PGWC
8	An EA deployment strategy is lacking
9	Top management is not involved in the complex environment of the EA discipline
10	No benefits from current EA project.
11	IT projects outstanding
12	System requirements outstanding
13	Support community and Department lacking
14	Business processes not clearly defined
15	Information system not all clearly defined
16	The role of the human in the process is neglected

The business vision (BV), strategies (BS), benefits (BB), processes (BP), information systems (IS) and information technology (IT) were placed against the formulation of the business strategy, implementation, planning, information systems analysis and design, operations, research and project management (Figure 1).

The BV guides the business on a day to day as well as the future basis. The BS is formulated with specific regard to support the vision goals and objectives of the business. It is important that the BS generate the BB that are sought. The BP is most crucial to the success of the business. IS must support the BP and the management is responsible for carrying out their mandate. The IT requires infrastructure as well as methodologies and must be undertaken specifically with the business needs. The arrows indicate the relationships between the alignment of business and EA strategies. The inter-dependencies between all the elements are highlighted by the arrows. The IT department focusses on how applications are delivered, how technology and resources are required, used, monitored and managed. All of the interviewees are satisfied with the technical services. In contrast to the level of satisfaction of the technical services, both business and the IT department have expressed dissatisfaction with the *status quo*. The low level involvement of business in matters of the IT department is matter of concern. Furthermore, the lack of understanding of business and the IT department on how to achieve alignment is also evident from the proposed framework.

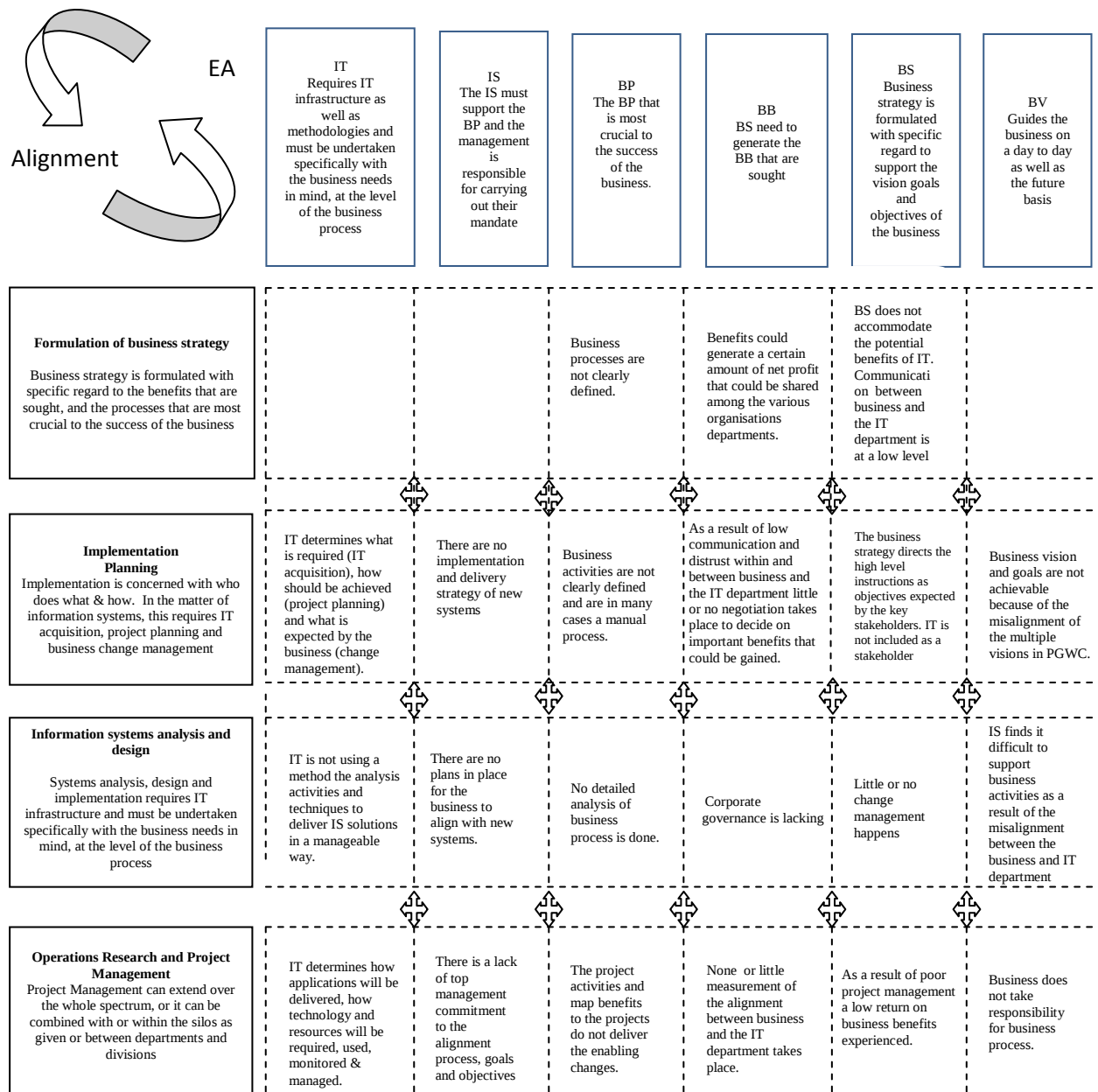


Figure 1. The Conceptual Framework with Findings of the Research Done in PGWC

The framework as proposed may be useful for governments and other non-profit organisations as it encompasses the technical as well as non-technical issues associated with the implementation of EA strategies. Critique against the proposed framework is that as in the case of the recognized frameworks, it also omits the role that the human plays in the alignment process.

From the findings, eleven themes were developed. The themes spans from alignment, benefits of EA, change management, communication within and between departments as well as top management, business and IT expectations, and governance. The themes also include business and IT strategies, domain knowledge within the organization and general management (Table 2). A brief summary of the responses from the interviewees to support the theme development is also added in table 2.

Table 2. A Summary of the Themes Developed as well as a Supporting Summary of the Responses of Interviewees

Themes	Summary of responses
Alignment	There is a shortcoming between business and IT and employees are unhappy with the situation
Benefits of EA	The interviewees do not fully understand the principles of EA and the benefits to the organization.
	Only two interviewees were able to give a limited view on EA and the importance of it in the organization
Change	EA is seen by the stakeholders as a change agent to bring about more alignment between business and IT
Communication	Understanding the information required from top to bottom and versa visa
Expectations	The Zachman and FEA frameworks were adopted by PGWC but they did not meet the expectations of PGWC.
	Interviewees had dispersed expectations of EA benefits
Governance	Best practice within PGWC.
	That governance is lacking
Knowledge	At this point of time (2012) the FEA is the architecture of choice
	There are inconsistencies to the question and the interviewees do not know exactly what the status of the deployment of EA is within PGWC.
	The interviewees could not explain or demonstrate how the frameworks were selected.
Management	The main factors influencing implementation of EA in PGWC can be summarized as i. communication ii. Understanding of EA and iii. Change management.
	Team work is lacking.
	Top management is not involved in EA
Strategy	No deployment strategy or methodology were followed within PGWC
	EA projects not well defined
Governance	IT projects outstanding
	System requirements outstanding
Communication	Support community and Department lacking
Requirements	Business processes not clearly defined
	Information system not all clearly defined
Alignment	Business and IT strategies not clearly defined and aligned

5. DISCUSSION AND RECOMMENDATIONS

PGWC chose the Zachman's framework as framework of choice in 2006. A year later (2007) the Federal Enterprise Architecture framework was introduced, but the chosen frameworks did not meet the expectations set by business and IT as it did not fully took into account the needs of the organization nor the complex human factors in the environment. The organisation also evaluated different frameworks such as Gartner, TOGAF and FEA and decided that TOGAF provided a practical approach in implementing EA. The evaluation was done on a cost to benefit ratio as well as specific time frames. More importantly the national government decided to follow the TOGAF route for government *per se* and the choice of TOGAF as a framework for PGWC was a logical outcome of the process. This unilateral decision makes buy-in from all the role players very difficult.

The ineffective linkages between business needs and technology opportunities create the misalignment between business and the IT department (Bytheway, 2012). In an attempt to create these linkages, the IT department started to implement an EA strategy. However, the results of these efforts to a large extent failed. The low level of executive involvement, poor communication, political pressure from outside and within the PGWC, lack of training, inadequate business processes, a vision everyone believes in, clear goals and objectives and the measurement of the IT department contributed to the misalignment and resulting non-delivery of the promised services to the public.

EA is a strategy and a process that assist business and IT to better utilize their IT infrastructure. To throw more hardware, develop more software, using more tools, deploying larger project office will not solve this wicked problem (Zachman, 2003; 2013). The conceptual framework used in this research highlighted that many of the issues that came forward points to the human factor. It is the human in the equation that makes

EA effective, that communicates, that develops processes and use information. The human factor must be taken into account. A person with the right behavioral skills and right technical skills must do the functions required (van Blerk, 2014). A concept of IT alignment intelligence becomes an appropriate term and the higher the organizations IT alignment intelligence the greater the chances for implementation success will be.

Based on the findings, guidelines that can assist with the implementing EA and creating an aligned environment between business and the IT department within PGWC were developed. It is proposed that the EA implementation and alignment processes start with (i) the executive management getting closely involved in the implementation and process of the business. This can be done by (ii) having a clear vision goals and objectives that is being (iii) communicated to the whole of the organization. Communication is not enough. All employees need to be (iv) trained, albeit on different levels, on EA and business processes. Executives and managers need to be (v) measured specifically on EA implementation and alignment and should be part of their key performance indicators. As EA is used to optimize the infrastructure of a business, (vi) change management becomes an important strategic tool. IT is recommended that a change management program be developed and implemented.

From the data gathered from the interviews the lack of senior management is evident. Senior management does not understand the broader concepts of EA and it seems as if they hope that by allocating money will solve the challenges that are facing at PGWC. It is proposed that weekly information and training sessions be held with senior management to give them the broader picture and also some background to what is needed for a successful EA implementation. Not only should senior management be informed and trained but should they get involved with the process by clearly stating the vision, goals and objectives and asking for feedback on regular basis in order to manage and control the implementation processes. These proposals can only be effective if the communication channels are open in all direction. Having these weekly training and feedback session will go a long way in achieving the required results. Having open feedback will create the needed trust within PGWC in order for implementation to be successful. As stated earlier, training should be done on a regular basis throughout the implementation of the EA strategies, but also very importantly, in the maintenance phase. This will allow the employees to get updated on new developments (not only on technology but also from the non-technological environment). One of the shortcomings of the EA implementation at PGWC is the lack of measurement of the goals and objectives of EA team and more importantly, senior management. This is especially true for senior management as they do not have EA as goals and objectives in their critical performance areas. The importance of change management with these processes has been under estimated by all involved with the implementation at PGWC. A well-structured change management program is needed to successfully implement EA strategies. Such a program will include all of the above factors discussed and will increase the effectiveness and efficiencies of the implementations.

6. CONCLUSIONS

This paper focus on the issues of implementation of EA and the alignment of the business and IT department of Provincial Government of the Western Cape in Department of the Premier within Centre for e-Innovation. The failed implementation of EA frameworks and the misalignment of business and IT strategies, goals and objectives result in the non-delivery of many services to the public. The proposed framework is recommended to be implemented by the organisation. There are several gaps and constrains hindering the implementation of EA in the PGWC organisation. Some of these constrains are the need for executive leadership in terms of communication, change management, business and IT strategies are important.

Further research will be required to establish whether the alignment problem is better addressed when the proposed framework and guidelines are followed. Research in terms of the human in the EA and alignment process is also needed.

The successful implementation of an EA strategy and process are important for the successfully of services by the PGWC. Without the successful implementation of EA the public will experience poor services and the economy at large will be negatively impacted.

The purpose of this paper was to explore and understand why EA implementations are not delivering to business the expected benefits of EA implementations. The results showed that the nontechnical challenges are contributing to the failure of EA strategies. The lack of communication, training, change management and especially the human factor are some of the challenges to overcome.

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