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# Enterprise Architecture (EA) as a governance tool to reduce application duplication: A case study of a South African Provincial Government

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**Masters in Information Management (MCOM (IM))**

**Full Thesis**

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# Declaration:

**Title of Master's Thesis:** Enterprise Architecture (EA) as a governance tool to reduce application duplication: A case study of a South African Provincial Government.

I, Farouk Gamiet, hereby declare that "*Enterprise Architecture (EA) as a governance tool to reduce application duplication: A case study of a South African Provincial Government*" is my own work, and it has not been submitted before for any degree or examination in any other university, and that all the sources I have used or quoted have been indicated and acknowledge as complete references.

Furthermore; it represents my own opinions and not necessarily those of the PGWC.
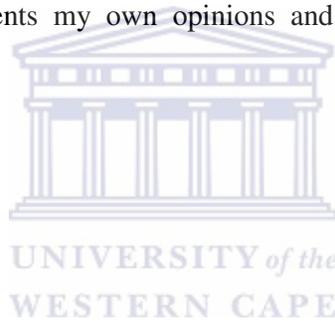
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Date

# Abstract:

The aim of this study is to investigate why the implementation of Enterprise Architecture (EA)in the Provincial Government of the Western Cape (PGWC)adopted in 2006,failed to be ineffective to address application duplication.

It was found that a number of EA critical success factors were not taken into consideration during EA implementation, especially the implementation of EA governance. The findings further uncovered a new "uncertainty" factor, which influenced the organisation's reluctance to deal with the changes brought about by the EA implementation.

PGWC should consider implementing the recommendations of this study and initiate a further study into the "uncertainty" that exists among their IT management with regard to its current EA adopted in 2006, to eliminate duplication in order to save taxpayers' money by achieving its intended objectives.

The findings will recommend the best way forward from an EA perspective and thereby saving the taxpayers' money by preventing PGWC from investing in a new Information Technology (IT) governance initiative (e.g. COBIT), as well as new unnecessary (duplicated) applications.

This finding will benefit other South African government organisations wanting to adopt an EA initiative in considering EA critical success factors and the importance of dealing with organisational change to avoid project failure.

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# Abbreviations:

ADM       (Application Developer Manager)

CEISAR  (Centre of Excellence in Enterprise Architecture)

Citcom    (Central IT committee)

COBIT   (Control Objectives for Information Related Technology)

Ce-I       (Centre for e-Innovation)

Ditcom   (Departmental IT committee)

EA         (Enterprise Architecture)

EARB     (Enterprise Architecture Review Board)

FEAF     (The Federal Enterprise Architecture Framework)

GEAF     (Gartner Enterprise Architecture Framework)

IS         (Information System)

ISA       (Information System Architecture)

IT         (Information Technology)

ITG       (Information Technology Governance)

PGWC   (Provincial Government of the Western Cape)

ITIL       (IT Infrastructure Library)

SM        (Services Manager)

TM        (Technology Manager)

TOGAF   (The Open Group Architecture Framework)

# Keywords

Critical Success Factors, Enterprise Architecture, Implementation, Government, Public sector, Change Management, Resistance to Change, Uncertainty

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# Chapter 1: Introduction

Owing to the current economic climate, organisations are forced to do more with less. This situation is crucial, especially from an Information Communication Technology (ICT) perspective, when government organisations are obliged to generate maximum value from taxpayers' money, in order to deliver an effective and efficient service to the South African citizen.

## 1.1 Background

This study is based on a preliminary case study conducted in 2008 within Provincial Government of the Western Cape (PGWC), Centre of e-Innovation (Ce-I),where the key purpose of the researcher was to identify the reasons for application duplication (Gamiet, 2009).

Although the initial study concluded that the lack of Information Technology Governance (ITG) as one of the major causes for application duplication, refer to *Appendix 2*, it was the awareness of an existing Enterprise Architecture (EA) and its effectiveness that identified the need to understand why the PGWC was struggling to successfully implement EA. EA is a methodology to unite business and IT to ensure that every rand invested by business in IT solutions delivers maximum value for the business (Ward & Peppard, 2003).

In that study, it was recommended to research "*Whether the EA implementation approach within PGWC was according to best practices and the success thereof would be a great topic for further research to add to this study*" (Gamiet, 2009).

The purpose of this research is therefore:

1. To determine the reasons why EA implementation introduced to PGWC in 2006 was not effective in addressing application duplication, and

2. To recommend the best way forward for the current EA implementation in order not to invest in another governance framework like COBIT to achieve the intended objective.

With the above in mind, this study will use data analysed in the preliminary study, refer to *Appendix 3,* to highlight the EA perception of the IT managers involved in decision making with regards to new applications, as well as conduct research in order to determine the ineffectiveness of EA to address application duplication.

The research will conclude by recommending the best way forward for PGWC to implement EA and present a guideline model and further critical success factors to assist in the successful implementation of EA in the PGWC.

## 1.2 Research Scope

The scope of the research is limited to examining the critical success factors influencing the effective adoption of EA Governance at the PGWC. The implementation of EA is driven by the PGWC Centre for e-Innovation (Ce-I).

## 1.3 The PGWC Centre of e-Innovation

The Centre for e-Innovation (Ce-I) is the central Information Technology (IT) component for the PGWC. It provides IT services to twelve departments and approximately fourteen thousand users across the Western Cape. Within Ce-I, a division called Planning and Development (P&D), is responsible for managing and maintaining of ICT standards for PGWC.

Their key priority is to standardise on strategic ICT planning across all departments in order to achieve economies of scale, eliminate duplication and promote interoperability.

In order to deliver, P&D invested in a structured approach by implementing an EA initiative in 2006 (Isaacs, 2006). EA is the methodology to unite business and IT to ensure that every rand invested by business in IT solutions, delivers maximum business benefit (Ward & Peppard, 2003: 2).

## 1.4 Research Focus

In an attempt to address the identified research problem this study will:

1. Focus on researching the current perception of EA implementation within PGWC.

2. In order to identify the reasons why the EA implementation is not effective at addressing application duplication.

## 1.5 Research Question

The main problem of this research is therefore to identify the critical success factors leading to the effective implementation of EA within the public sector. This can be converted to a research problem as follows:

**Research Question:** What are the critical success factors leading to the successful implementation of EA in the public sector?

**Secondary Question:** How can these critical success factors assist the PGWC (and other public sector agencies) to ensure effective implementation of future EA initiatives?

The above main research question instigates further (sub) questions:

1. Why adopt an EA approach?

2. How do organisations approach EA implementations and what factors influence their success?

3. What are the best practice methodologies for implementing EA and do they impact on the success of EA?

4. Can EA be used as a governance tool?

5. Which government organisation has implemented EA and what factors led to its success or failure?

6. What are the best practice tools for measuring EA implementation?

7. At what stage, or how is the decision made, to continue or stop the investment?

8. What can be learnt from the current implementation in order to aid future implementations?

To examine the research questions above, an extensive literature review will be performed in Chapter 2, so as to determine the critical success factors for EA implementation. This set of critical success factors concept, created during the literature review, will form the foundation for the research conducted within the PGWC.

From this literature, a number of questions will be derived to assist in uncovering the key aspects of EA implementation perception amongst key stakeholders in the PGWC. The questionnaire formulation and research method will be expanded on in Chapter 3. The presentation of the analysis and discussion thereof will be done in Chapter 4. This will be analysed and the findings will be presented in Chapter 5. Final recommendations and conclusion will be done in Chapter 6.

## 1.4 Ethical considerations

The project involved people as the research subjects. The researcher was aware of the necessary ethical considerations and specifically, for this project, the ethical considerations included ensuring privacy in government matters. The onus was on the researcher to ensure that the appropriate training and preparation for the work was carried out; that the rights and welfare of the human subjects were protected; that the identities and interests of those involved remained confidential, that the information imparted has been treated with confidentiality; and that the research was conducted in accordance with the ethical and professional practices of the information technology industry.

In addition, the researcher conducted confidential interviews across different government areas, stating these terms to the interviewees involved. The names of the interviewees were replaced by numbers: e.g. Interviewee 1, Interviewee 2, etc. All interviewees were presented with the Information Sheet and the Consent Form. These documents are given in Appendix 9.

## Chapter 2: Literature review

## 2.1 Introduction

Most companies have the perfect business strategy, cutting-edge technology and hard-working employees, but still fail to gain sustainable competitive advantage from their technology investments. Their return on investments will continue to decrease as the pace of business changes increases (Ross*et al*., 2006:1-3).

As a result of new technology being the driving force, more than 60 to 70% of companies' IT budgets are spent on operations. 10% of the budget is still available for use to try to find the perfect application that will support their actual business processes (Varghese& Kurien, 2004). Government organisations have an obligation to their citizens not to fall into this trap and invest in IT solutions that do not achieve the intended objectives which impacts on service delivery.

In large organisations individual departments implement initiatives to solve problems which are made in isolation because it is easier not to influence the organisation as a whole (Sanders, 2004). One of the major concerns that large organisations are faced with, is the "reinventing the wheel" scenario, especially with regard to application duplications. Very few public or private sector organisations have been able to reap the benefits of EA planning (Hjort-Madsen, 2007).

Therefore, this literature will mainly focus on the best and worst practice guidelines for organisations implementing EA as a governance tool, and to present an EA methodology guideline for success.

## 2.2 Enterprise Architecture

The Centre of Excellence in Enterprise Architecture (CEISAR)describes EA as a methodology organisations can use to assist in the transformation of daily operations through the sharing and reuse of elements (CEISAR, 2008).

Government organisations mostly adopt EA for the integration of organisational, information and communication technology silos and thereby increasing the reuse across public sector (Liimatainen, 2008: 353). They also invest in EA to ensure inter-operability of different processes and information systems to avoid duplication (Janssen & Hjort-Madsen, 2007).

Overlapping application functionality cannot be entirely eliminated, but overlapping problems can be managed and reduced where they occur inEA. The EA approach is a centralised methodology to document the current state, identify the future state, and then close the gap with regard to IT within the organisation (James, 2005).
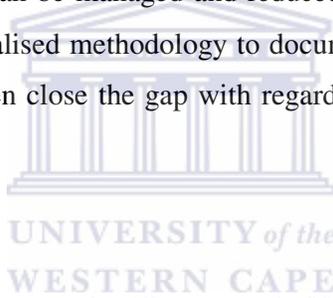
## 2.2.1 EA Benefits

EA adds value to organisations by (Gregor *et al.*, 2007):

1. Providing a common foundation for understanding and communicating how systems are structured to meet the business objectives.
2. Providing a common approach to the selection, design, deployment of all IT solutions to support the business.
3. Allowing stakeholders to prioritise and justify technology decision making based on the bigger picture.
4. Providing a consolidation and simplification of systems planning, funding and development to minimise risk.
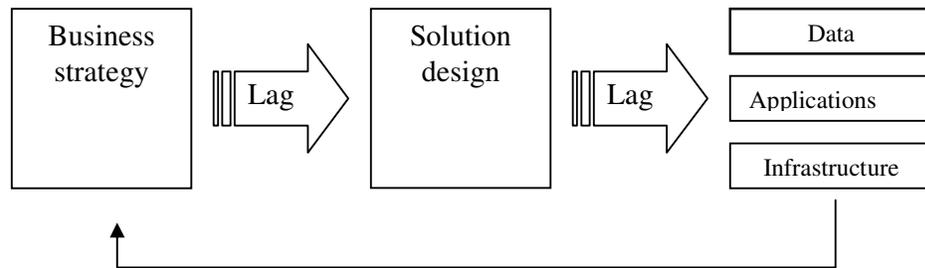
**Figure 1: IT-Business Alignment Problem (Ross*etal*., 2006: p3)**

*Figure 1* illustrates the major challenge with which organisations are faced with in trying to achieve their objectives by using IT as an enabler. According to the Centre for Information Systems Research (CISR, 2007), it is very difficult to have IT strategy support a business strategy if it is not defined. EA approach is the methodology to define IT strategy in an executable structure to support the business strategy.

## 2.2.2 EA Challenges

True value in EA is a long term process and needs to be revised and maintained to remain valuable and allow for business change (Ross *et al*., 2006: 3).Although many research articles highlight the benefits of EA, not a lot of empirical research has been conducted to support these claims (Boh & Yellin, 2007). Hence, this study will examine the challenges, critical success factors and lessons learnt of EA implementation globally to assist organisations in achieving their EA benefits in future.

Some of the key reasons for EA failure in large organisations are the inability of business to clarify their business requirements to their IT component. The IT people on the other hand are constantly applying technology changes and are unable to describe the impact in such a way that the business understands the risks. Many of the EA efforts are documented and open to interpretation due to the lack of verbal communication to present a common understanding (Bailey, 2006).EA provides a standardised architecture for applications but does not tell you how to execute them, who will use them, or at what level they will operate within an enterprise. Based on this statement, the importance of EA governance process, or

the EA alignment to co-operate, or ITG becomes vital to ensure a successful EA implementation.

What often needs to happen is that an understanding of the organisation and what it has to achieve needs to be re-assessed. This then allows the organisation to start investing and aligning the business perspectives to a common goal shared across the various business units (James, 2005).

## 2.3 EA implementation process

The foundation of EA is to translate strategies to IT capabilities that will enable a business to achieve its objectives. The aim is to capture an organisational view of their business goals, business tasks, activities and the relations to the technology required to execute them (Schekkerman, 2004). The EA process describes and implements the organisation's strategies which are actual plans to inform the enterprise how to operate (Wegmann, 2003).

*Table 1* presents the most commonly adopted EA processes by organisations to guide their implementation.

| | EA implementation process | | | | | |
|---|---|---|---|---|---|---|
| Author | Step1 | Step2 | Step3 | Step4 | Step5 | Step6 |
| Lapkin (2009) | Create future state architecture | Document current state architecture | Develop gap analysis between future and current state | Define a roadmap to achieve future state | *Develop a Governance framework to support the architectures* | *Develop a communication plan to support the EA efforts* |
| Pearlson & Saunders (2004) | Define strategic goals | Translate theses goals into business requirements | Define the existing architecture | Translate the requirements into infrastructure (includes, hardware, software and data) | *Evaluate additional management issues* | |
| Ross *et al*(2006) | Define the organisations' | Define the key IT capabilities | Define the policies and | | | |

| | strategic objectives | to achieve these objectives | technologies to develop the IT capabilities | | | |
|---|---|---|---|---|---|---|

**Table 1: Preferred adopted EA processes**

Current state or "As-Is" EA describes the organisation's current business processes, resources and technologies. Future state or "To-Be" EA describes the capturing of the business strategic thinking that is formulated into business and technology plans. Gap analysis describes the changing of the organisation from the current state to the future EA state to meet the business objectives (Schekkerman, 2004).

The EA processes illustrated in *Table 1,* all follow similar steps in capturing an organisational view of the scope of an EA implementation plan but not necessarily in the same order. From a business process, people and technology perspective, all tree processes agree that one should start with capturing what is currently in place. The next step would be to determine the business requirements to achieve their objectives. The final step would be to define the IT solutions that will enable those requirements to achieve the organisational goals. This concept has evolved over the years, Pearlson and Saunders (2004) added step 5 highlighted in italics called *Evaluate additional management issues*. Lapkin (2009) adds an extra two steps also highlighted in italics, namely step 5 to *develop an EA governance framework* and step 6 to *develop a communication plan*. This is to add value in improving the communication during the EA project and to enforce compliancy to the EA artefacts to ensure alignment between business and their IT component.

Companies that have shown growth in their EA competency have adopted the following four stages in IT architecture approaches (Ross*et al*., 2006: 3-6):

1. **Application silo architecture:** A focus on individual applications instead of a wide enterprise approach.
2. **Standardised technology architecture:** Delivery by standardisation and centralisation on the entire enterprise in some instances.

3. **Rationalised data architecture:** Standardisation of IT architecture that includes data and processes.

4. **Modular architecture:** The architecture is made up of global standards but allows for integration of applications, data and technologies to make provision for local differences.

Most organisations are at stage two and do not reach the fourth stage. Stage two is when the organisation moves from silo application to shared infrastructure but application functions are still present in individual applications. At stage 3 the criteria shifts to standardisation of business processes and centralised data which identify the future IT initiatives. During this stage business functions can be identified across the entire enterprise to develop centralised applications that service the entire organisation e.g. supply chain, communication and human resource components. Organisations that do not drive their EA to go beyond stage 2, will always be faced with application duplication and benefit only within each silo they operate in, and not as an enterprise (Ross*et al*.,2006: 3-6).

*Table 1*illustrates an EA process adoption specifically from an applications perspective that follows the concept presented in *Table 1*to identify and eliminate duplicate application functions (James, 2005).
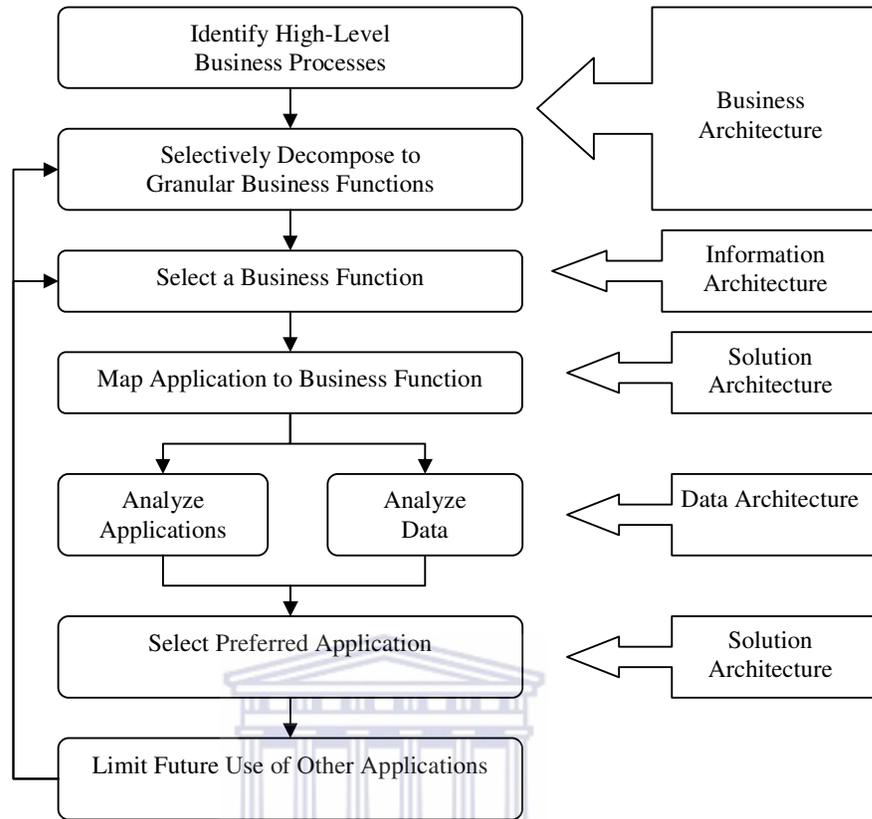
**Figure 2: Iterative process to identify and eliminate duplicate application functions (James, 2005:p3)**

Steps in *Figure* 2 process include:

1. **Identifying high-level business processes:** Understand what the organisation does and aligning it to its business strategy. This will display part of the business architectural view.

2. **Selectively decomposing business functions:** Select only the key processes that will be used to implement the business strategy. This is also part of the business architecture.

3. **Selecting a business function**: Highlight the business functions that will activate these processes. This step adds to the information architecture.

4. **Mapping application to business function:** Identify the applications that will perform these business functions. In some cases a single function will be performed by several applications and in others several functions will be performed by a single application. This step forms part of the solution architecture.

5. **Analysing applications and data:** Determine the technologies for each application and identify the non-compliant applications. This forms part of data architecture.

6. **Selecting preferred applications:** Identify all applications that will perform the desired business functions and be reused. This also forms part of the solution architecture.

7. **Limiting future use of other applications:** Prevent the use of other future application.

The above process can be repeated for each business function throughout the organisation and thereby eliminate future application duplication (James, 2005).

The tools that is used during an EA implementation to capture an enterprise view of the organisation's EA current, future and gap analysis is EA frameworks.

## 2.4 Frameworks to implement EA

EA framework is a methodology used to define information systems in terms of a set of building blocks, displaying how they fit together. A framework consists of different approaches and models of communicating the entire organisation's architecture components. EA framework presents a common view for defining and describing complex enterprise systems throughout the entire organisation (Zachman, 1987).

A brief overview of the four most commonly used EA frameworks will be summarised to determine whether the framework selection impacts EA implementation success (Sessions, 2007).

## 2.4.1 ZACHMAN Framework

The Zachman framework was originally proposed by John Zachman in 1987 and extended in 1992. It is an integrated framework with the aim of managing change and systems complexity in an enterprise. John Zachman is regarded as the person who introduced the concept of Information System Architecture (ISA).

Zachman's vision was to propose a holistic approach when looking at the organisational structure, by capturing every important issue and every important perspective and their relationships to each other across the entire enterprise, refer to *Figure 3*.
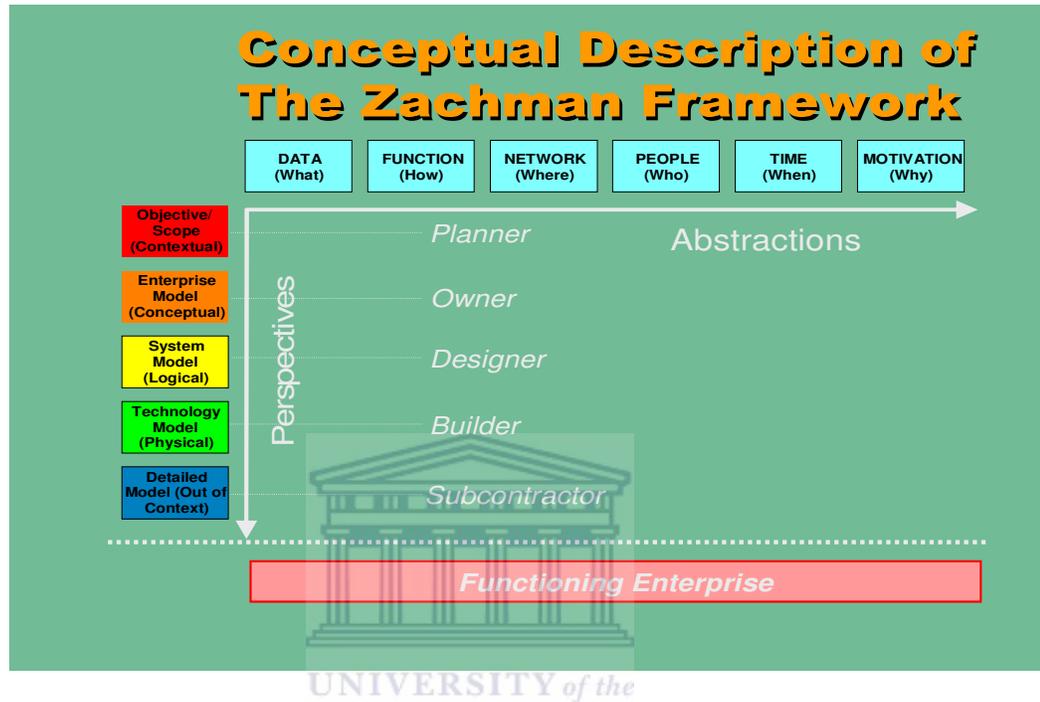


**Figure 3: The Zachman Framework (Zachman, 1987: p276)**

*Figure 3* summarises the Zachman framework by portraying abstractions flowing from the left to right (what, how, where, who, when and why), and the different perspectives or views of the (planner, owner, designer, builder and sub-contractor) flowing down. When you understand these abstracts and perspectives on their own and the relationship between them with regard to the defined descriptive (data, function, network, people, time and motivation), refer to *Figure 3*, you have a good understanding of the Zachman methodology.

To simplify things further, let us use an example of just the data and how it is viewed from within the Zachman framework. From the owner's perspective, data is viewed as a business entity e.g. clients and products. The designer might view the data as rows and columns organised in tables. A relationship needs to exist

between the two perspectives in order to create a single view of the enterprise's data, resulting in a common outcome.

The Zachman framework, on its own, is not a complete solution. It does not provide a step by step process to create new architecture, provide decisions as to whether the architecture created is the best for the future, or whether to use the top-down or bottom-up approach. Organisations with integration as an objective, will find the Zachman framework suitable for their purpose (Zachman, 1987).

## 2.4.2 The Open Group Architecture Framework (TOGAF)

TOGAF, established in 1995, is an open source framework, freely available for organisations to access and develop a comprehensive approach to the design, planning, implementation and governance of an EA. Most private and public sector organisations are adopting the TOGAF methodology to provide reduction of IT system complexity, creation of clearly defined interfaces, provision of well-integrated IT solutions and better management of IT services (Hillard, 2003).

TOGAF has a four domain approach to EA, business, application, data and technical architecture, refer to *Figure 4*.
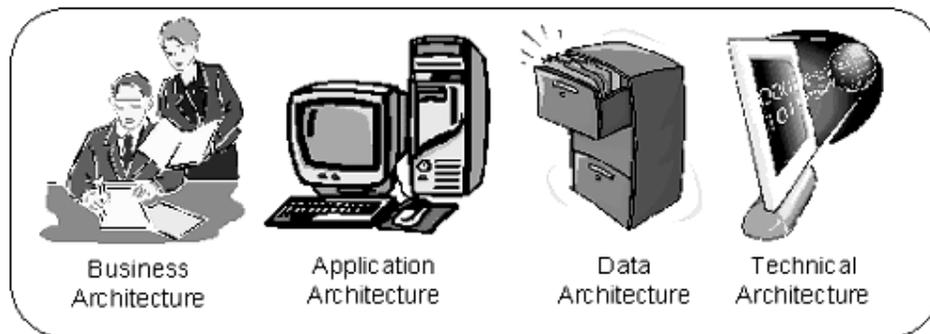


**Figure 4: TOGAF Enterprise Architecture (TOGAF, 2003: p300)**

Although much of TOGAF was derived from the Zachman framework, it goes further in providing a step by step process to EA, and the possibility of defining the future architecture and it can be implemented in a phase approach. Based on

the area of concern, TOGAF allows you to start with any of the four architectures when faced with a budget constraint, refer to *Figure 4*.

Business architecture describes the *processes* the business uses to achieve its objectives. Applications architecture describes the *application designs* and their interaction and relationship with each other. Data architecture describes how the *enterprise's data* are accessed, stored and organised. Technical architecture describes the *hardware and software infrastructure* needed to support the applications and how they interact.

The fact that TOGAF is an open methodology without constraints provides a great potential for it to become the leading methodology for the future in establishing a unified EA (TOGAF, 2003).

## 2.4.3 Federal Enterprise Architecture Framework (FEAF)

FEAF was developed in September 1998 to specifically assist Federal Government to establish a shared environment by promoting common processes, interoperability and information sharing across all government segments. This approach was developed to assist agencies to describe its organisation's business, the data that perform the business, systems that manage the data, and the technology that support their systems (Urbaczewski & Mrdalj, 2006). FEAF was developed based on the following reference models, namely:

1. **The Business Reference Model:** Describes a view of the operational functions performed by each government agency, including the services it provides to the citizens.
2. **The Data Reference Model:** Describes the data and information that supports the operational functions and their relationships.
3. **The Component Reference model:** Describes an IT view of the systems that support the business to encourage the reuse of systems across government entities.
4. **The Technical Reference Model:** Describes the technology and the standards to build the IT systems.

5. **The Performance Reference Model:** Describes a common set of performance measures that the agencies can use to achieve its objectives (Sessions, 2007).

The above mentioned five reference models can be used together for the improvement of government-wide service delivery by identifying duplication of IT investments, interoperability, and integration across all government agencies (Sessions, 2007).

## 2.4.4 Gartner Enterprise Architecture Framework (GEAF)

Gartner is known as one of the leading IT research and consulting companies in the world. He further defines GEAF as being a practice and not taxonomy like Zachman, a process like TOGAF, or methodology like FEAF (Sessions, 2007).

Gartner believes that EA is about bringing together the stakeholders, information specialists and the technology implementers to share a common vision to ensure success. Start with the future state and concentrate on what needs to be done to get there, instead of documenting standards about the current state (Sessions, 2007). GEAF consists of an enterprise business architecture which describes the process and concerns of the business, information architecture to describe the flow of information and modelling and technology architecture to describe the technical implementation and operational issues of the technology.

The above mentioned viewpoints will provide stakeholders a view of the organisation's content. This will enable more effective and efficient decision making in achieving its future vision (James, 2005).

EA frameworks have very little to do with the success of an EA implementation. The main criteria of EA frameworks are to provide consistency and structure to enable a single view of the organisation's EA concepts. They also encourage EA teams not to waste too much time on deciding on an EA framework but rather focus their energy on real EA business which directly impacts on EA success, such as communication, support and stakeholders (Lapkin & Weisis, 2008).

## 2.4.5 Criteria for choosing EA frameworks

The following best practice criteria models for choosing an EA framework will prevent organisations from wasting time and energy when choosing a framework and getting started on the real EA business.

Organisations can adopt the following criteria to simplify the process of choosing an EA framework (Lapkin & Weisis, 2008):

**Consistent and structured:** To ensure that the EA framework's key function is to organise the EA concepts and clarify their relationships in a clearly defined manner.

**Business-strategy-driven:** The framework must start with the analysis of the business strategy. This will ensure that the EA delivers in accordance with the expected business requirements.

**Iterative:** EA should start with the business strategy, continuing through to the roadmaps for implementation in the end.

**Defined process:** The framework should consist of a defined process of translating the business strategy into executable solutions to achieve the future vision.

**Clear deliverables:** The framework must highlight all deliverables and their relationships.

**Usefulness:** The framework deliverables should be useful to all stakeholders and support the governance process. The selected framework should display deliverables that meet the EA customers' needs and not just EA talk.

**Customizable:** The framework must be adaptable to change and seamlessly able to latch on to elements from other frameworks if required.

**Easy to use:** Enterprise architects should choose a framework to make their task easier and not more difficult.

**Broad:** The framework should not only address technology, but the entire enterprise to ensure a complete view of the future state view.

**Simplified communications:** The framework should communicate the deliverables to stakeholders in an easily understandable format.

The most commonly use EA frameworks are Zachman, TOGAF, The Federal
Enterprise Architecture Framework (FEAF) and the Gartner EA Framework.
Zachman is described as taxonomy, TOGAF more a process than a framework,
FEAF as a descriptive methodology to implement EA and GEAF more as an EA
practice (Session, 2007).

Organisations that are looking to adopt one of the above common EA frameworks
may use the following criteria in choosing a framework depending on their
environment and requirements (Session, 2007):

**Taxonomy completeness:** Based on the Zachman framework.

**Process completeness:** A step by step process.

**Reference- model guidance:** Building a relevant set of reference models.

**Practice guidance:** Culture creation in which it is valued and used.

**Maturity model:** Guidance provided in assessing effectiveness and maturity in
using EA.

**Business focus:** Using technology to drive the business value.

**Governance guidance:** Creating an effective governance model to drive EA.

**Partitioning guidance:** How the framework will guide you in partitioning the
enterprise which is the key in managing complexity.

**Prescriptive catalogue:** Guidance in acquiring an architectural asset catalogue
to be reused for future activities.

**Vendor neutrality:** How the organisation can be a vendor locked-in by
choosing this methodology.

**Information availability:** Refers to the free or low cost information about this
framework.

**Time to value:** Time that this framework will be used to actually build
solutions that will deliver high business value.

Based on the above criteria a comparison study was conducted between Zachman,
TOGAF, FEAF and the Gartner EA frameworks which reached the below
subjective results, refer to *Table* 3. Each framework was rated with reference to
the criterion from 1 to 4, concluding as follows:

1: Does a poor job in this area.

2: Does an inadequate job in this area.

3: Does an acceptable job in this area.

4: Does a very good job in this area.

| | Ratings | | | |
|---|---|---|---|---|
| **Criteria** | Zachman | TOGAF | FEAF | Gartner |
| Taxonomy completeness | **4** | 2 | 2 | 1 |
| Process completeness | 1 | **4** | 2 | 3 |
| Reference-model guidance | 1 | 3 | **4** | 1 |
| Practice guidance | 1 | 2 | 2 | **4** |
| Maturity model | 1 | 1 | 3 | 2 |
| Business focus | 1 | 2 | 1 | **4** |
| Governance guidance | 1 | 2 | 2 | 2 |
| Partitioning guidance | 1 | 2 | **4** | 3 |
| Prescriptive catalogue | 1 | 2 | **4** | 2 |
| Vendor neutrality | 2 | **4** | 3 | 1 |
| Information availability | 2 | **4** | 2 | 1 |
| Time to value | 1 | 3 | 1 | **4** |

**Table 2: Criteria and ratings for each methodology (Sessions, 2007)**

Based on the results displayed in *Table* 3, it is evident that none of the EA frameworks offers a complete solution as each has strengths and weaknesses in a particular area. Organisations may use the above methodology for choosing their EA framework based on the above criteria that is the best fit for their business objectives (Sessions 2007).

Many EA frameworks exist but they all differ in their approach and level of detail. The Zachman framework appears to be the most comprehensive by including all viewpoints of the EA elements (Urbaczewski & Mrdalj, 2006).It is difficult to implement a successful EA by using a framework developed in the 1990s (Lapkin & Weiss, 2008). The best-fit framework is entirely dependent on the stakeholders needs for the specific project. Most frameworks only represent certain viewpoints of the aspects (Urbaczewski & Mrdalj, 2006). TOGAF is acknowledged as one of the best frameworks. EA success is not necessarily attributed to the framework you choose, but to the ability to understand and work correctly with the

framework, especially in all aspects that are of importance to the enterprise (Luftman & Brier, 1999).

## 2.5 EA Critical Success Factors

Very few public or private organisations have reaped benefits from their EA implementation (Hjort-Madsen, 2007). This is mainly due to the EA project team getting so caught up in technology standardisation and never reaches the process or application integration efforts (Ross, 2006).The future EA state does not reflect the business strategy and reuse of technologies, information and business applications are not encouraged (Schekkeman, 2004: 25-26). This study will further look at EA best and worst practices to assist organisations implementing EA to achieve their intended benefits.

## 2.5.1 EA Best Practices

EA has to be driven by the business to be successful. The quality of EA is dependent on the entire EA project team and all role players. By assessing the current state, this will prevent re-inventing the wheel and reduce application duplication. EA may be viewed as less valuable and have limited impact due to the lack of integration with strategic plans (Burton, 2009). The key success to a good EA is to ensure that it is driven by the business and not by IT, and not at an operational level, but at a top management level. It is also important that the initiatives presented are taken further for execution (Campbell& Mohun, 2007: 229-234).

EA implementation is entirely dependent on gaining support and allocation of key resources in the organisation. Documenting and understanding your key stakeholders is the most important success factor in EA adoption (Burke, 2008).

| Title/Role | Level of influence | Perception of EA | Power | Issues | Opportunities | Decision Style | Personal Character |
|---|---|---|---|---|---|---|---|
| Jane Doe CEO | Decision maker | Positive | Formal | EA strategy that delivers results | Solid strategies for future growth | Directive | No-nonsense and all business |

**Table 3: Sample Stakeholder Analysis (Burke, 2008: p4)**

*Table 2* illustrates a suggested sample template that could be used to identify and gather key information from your stakeholders.

## 2.5.2 EA Worst Practices

The best practices for EA to ensure success have been highlighted above. What about the factors that should be avoided when adopting EA to prevent failure? Gartner conducted a global study that highlighted key "worst practice" approaches for EA initiatives (Lapkin, 2009):

**Start anywhere but at the top:** Due to the fact that business tends to view architecture as a technology problem, it refuses to get involved. The problem with starting from the bottom is just an exercise of standardising platforms and products but does not identify the solutions that should be used to achieve the objectives of the business. Starting EA with a business strategy which defines the technology strategy ensures that the technology solutions will meet business requirements. In summary, a top-down approach best supports an EA initiative.

**Start with a bang:** Adopting an EA initiative is a long term process which does not necessarily deliver benefits at the beginning. It is important for the EA team not to raise the expectation of the business but rather to deliver in a phase approach. At the initial stage, the EA team will only deliver on current information in the form of presentations and diagrams. Setting clear goals upfront by the EA team, will not lead to under deliver expectations by the business.

**Assume that someone else can do the hard work:** IT often makes use of consultants when adopting EA due to the lack of architecture skills. The problem it faces is that staff expects the consultant to do the work instead of working with the consultant. If the consultant is doing the work for you and not with you, how will *skill transfer* be achieved for future maintenance and support?

**Do not communicate until it is done:** Technology is directed by the business needs. If you cannot define the business functionalities, thus EA will fail. This can be prevented by proper and regular communication with business and IT throughout the entire EA implementation. The request for an EA consultant should be based on their EA experience and not your experience in the industry.

**Take too long:** When the EA team takes too long to display any benefits, the business will lose interest as changes or the initial requirements are no longer valid.  It should not take more than 3 months to deliver high level information and technology architectures as a first phase. Full-time staff should be assigned to the EA project to deliver within the timeframe and prevent business and IT from losing interest.

**Leave it on the shelf:** The organisation must ensure that its EA directly impacts on all developments and ICT investments by consulting their EA technology when making decisions. By not governing this approach, EA will end up as a document filed away on a shelf.

**Assume the architecture is "done":** EA is never done. It is a continuous process to accommodate changes in business strategy to align technology. Organisations that think of EA as having a beginning and an end date will face the following challenges of their EA becoming obsolete:
- EA delivers limited impact due to resources relocation
- their EA is not aligned to management expectations and
- the EA efforts are not realised.

Many organisations adopting below worst practices has struggled to realise their EA benefits due to the adoption of the following worst practises (Burton, 2009):

**No link to strategic planning and budget processes:** The EA process is there to ensure that all strategic processes are linked to support the organisation's future state. No linkage to the current business strategies and budget will result in less EA value and limited impact.

**Over standardisation:** EA teams sometimes concentrate too heavily on defining technology, processes and services standards without aligning them to business needs. The EA team should limit the standard to the specific need of the business. The problem with too many standards is that users will purposely ignore the defined standards. The EA team is reputedly busy watching if standards are adhered to and EA efforts are not seen as being strategic.

**Lack of business focus:** The organisation tries so hard to create an EA through educating and facilitating that it forgets the business value of its EA efforts and does not focus on business, people and processes.

**Analysis Paralysis:** Due to the lack of business vision and governance, the EA teams are unable to make decisions and focus too much on one specific area. If the scope, value proposition and governance are not defined during the initial stage of EA, they should immediately stop what they are doing and address this issue.

**'Ivory tower' approach:** EA teams must not view their role as telling the organisation what to do, but focus on empowering others and delivering business value.

**Lack of open communication:** When a US company was asked about its EA efforts after one year, the architect responded by saying that they were not yet ready to share their information outside the EA team. EA teams must provide

easy ways of sharing and communicating their EA artefacts as this would enable the business and IT to make better decisions. They can make use of presentations, blogs and internal web sites for communication.

**Lack of feedback loop:** EA best practice is to continuously make EA information available to business and IT to enable it to understand and implement the stakeholder's requirements. If business and IT do not understand what EA expects from them, how can EA be implemented successfully?

**Technology driving the architecture:** In most organisations EA is initiated by IT leaders due to the applications, technology and services they manage and a need to align to business. This causes the initial stage of EA to become technology architecture and to have limited EA impact across the enterprise by not focusing on business information and solution architecture.

**Technical talent and skill set:** The EA team should not be made up of only IT resources with a strong technology background. Nor should an architect with only a strong technical skill be hired, but should include strong business people with expertise in processes and communication.

**Tools driving EA:** Organisations tend to purchase the EA tool first in order to kick start the project and end up with the tool defining the processes. This approach will not include the business needs and will take focus away from the crucial work of understanding the business goals, defining what problems need to be address, defining the correct processes and governance.

**Focusing on the current state first or primarily:** Government organisations tend to hire consultants to do their EA which normally produce documents containing an inventory of current applications, technologies and infrastructure. This approach will end up with a continuous current state documentation, without ever defining the future state.

In order to mitigate some of the worst EA practices presented above, the EA project team should take a top-down approach by starting the EA implementation with the business strategy and work their way to the technology. The aim is to try to deliver the business architecture within the first 3 months of the project. The team must not raise the expectation of the client and communicate and approve at each stage of the EA project. Dedicated full-time staff is recommended to work on the EA project to maintain and transfer skills. Control points, management processes and regular reviews should be inserted in the EA implementation to keep the EA documents alive and allow for organisational change (Lapkin, 2009).

Government or private organisations that are faced with adopting an EA initiative and do not know where to start or how to approach EA, may start by using all the above best and worst practices for an EA adoption as a guideline to success (Burke, 2008).

## 2.6 EA as a governance tool

Several control frameworks have been developed that support the implementation of IT Governance. IT governance is the organisational capacity driven by the board, executive management and IT management to control the IT strategy formulations and implementation to ensure the alignment of business and IT (Van Grembergen & De Haes, 2005).There is no single defined methodology as it is dependent on the size and scope of the organisation to ensure proper decision rights, designed and monitored IT processes (Weill & Woodman, 2002). Some of the common frameworks are:

1. Control Objectives for Information Related Technology (COBIT) provides a high-level approach to processes and the way in which the organisation's performance can be managed, assessed and monitored (ITGI, 2005).

2. IT Infrastructure Library (ITIL) is the best practice approach for service support and service delivery (ITGI, 2000).

3. The Code of Practice for Information Security Management (ISO/IEC17799:2000) provides guidelines for security processes and controls standards for information in an organisation (Wallhoff, 2004).

4. Capability Maturity Model (CMM) assesses performance of an organisation's processes (ITGI, 2000).

5. TOGAF established in 1995 is an "open source" framework, freely available for organisations to access and develop a comprehensive approach to the design, planning, implementation and governance of an EA (Hilliard, 2003).

Organisations adopting the above best practice control frameworks will ensure that IT is managed as a routine part of their daily activities and will help with quick implementation of good procedures that avoid re-inventing the wheel (ITGI, 2005).
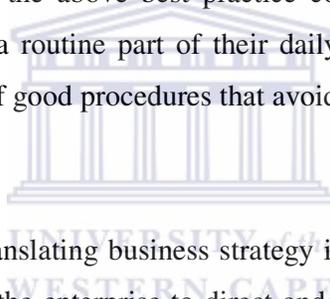
EA is the process of translating business strategy into effective plans and ITG is the method needed for the enterprise to direct and control resources to get there. EA and ITG should be closely linked so as to leverage results from each other (Burton *et al*. 2008).

The relationship between EA and ITG can be perceived as follows (Burton *et al*. 2008).

1. Organisations that have an effective EA and an effective ITG initiative must ensure that their inputs and outputs are aligned.
2. Organisations that have an effective EA initiative but not an effective ITG initiative should use the EA to create the ITG model by focusing on the same business objectives.
3. Organisations that have an effective ITG initiative but do not have an effective EA initiative should use the ITG model to develop an EA

programme by creating a more practical use of content in applying governance.

4. Organisations that do not have an effective EA and effective ITG should carefully consider their level of investment when supporting EA and ITG.

Due to an overlap between EA and ITIL, their efforts should be closely linked to improve the IT services across the enterprise. EA can amplify the value of ITIL by linking it to the EA works and making it visible to enterprise stakeholders (Robertson, 2009).

Governance is the way in which important decisions are made by the enterprise to ensure success. Whether it is corporate governance, ITG or EA governance, without a governance process or alignment to it, this can result in project failure. CEISAR recommends their five-step decision process that could be used for architectural projects, namely (CEISAR, 2008):

1. Gather requests for all solution projects.
2. Decide on the priority of all the solution projects.
3. Do a compliance check for all solution projects.
4. Take a "go/no go" decision after a design and project evaluation for each solution project.
5. Check results, compare with objectives and take actions at the end of each solution project.

Effective management is the most important step towards your governance structure. The major reasons for ineffective management are the lack of user involvement, incomplete requirements, lack of executive support and planning. This all contributes to the investment in systems which is no longer needed (Brown, 2006).

The lack of top management's active commitment is the major risk for all project failures. Effective EA governance ensures that EA content are being used to deliver value (Bittler, 2009). Due to the lack of governance, EA teams are unable

to make decisions (Burton, 2009). The above reasons for ineffective management illustrate why EA has developed its own governance process as part of its entire solution. Organisations should identify all current governance methods in place and create a single governance culture approach for all initiatives (Kyte, 2007).

## 2.7 EA case studies

Very few in-depth case studies looking at EA success stories have been published in IS/IT literature (Martin, 2005),This study will further look at actual EA implementations in government organisations globally, with an attempt to highlight their EA adoption experiences that impacted on success or failure.

## 2.7.1 Case study: USA Federal Government

A multiple case study was conducted in the USA Federal Government of 12 agencies to understand the reasons and the circumstances for adopting EA planning. Semi-structured interviews were conducted with twenty-one people from the twelve different public agencies. The key contact persons in all agencies were the chief enterprise architects, the chief information officers (CIO) and lawyers from two agencies. After an in-depth data-analysis, three distinct patterns for EA adoption planning within the twelve agencies were identified as (Hjort-Madson, 2007):

**Acceptors:** The CIO stated that they initially adopted EA to get financial support for their IT projects. Three of the twelve agencies were described as being acceptors. A key observation within this pattern was that none of the CIO officers had control over or decision making power with regard to IS-budgets. Their role was purely from a technical perspective with no regard for EA planning. The findings question the adoption of EA and its impact on their IS planning and see the resistance to change as the major stumbling block.

**Improvers:** The seven agencies identified in this pattern adopted EA primarily to reduce the diversity of their technology and to eliminate redundant and obsolete applications. The CIO's in these patterns claim that EA is not fully understood by management but see it as a compliance tool and

accept that they have to do it. Findings presented indicate that two out of the seven agencies in this pattern have reaped the benefits of their EA. This is due to the fact that the IS department controls the IS-budget and all agencies using an EA framework with an enterprise-wide view of their business and technologies, EA planning for improvers helps guide executive decisions.

**Transformers:** This pattern is perfect if the need is to change the way government does things. According to the chief enterprise architect, management took a while to understand but listened when the EA team talked. Only two agencies can be identified as transformers and they used EA as an administration transformation tool.

The findings concluded by highlighting the failure of agencies that did not benefit from their EA implementation was due to adopting EA to get financial support for IT projects. Their CIO's had no control over the IS-budget were they involved in the decision-making process with regards to the IS-budget.

The findings further highlighted that the success of agencies that did benefit from their EA implementation was mainly due to (Hjort-Madson, 2007):

1. Adopting EA to standardise on their technology and to eliminate redundant and obsolete applications.
2. Using EA as a compliance tool.
3. Having the IS department control the IS-budget.
4. Using an EA framework to display enterprise views of their business and technology.

## 2.7.2 Case study: The Australian Bureau of Statistics (ABS)

ABS is among the few government organisations that have successfully implemented EA, developed in 1999-2001, with the aim of bringing business and IT to talk the same language (Gregor *et al.* 2007). The Australian Auditor General stated that alignment between strategy, technology and people can only be

achieved through complete management and governance processes which can be enabled through EA adoption (Martin, 2005).

This case study was conducted to display the practical use of EA in ABS to highlight the importance of the business strategy and IT as one to achieve successful operations in public sectors (Martin, 2005). A qualitative approach was adopted using semi-structured interviews with ABS CIO, IT directors, assistant IT directors and corporate governance areas.

The findings showed that their EA success was achieved due to the following key factors (Gregor *et al.*, 2007):

1. ABS developed a governance framework as part of its initial EA to structure decisions and information systems.
2. CIO of ABS formed part of the governance committee where investments are discussed with regard to IT projects.
3. EA mandates the developers to first look at current systems for reuse and encourages building new systems as a last option.
4. EA knowledge was freely available to all staff via central repositories to allow for open communication throughout the project.

### 2.7.3 Case study: Denmark and the Netherlands

Over the past years, several European countries have adopted EA initiatives which were developed independently from one another. A study was conducted with the aim of understanding EA adoption within National Governments by comparing Denmark and the Netherland's EA efforts (Janssen & Hjort-Madsen, 2007).

The findings displayed the following outcomes:

1. Both countries have no formal CIO responsible for their EA and struggle to ensure that their EA is not just a paper exercise.
2. Development of EA is problematic due to the Zachman framework being criticised for not supporting communication.

3. The lack of a centrally mandated EA strategy and strong leadership, negatively impacts on the reuse of IS across government domains.

4. The lack of governance seems to be their major challenge for advancing to new EA efforts.

Janssen and Hjort-Madsen (2007) concluded in quoting one of the interviewees, "EA without governance mechanisms ensuring adoption is like a restaurant without providing any food."The findings of the above-mentioned case studies, highlights the key factors for EA success and failure in government organisations will form the foundation on which the research will be conducted within the PGWC.

## 2.8 EA maturity models

How does an organisation determine whether its EA implementation is successful or effective in achieving its objectives? As in the case of the PGWC who invested in EA in 2006,andis currently still facing major duplication with regard to applications across departments (Gamiet, 2009). At what stage or how is the decision made to continue or stop the investment? This study will briefly look at the best practice models for measuring EA maturity and will assist organisations to assess their EA progress.

## 2.8.1 Herzum's EA maturity model

Herzum (2003) has developed a five phase approach maturity model which can be used to measure the business value in relation to establishing an EA:

1. **Inception:** At this stage there are no formal processes developed for an IT strategy and EA activities have not yet been realised. The organisation believes that technology will address its integration and interoperability issues.

2. **Classification:** EA team is in place and are looking at existing EA frameworks. The perception is that EA problems will be resolved via a tool. An inventory of all existing systems in the organisation might

exist with no relation to the EA deliverables. A few programmes may have been initiated across the organisations but the proper governance and architectural support are not in place for IT management to address these problems. IT strategic decisions are still made on an ad hoc basis.

3. **Blueprinting:** Organisation develops a conceptual framework including all activities from an enterprise perspective. The IT current and future state is defined. EA efforts are managed as a strategic programme with cross-organisational teams reporting to top management. EA objectives are driven by a governance process. EA deliverables are starting to make decisions and give direction.

4. **Integration:** A strategy is in place to continuously narrow the gap that exists between business and IT. The governance process in place enforces all new initiatives to align to the architectural reference and IT strategy. The focus is changing from inter-operability to integration architecture.

5. **Optimisation (Future state):** IT component has the proper governance, architectural support and tool in place to manage IT. Business strategy objectives are aligned to IT strategy objectives including project management, budgeting and execution. Organisation has reached a high level of integration. IT component has realised the benefit of the EA reference and has reached the future state. IT complexity has been reduced and a learning organisation has been discovered. IT performance matrix is in place and the value of IT has been realised throughout the entire organisation.

All the above activities within the five phases need to be completed in the order from one to five to reach the ideal state. He further highlights that EA efforts are not a well-documented EA, but provide the ability for IT to enable business objectives through EA (Herzum, 2003).

## 2.8.2 Architecture maturity matrix

An architecture maturity matrix model was introduced to evaluate the current state of an organisation's EA practice). This approach differs from the normal five phase step approach due to the realisation that many factors influence the success of EA at different points of the implementation, refer to *Table4,* (Van den Berg & Van Steenbergen, 2007).

| Area \ Scale | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development of architecture | | A | | | B | | C | | | | | | | |
| Use of architecture | | | A | | | B | | | | C | | | | |
| Alignment with business | | A | | | | B | | | | C | | | | |
| Alignment with the development process | | | A | | | | B | C | | | | | | |
| Alignment with operations | | | | | A | | | B | | | C | | | |
| Relation to the as-is state | | | | | A | | | | B | | | | | |
| Roles and responsibilities | | | | A | | B | | | | | C | | | |
| Coordination of developments | | | | | | | A | | | B | | | | |
| Monitoring | | | | A | | B | | C | | D | | | | |
| Quality management | | | | | | | | A | | B | | | C | |
| Maintenance of the architectural process | | | | | | | | A | B | | C | | | |
| Maintenance of architectural deliverables | | | | | A | | | B | | | | | C | |
| Commitment and motivation | | A | | | | | B | | C | | | | | |
| Architecture roles and training | | | | A | | B | | | C | | | D | | |
| Use of an architectural method | | | | A | | | | | | B | | | | C |
| Consultation | | | A | | B | | | | C | | | | | |
| Architectural tools | | | | | | | A | | | | B | | | C |
| Budgeting and planning | | | | A | | | | | | | B | | C | |

**Table 4: Architecture maturity matrix (Van den Berg & Van Steenbergen, 2007:p4)**

The matrix displayed in *Table 4* above identifies 18 key areas important to EA practice. Each key area has its own maturity growth path from 2 to 4 levels displayed by the letters A to D in the above matrix. If we take the first key area displayed in the matrix e.g. *development of architecture,* it has three maturity levels namely:

A - Architecture used informatively.

B - Architecture used to steer content.

C – Architecture integrated into the organisation.

The letters A to C displayed in the matrix are fixed and indicate the maturity level of each of the 18 key areas, read from left to right. The scale 1 to 13 identifies the different checkpoints and goes up to 137. The A's displayed at checkpoint 1's column, highlight that the key areas namely; *development of architecture*, *alignment with business* and *commitment,* should get attention first before moving on. These 3 key areas should be developed first on maturity level A before attention can be given to the remaining 15 areas. Only if maturity levels A has been achieved for all the 18 key areas in columns 1, 2 and 3 during developing the architecture, can the EA practice move to maturity level B and thereafter C. Each check point from 1 to 137 is used to assess the EA practice maturity level which suggests the progress development as per best practices. If all 18 key arrears reach their level A maturity, an organisational view of the current EA state becomes visible and this information can be used to make better decisions with regards to the intended outcome.
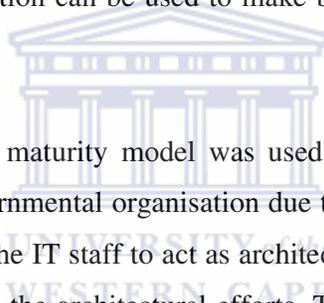
The above architecture maturity model was used to perform a case study in a Netherland's semi-governmental organisation due to concerns that they appointed three consultants from the IT staff to act as architects. The rest of the IT staff was not actively involved in the architectural efforts. The EA was project driven and EA artefacts were not consolidated into an EA and made easily available for the rest of the company.

The findings of the case study using the matrix is highlighted in grey in *figure 5* above and the following recommendations were proposed based on the outcome in the matrix.

*Use of architecture- Develop* an overall EA and publish it.

*Consultation -* Spread EA awareness throughout the organisation

*Monitoring -* Bring all projects under EA.

The matrix helped identify their strengths and weaknesses and was able to identify the prioritised area that should be addressed first in order for their current EA practice to move forward (Van Steenbergen *et a*l., 2007).

The Herzum and Van den Berg's EA maturity models can be used to measure the maturity and value of the organisation's EA. It will further assist organisations to highlight the areas that need to be focused on more visibly for improvement.

## 2.9 Conclusion

According to the literature presented, most government organisations adopt EA initiatives to integrate independent organisational and ICT silos. Increase cross-public sector reuse and reduce duplication and hence reduce cost (Liimatainen, 2007).

Unfortunately the EA journey to achieve the above is a long and continuous process and not many organisations reap the true benefits (Ross *et al*., 2006: 3-6). More relevant to this study is the fact that globally very few government organisations have successfully implemented EA (Gregor *et al*., 2007). Some of the key challenges that lead to organisations not achieving true benefits from their EA are due to the lack of an EA governance process or an alignment an existing ITG initiative, as well as the inability of IT to understand the business requirements to act as an enabler (Bailey, 2006).

The concept displayed in *Table 1* suggests the best practice EA implementation process to adopt in order for an organisation to achieve an enterprise view of their EA current state, their vision for the future EA and the plan on how to get there. This process address one of the key EA challenges by highlighting the importance of starting your EA practice with determining the business requirements as step one. *Table 1* further highlights how the process has evolved and improved to mitigate the risk and suggest the most preferred EA process as (Lapkin, 2009):

1. Creating a current state architecture.
2. Defining the future state.
3. Analysing the gap.
4. Developing a roadmap to achieve the future state.
5. Developing a governance framework to drive the EA.
6. Developing an EA communication plan.

Large government organisations that hire external consultants to do their EA should not start with the current state architecture. It ends up being a process of continuous inventory of current applications, technologies and infrastructure documentation without ever defining the future state (Burton, 2009).

A specific process was presented in *Figure 2,* more appropriate to encourage application reuse and mitigate duplication (James, 2005):

1. Determine business strategy.
2. Select the key processes to implement the business strategy.
3. Highlight the business functions to enable the processes.
4. Identify the preferred applications to perform the business functions and encourage reuse.
5. Limit the use of new applications.

Literature has looked at the most commonly used leading practice frameworks for implementing EA to determine the criteria for choosing a framework and if it in fact, has a huge impact on the success of implementation. *Table 3* highlights the fact that no EA framework provides a complete solution and that they all have strengths and weaknesses in certain areas. The criteria for choosing an EA frameworks presented in section 2.4.5 can be used by organisation to choose a framework that would best suit their needs. The success of EA implementation is not in the framework you choose but the ability to understand and work correctly with the framework (Urbaczewsk & Mrdalj, 2006).

The literature further presents many key factors that influence the success and failure of an EA implementation and can be summarised as follows according to leading and worst practices, refer to *Table 5*.

| EA leading practices(success) |
|---|
| 1. Business should drive EA and at a top management level, not IT. |
| 2. **Use EA as a compliance tool.** |
| 3. **Use EA framework to display enterprise view of the business and technology.** |
| 4. **IS department is in control of the IS-budget (Hjort-Madsen, 2007).** |
| 5. Top-down approach starting with business strategy. |
| 6. Plan regular reviews to allow for organisational change. |
| 7. Dedicate full-time staff to the EA project. |
| 8. Documenting and understanding your key stakeholders (Burke, 2008). |
| 9. Initiatives presented are taken further for execution (Campbell, 2007). |
| **EA worst practices(failure)** |
| 1. **CIO has no control over the IS-budget.** |
| 2. **CIO is not involved in decision making process with regards to the IS-budget (Hjort-Madsen, 2007).** |
| 3. Start anywhere but at the top |
| 4. Start with a bang. |
| 5. Leave it on the shelf. |
| 6. Take too long. |
| 7. Assume that someone else can do the hard work. |
| 8. Assume the architecture is done (Lapkin, 2005). |
| 9. No linkage to the current business strategies and budget. |
| 10. Don't communicate until it's done. |
| 11. Over standardisation. |
| 12. Lack of business focus. |
| 13. Analysis Paralysis. |
| 14. Technology driving the architecture. |
| 15. Focusing on the current state first (Burton, 2009). |

**Table 5: Summary of EA leading and worst practices**

*Table 5* serves as a good guideline for organisations looking at EA adoption. Section 2.7of the literature went a bit further in order to strengthen these leading practice guidelines presented in *Table 5,* highlighting in bold the lessons learnt from actual EA implementations in global government organisations.

The above summary in *Table5*of the EA critical success factors will guide the research of this study in determining the reasons why EA is not addressing application duplication in the PGWC.

If governance did not form part of the initial stage of an EA implementation, the EA team should consider addressing this issue first. The absence of an initial governance structure will result in EA failure (Burton, 2009). Irrespective if it's corporate, IT or EA governance, without a governance process or alignment to an existing governance process it will result in project failure (CEISAR, 2008). Literature presents COBIT as being one of the most commonly used control frameworks to implement ITG (ITGI, 2005). TOGAF is a freely available framework also used to implement EA governance (Hillard, 2003). Part of this study aims to prevent PGWC from adopting a new initiative to implement IT governance in addressing duplication by determining why EA could not be used as the governance tool to do the job in the first place.

Both Herzum and Van den Berg's EA maturity models presented in Section 2.8 shows great potential to evaluate the current state of an organisation's EA practice. The architectural matrix model was taken a bit further by presenting the findings of a case study where the actual model was used to evaluate the organisation's EA maturity and displayed the key areas that needed to be addressed first.

The literature presented forms a guideline of EA critical success factors for organisations wanting to adopt EA, and will form the foundation for this study to determine why EA could not address application duplication in the PGWC.

## Chapter 3: Research design and methodology

This study originated from a preliminary case study conducted by Gamiet (2009) where the findings concluded by identifying the lack of ITG as being the major cause for application duplication within PGWC. The case study also highlighted the existence of an EA initiative adopted in 2006 within PGWC. The researcher recommended a further study by stating "*Whether the EA implementation approach within PGWC was according to best practices and the success thereof would be a great topic for further research to add to this study*" (Gamiet, 2009).

With the above in mind, this study will use data analysed in Gamiet's (2009) preliminary study, *refer to Appendix* 3, to highlight the EA perception of the IT managers involved in decision making with regards to new applications in 2009, and conduct a case study based on the concept developed from the data presented in the literature review to determine the reasons for EA not addressing application duplication. The research will conclude in recommending the best way forward for PGWC to address duplication and present a guideline model formulated from the evidence of the research in support of the literature presented in Chapter2to assist the success of EA adoption.

## 3.1 Research methodology

Dawson (2002) is of the opinion that choosing a research methodology is like thinking about the differences between qualitative and quantitative research. She further states that no methodology is better than the other, but that both have their strengths and weaknesses and the choice depends on which methodology motivates the researcher and makes him/her feel comfortable. Hancock (2002: 3) identifies qualitative and quantitative research methodologies as the starting point in trying to understand the collection of information for research purposes. The very general criteria that guide a researcher in collecting information can be defined as the research methodology and the research methods are the tools used to collect the data, e.g. questionnaires and interviews (Dawson, 2002).

Both Dawson and Hancock highlight that understanding the difference between qualitative and quantitative research will guide the researcher in choosing the best methodology for his/her study.

### 3.1.1 Quantitative versus qualitative research

Collis and Hussey (2003: 252) define quantitative research as a process of gathering and analysing measurable data to numerical/mathematical relationships among variables. This method displays the researcher's concern so as to obtain accurate information from the interviewee, untainted by the relationship factor. Quantitative research deals more with questions such as, How much, How many, How often and To what extent. Qualitative research is based on experience or observation rather than reasoning (Dawson, 2002). The qualitative researcher believes that there can be no such thing as a "relationship-free" interview and that the relationship is part of the research process. This method involves the collection of data and a deep analysis to understand and interpret the output of the research (Ghauri & Gronhaug, 2005: 88). A qualitative approach is one's apprehension and interpretation with the surrounded reality based on opinions, experiences and feelings of individuals on the topic at hand (Fidel, 1993).

The criteria for choosing a research approach should be determined by the purpose of the study and the research problem (Yin, 2003: 33).*Table 6* summarises the key differences between qualitative and quantitative research in assisting the researcher in choosing the correct approach for his/her study:

|  | **Qualitative** | **Quantitative** |
|---|---|---|
| **Questions about** | **What? Why**? How? | How much? How many? |
| **Interest** | People's thoughts, **experiences** and feelings. | Based on measurements derived from a sample. |
| **Nature of reality** | Subjective - Research aims to increase our understanding of **why things are the way they** | Objective - Research investigates things which can be observed and measured in |

| | | |
|---|---|---|
| | **are.** | some way. |
| **Data Reduction** | **Words**, categories and **themes**. | Numerical (statistical). |
| **Reasoning** | Inductive– Data is used to **develop concepts** and theories. Generating theories and constructing knowledge. | Deductive –Testing theories from previous studiesusing numbers and facts. |
| **Appropriate for topic** | **Topic is not fully understood yet** and needs further exploration. Outcome is based on the participants. | Topic is understood and the variables influence the outcome controlled by the researcher. |
| **Methods** | **Semi-structured interviews** focus groups and participant's observation. | Structured interviews, surveys and structured observation. |
| **Question format** | Open-ended and allows flexibility. | Restricted and inflexible. |
| **Analytical objectives** | To describe variation, **individual experiences** and explain relationships. | To quantify variation and predict relationships. |

**Table 6: Qualitative vs. Quantitative Research (Dawson, 2002; Fidel 1993; Hancock, 2002)**

The research for this study is entirely dependent on the perspective of the participants with regards to EA implementation and their experiences in their specific area since the adoption. *Table 6* simplifies some of the criteria, especially the intentions of this study highlighted in bold, in assisting the researchers in choosing a research approach. Limited research has been conducted to support the research articles on EA benefits (Boh & Yellin, 2007). The literature also highlighted that few public or private organisations have reaped benefits from their EA implementation (Hjort-Madsen, 2007). Therefore this study will adopt a qualitative approach based on inductive reasoning in researching historical data based on EA critical success factors and actual EA implementations globally to establish an EA success concept in guiding the formulation of the research questions (Hancock & Algozzine, 2006: 27).

## 3.1.2 Qualitative research methods

Qualitative research methods consist of four major designs (Hancock, 2002):

**Phenomenology:** the study of phenomena, something that exists in the world we live in. This design sees that there exists a gap in our understanding which needs clarification or illumination.

**Ethnography:** describes the study of culture and people which can be problematic when the researcher is not familiar with people or their language.

**Grounded theory:** this design's main feature is based on new theory development by the collection and analysis of data about a phenomenon in health care.

**Case study:** this design relates to an in-depth analysis of an entity that forms part of a single person or an organisation. It further claims to offer a richness and a depth of information that the other methods cannot provide. It's the most versatile approach which can adopt any form of data collection - from testing to interviews (Hancock, 2002).

The purpose of this section is to inform the reader of the different qualitative methods and the meaning of the terms. Since the object of this study is primarily to investigate the implementation of an information system, a case study is particularly well-suited (Benbasat *et al*. 1987). Due to the fact that the literature presented in Chapter 2 with regards to EA leading practices was constructed based on actual global case studies, this study will adopt a case study approach for data collection.

## 3.1.2.1 Qualitative data collection methods

Data collection methods are best described as the tools used to gather data. These methods of data collection are derived from face to face interviews, focus groups, observation and questionnaires (Hancock, 2002).

Interviews can be conducted in the following three forms (Hancock, 2002):

**Structured**- Mostly used in quantitative research where the interviewer asks questions that can be answered via tick boxes.

**Semi-structured -**Most commonly used in qualitative research where the researcher seeks specific information which can be compared with information gained via other interviews. The same set of questions is asked to all interviewees with some flexibility to extract other important information.

**Unstructured** - The interviewee is free to talk about what he sees to be important and can consume unnecessary time and a great deal of irrelevant data.

Based on the guidelines highlighted in *Table 6*above, and the nature of this research, face to face interviews will be conducted by means of a semi-structured questionnaire to successfully achieve the objective of this study.

*Figure 5* summarises the research design approach that will be adopted for this study:
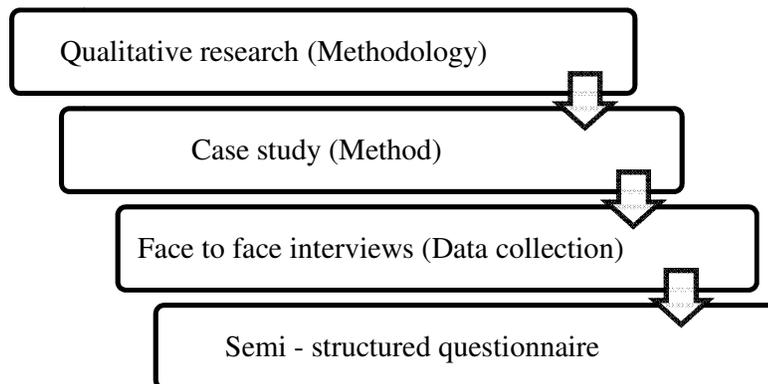


**Figure 5: Qualitative research design**

## 3.1.2.2Origins of questionnaire questions

The origin of the questions compiled in the interview questionnaire stems from the concept developed and presented in the literature review which focused on leading practice 'Do's' and 'Don'ts' to ensure EA success, refer to *Table 7*.

| Output | Rationale |
|---|---|
| Question 1 | Reason for EA adoption |
| Question 2 | EA process developed to address duplication |
| Question 3 | EA critical success factors<br><br>A. Business should drive EA not IT and at a top management level (Hjort-Madsen, 2007). |
| Question 4 | B. Top-down approach starting with business strategy (Burke, 2008).<br>C. Technology driving the architecture (Burton, 2009). |
| Question 5 | D. Analysis Paralysis (Burton, 2009). |
| Question 6 | E. Dedicate full-time staff to the EA project (Burke, 2008). |
| Question 7 | F. Identify and gather key information from your stakeholders (Burke, 2008). |
| Question 8 | G. Initiatives presented are taken further for execution (Campbell, 2007). |
| Question 9 | H. Use EA as a compliance tool (Hjort-Madsen, 2007).<br>I. No linkage to the current business strategies and budget (Burton, 2009). |
| Question 10 | J. CIO has no control over the IS-budget (Hjort-Madsen, 2007).<br>K. CIO is not involved in decision making process with regards to the IS-budget (Hjort-Madsen, 2007). |

| Question 11 | EA as a governance tool<br><br>L. EA without a governance process or alignment to an existing governance process will result in project failure (CEISAR, 2008). |
|---|---|
| Question 12 | EA framework selection |
| Question 13 | Measuring EA current state |
| Question 14 | General |
| Question 15 | (Capture the feelings of the individual towards the topic) |

**Table 7: Origins of questions**

*Table 7* further highlights the rationale for the questions compiled; refer to *Table 8*, and how it links back to the literature review based on leading practice and actual case study findings used to construct the questions which will be used in the qualitative investigation. The concept presented in *Table 7* will form the foundation in achieving the objective of the research.

### 3.1.2.3 Pilot questionnaire

The questionnaire displayed in *Table 8* below, was used as a pilot to test if the results links back to the best practice EA 'Do's' and 'Don'ts' in order to answer the research questions. Highlighted in the preliminary study (Gamiet, 2009), is that "both the department and Ce-I referred to the IT managers when asked about application information." Thus, this research will use the IT managers as the subjects due to their responsible for business application development for departments, refer to *Appendix 5*. To capture the EA perspective from a departmental view, the researcher included a subject that works for one of the departments within PGWC. This is to provide a view of the link between the business and Ce-I interaction and to assist the various components to compile their business cases for their new application requests.

Based on above, the pilot was performed on one of the IT managers to determine his understanding and response to the questions.

| Number | Questions |
|--------|-----------|
| 1 | a) In which way do you think EA adds value? <br><br> b) Do you think there is a need for EA in PGWC? |
| 2 | a) What process is used within the PGWC when a request for a new business application is made? <br><br> b) Are any analyses/assessments done to check that existing solutions can accommodate new business application requests? |
| 3 | a) Is implementing EA in the province an executive management priority? <br><br> b) Do you think driving EA in the province is a business or IT accountability? |
| 4 | a) Do you think the existing EA was initiated by focussing on technology standardisation or identifying business needs? <br><br> b) Why do you think this approach was adopted? |
| 5 | To your knowledge, were you or the department that you service involved in any planning related to the current EA. If so, what were the key outcomes? |
| 6 | a) Is the EA project resourced by PGWC staff, external contractors or a combination of both? <br><br> b) Do you think this is the right approach for an EA project? |
| 7 | Do you know who the EA stakeholders are and, was any information about them provided to you, in the context of the EA project? |
| 8 | Would you say that the current EA plays an important role in adding business value, especially regarding application decision making? If yes, how? |
| 9 | Is EA included in the consultation and decision making for IT requirements and investments? If so, what is its role? |
| 10 | Who is accountable for the business application budget in your organisation? |
| 11 | a) How is governance applied to projects within your organisation? <br><br> b) In your opinion, how, and to what extent, does EA influence projects within your organisation? |

| 12 | What were the primary considerations for choosing the EA framework for your organisation? |
|----|------------------------------------------------------------------------------------------|
| 13 | Are there any monitoring and evaluation processes to determine whether the application of EA in your organisation is meeting its intended objectives? |
| 14 | Has EA provided any perceived value within the organisation since implementation, and if so, how? |
| 15 | Are there any additional comments that you would like to contribute to the topic at hand? |

**Table 8: Pilot interview questions**

The only questions that had to be amended were questions 3a), 5, 9 and 12, refer to *Table 9* below. The original pilot questions can be viewed in *Table 7* above. The concern with question 3 and 9 was that one of interviewees mentioned that he could only answer for the period of his involvement in the EA project, hence the inclusion of "current" in both questions. Question 5 was changed from "the departments you service" to "the departments you engage" because "the department you service" was more specific for IT managers and does not apply for all subjects. Question 12 was changed entirely, to firstly determine if the subject knew which EA framework was chosen and then request if he/she knew the criteria for choosing the framework. All remaining questions were clearly understood and the responses indicated that one of the IT managers accepted responsibility around the topics being discussed. The amended questionnaire is presented in *Appendix 4*.

| Number | Question |
|---|---|
| 3 | a) Is implementing EA in the province **currently** an executive management priority?<br>b) Do you think driving EA in the province is a business or IT accountability? |
| 5 | To your knowledge, were you or the departments **you engage** involved in any planning related to the current EA. If so, what were the key outcomes? |
| 9 | Is EA **currently** included in the consultation and decision making for IT requirements and investments? If so, what is its role? |
| 12 | **Do you know which framework was chosen to implement EA and what the primary considerations were in selecting the framework?** |

**Table 9: Pilot interview questions corrections**

## 3.1.3 Data Analysis

Data analysis is a process whereby all data collected is summarised and presented in a way that the results display the most important features. The process is the same for both quantitative and qualitative research. Every item of information will be labelled in order to highlight the differences and similarities between the items. The qualitative researcher lacks a system for pre-coding and has to identify data which appears in the literature so that all data collected from the interviews can be compared (Hancock, 2002: 16).

Seidel (1998) defines Qualitative Data Analysis (QDA) as a simple process of 'noticing', 'collecting' and 'thinking' about interesting things, refer to *Figure 6* below:
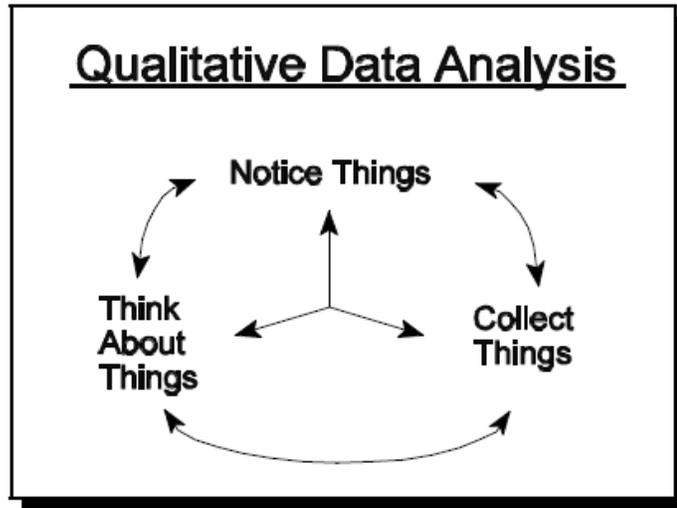
**Figure 6: Data Analysis Process (Seidel, 1998:p2)**

*Figure 6* further indicates that the QDA is a repeatable process and one part can direct you back to another and create a continuous cycle. For example, when you think about things, you notice new things and when you collect things, you notice more things (Seidel, 1998).

The QDA parts can be defined as follows, refer to *Table 10.*

| 'Noticing' | 'Collecting' | 'Thinking' |
|---|---|---|
| Making a record of things such as tape recording the interviews, observations or taking notes. This is also a form of coding (Agar, 1991: 181). | When you go ahead and sort the pieces of code to display a picture, like sorting the pieces of a jigsaw puzzle (Jorgensen, 1989: 82). | Reconstructing the data into meaningful patterns (Jorgensen, 1989: 82). |
| Breaking your data into separate units (Jorgensen, 1989: 82). | Categorising the data into specific parts (Corbin &Strauss, 1990: 422). | Compare the similarities and differences relating to the topic (Corbin & Strauss, 1990: 422). |
| Coding the interviews by reading and developing general | Cutting up and fill your pieces according to the | |

| topic codes (Schneider & Conrad, 1983: 240). | codes (Schneider & Conrad, 1983: 240). | |
|---|---|---|

**Table 10: QDA parts definitions**

Three qualitative content analysis can be adopted base on the depth of inductive reasoning. The first approach is conventional qualitative content analysis, used for grounded theory development in which coding categories are created directly from raw data. Secondly, the direct content analysis where the coding starts with a theory based on relevant research findings and the researcher develop themes to validate the theory. Finally, summative content analysis which seems to start with a quantitative approach, by initial counting words, and later extended to highlight meaning and themes (Hsieh & Shanon, 2005).

QDA approach highlighted in *Table 10* will be adopted to analyse the data collected during the interviews in order to conclude the findings.

### 3.1.3.1 Validity and reliability

Reliability indicates that your measurement is repeatable whereas validity tests that your measurement measures what it should measure. They further highlight that reliability comes before validity, in other words, your source must first be reliable for the data to be valid (Barker *et al*, 2002).

In order to ensure the quality of a case study, the following two kinds of tests can be used:

- **Validity test:** Ensures that the findings can be generalised and that the proper measures of the concept are studied.
- **Reliability test:** Ensures that the same approach of data collection can be repeated with similar results to highlight the operations of the study (Yin, 2003: 57).

Due to above, the ten subjects chosen for interviews for this research are management, who are directly involved in the decision making with regards to new business requests by the respective departments, and their perspective on the topic will validate the findings. This is also strengthened by selecting IT managers from the respective departments they provide ICT services.

### 3.1.3.2 Data analysis approach for the EA perception in 2009

To highlight the perception of EA and its linkage to new application requests of departments within PGWC, data from Gamiet (2009) with specific reference to EA, refer to *Appendix 3*, will be analysed to capture the EA perspective of the interviewees in 2009. The aim is to highlight the awareness of an existing EA in 2009 by Ce-I management interviewed on the topic of ITG, in comparison to their responses during this study on the topic of EA.

### 3.1.3.3 Data analysis approach for the interviews

The origin of the questions explained in Section 3.1.2.2 and data analysis goes hand in hand, as illustrated in *Figure 7*.
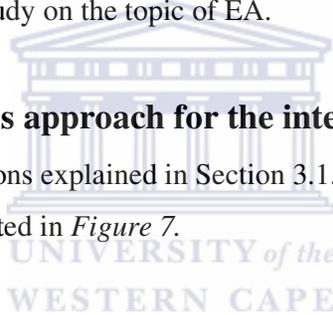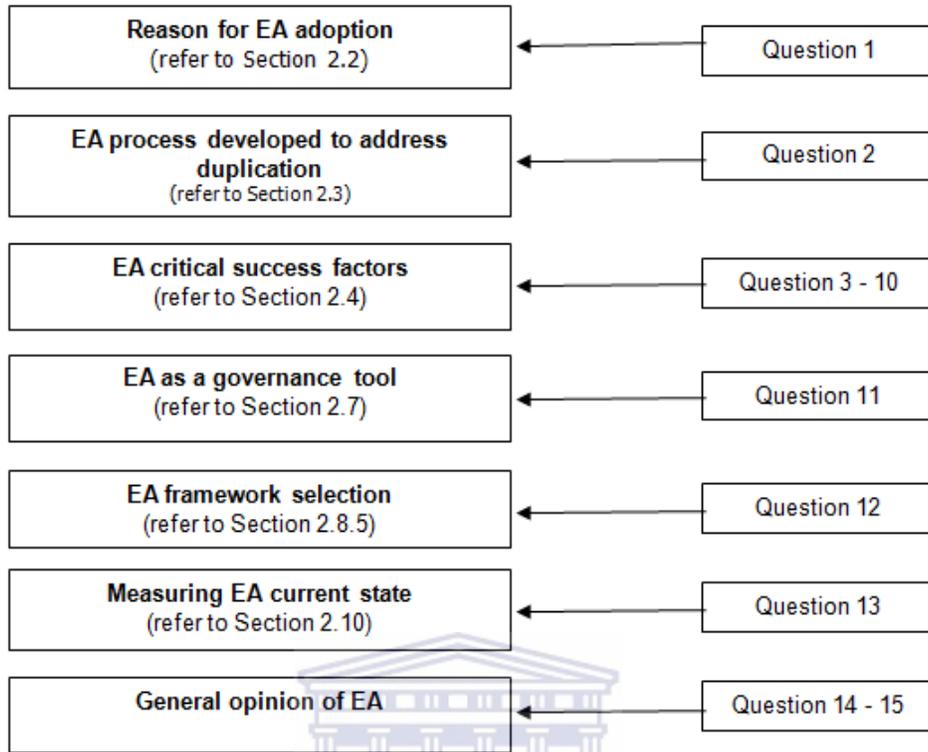
**Figure 7:Data analysis approach**

The data collected from the interviews, refer to *Appendix 6*, will be analysed using the QDA method, refer to *Figure 7*, linking back to their origin highlighted in bold in *Table 7*. The aim is to look for similarities, commonalities and key factors in the data which was collected during the interviews and that can be linked back to the concept presented in the literature review, refer to *Figure 7*. This will be presented as "Concept A", refer to *Table 9*.

| Question | Similarities | Differences | Interviewee |
|---|---|---|---|
|  |  |  |  |

**Table 9: Analysis template for 'Concept A'**

Holtman (2009) stated at a synthesising and developing workshop, "When concluding your thesis, sometimes it's not what was said during the analysis but what was not said that can be more effective". Based on this statement, the researcher's thoughts, factors not relating to the literature, and things that were not said will be presented as 'Concept B', refer to *Table 10*.

| Question | Observations | Thoughts | Interviewee |
|---|---|---|---|
|  |  |  |  |

**Table 10: Analysis template for 'Concept B'**

Concept 'A' and 'B' will form the foundation in presenting the reality in concluding the findings.

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## Chapter 4:  Presentation and Discussion

This chapter presents the outcome of the data analysis of data collected from Gamiet (2009) preliminary study; refer to *Appendix 3,* as well as data collected during the interviews to conclude the findings, refer to *Appendix 1*. The names of the interviewees and the departments they represent are not disclosed in order to protect the sensitive and confidential information collected during interviews and analysis. Instead, the interviewees' names are arranged numerically from interviewee'1' to '10' refer to *Appendix 5,* and the departments are identified alphabetically from 'A' to 'G', refer to *Appendix 2.*

The information gathered and presented is factual and the exclusion of interviewee or department names will not influence the result of the analysis or findings.

### 4.1 Presentation of EA perception (Gamiet, 2009)

This section presents the outcome of the analysis done on data reused from Gamiet (2009) preliminary study; refer to *Appendix 3,* to highlight the perception of EA within PGWC in 2009. Although his study at the time was to establish if the lack of IT Governance (ITG) was the reason for duplication within PGWC, only question 2 of his questionnaire (refer to *Appendix 3),* linked back to EA.

| Question Number | Common Response | Different Response | Interviewee |
|---|---|---|---|
| 2 | No central formal repository exists to assist in identifying existing solutions. | | 1,2,3,4,5,6 and 7 |
| | | EA is in place as a central repository to assist with new requests. | 8 |

**Table 11: Data analysed based on the responses of 8 interviewees on questions 2 (Gamiet, 2009)**

*Table 11* briefly sketches a picture of the understanding and awareness of EA from an IT management perspective interviewed at the time. What clearly comes across is that only the IT manager involved in the EA project mentioned that EA can be referenced in the event of a new business request to check if that solution already exists within the PGWC. This was the major factor that initiated this study and why the specific subjects were chosen to derive the reality from an EA perspective in addressing duplication. The findings of this study will determine the reason why none of the IT management interviewed in 2009 referred to EA in response to question 2, refer to *Table 11* above.

## 4.2 Presentation of Interview Questionnaire (Concept A)

The purpose of the interviews was firstly to collect data to determine why EA is not addressing application duplication within the PGWC. Secondly to recommend the best way forward to prevent PGWC from adopting another solution to address duplication that may suffer the same predicted fate as their current EA implementation. The data collections were based on the ten interviewee responses to the questions- refer to *Appendix 6,* which is also available on digital recorder and CD.

*Appendix1p*resents the outcome of the interview data analysis by highlighting the commonalities and differences with respect to the questions and responses from the interviewees specifically relating to EA leading practices to assist in formulating "Concept A." Due to the fairly structured approach of the questionnaire which originated from the concept presented in the literature review, refer to *Figure 7,* the outcome of the data analysis, refer to *Appendix 1,*and was then further formulated using Microsoft Excel as the tool to display a more simplified graphical view of the outcome, presented in figures 8 to 22 below:
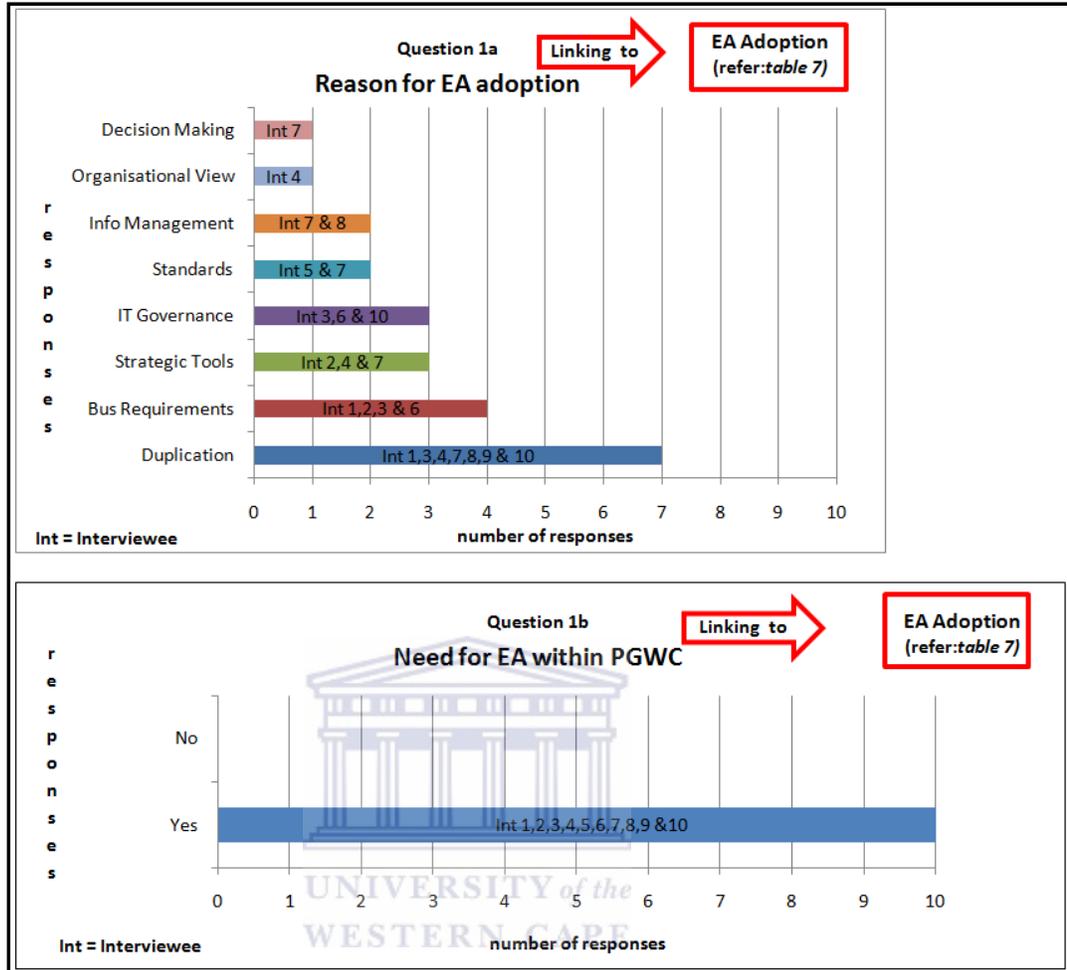
**Figure 8: Reason for EA Adoption**

*Figure 8* illustratesthat, based on the responses to question 1b from all interviewees, there is a definite need for EA within PGWC. It further highlights that the majority of the interviewees identify duplication as the key reason for adopting EA, followed by using EA as a strategic tool to identify business requirements and enforcing ITG.
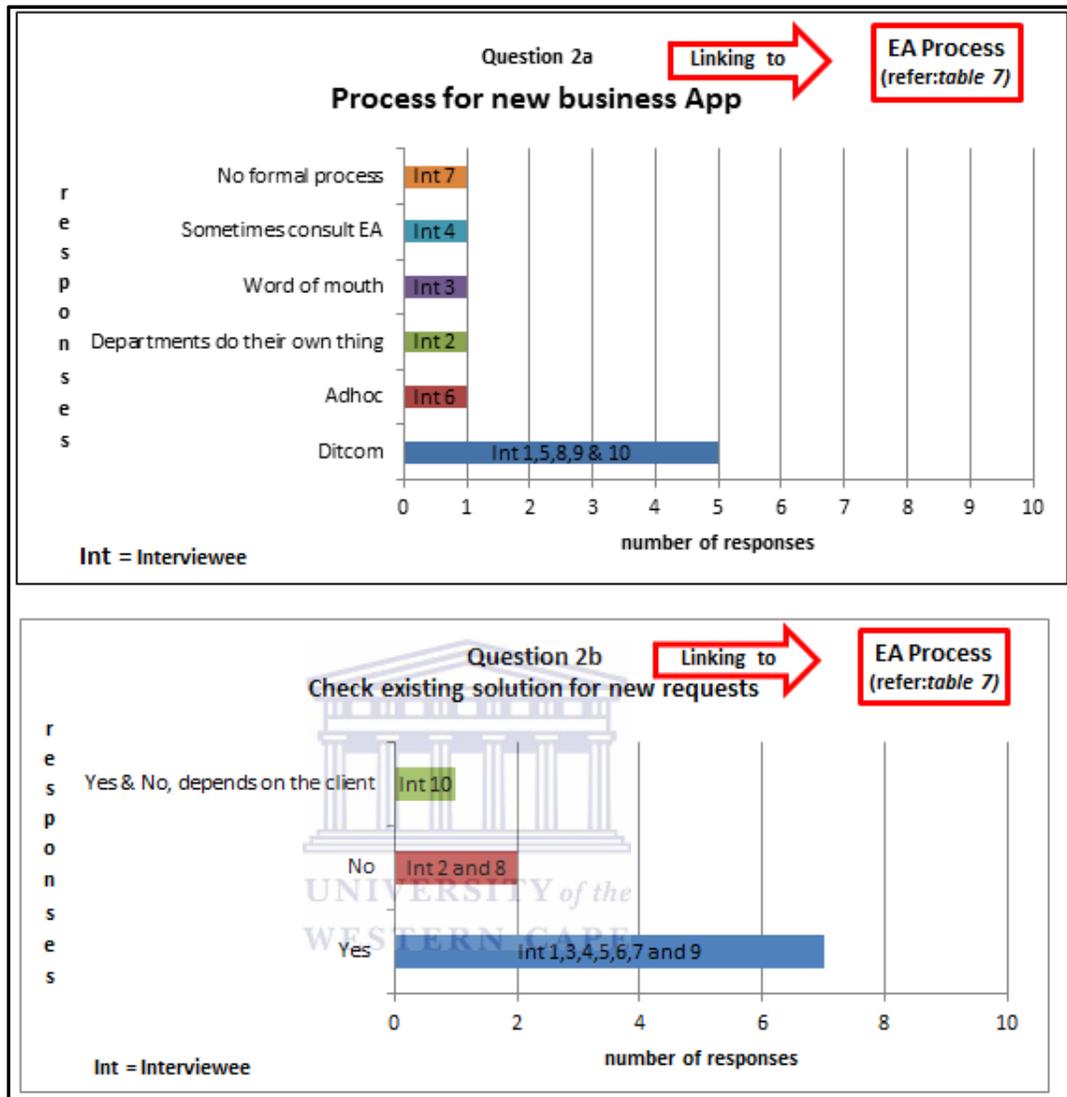
**Figure 9: Existing Solutions Check**

*Figure 9* indicates that the majority intervieweesdo check for existing solutions before approving new business applications, but it is the process they follow, highlighted from the responses to question 2a, that raises concerns. The only interviewee that related to an EA process was interwiewee 4.
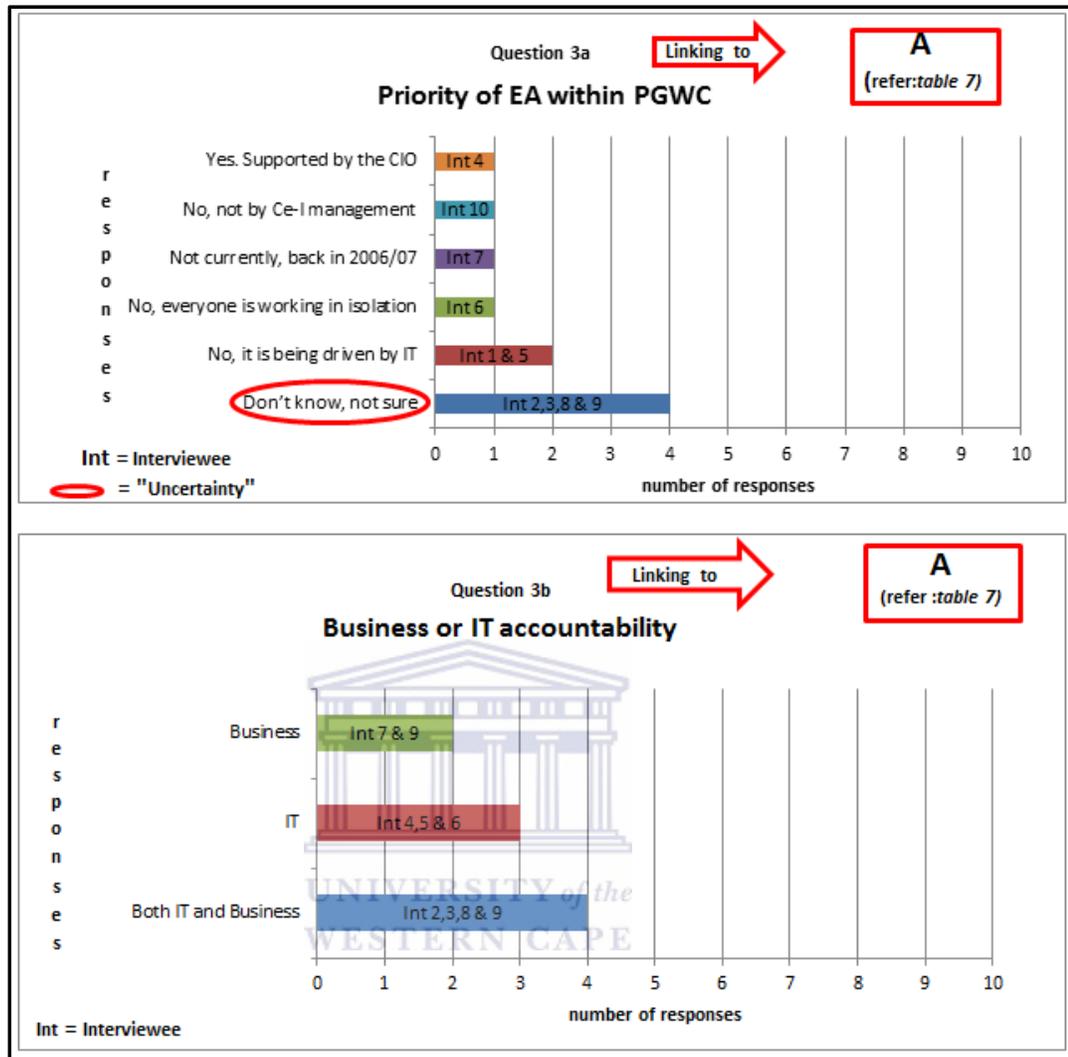
**Figure 10: Priority and Accountability**

*Figure* 10 illustratesthat interviewee 4,is of the opinion that EA is a priority within PGWC due to the fact that it is supported by the CIO. Interviewee 1 and interviewee 5, claims that EA is driven by IT and therefore not seen as a top management priority. The most common response to whether EA is seen as a priority and from the perspective of the departments,circled in red and represented by interviewee 2, interviewee 3 and 9, and interviewee 8 were all "unsure" if EA is an priority. This 'uncertainty' clearly influenced the outcome of question 3b by not reflecting a common perception of where the EA accountability should reside. This uncertainty is further highlighted by the difference of opinion of EA priority between interviewee 1 and 4, in response to question 3b.
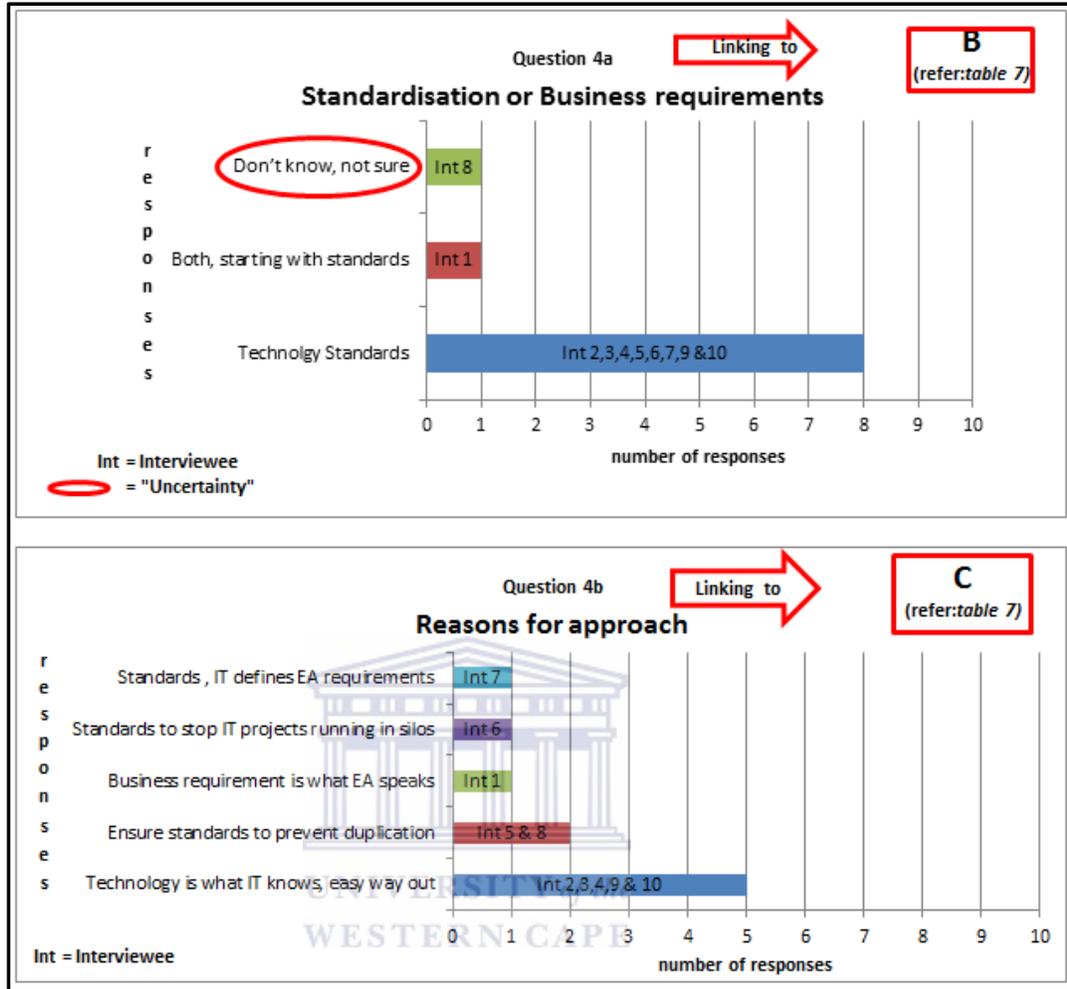
**Figure 11: Standardisation and Reasons for Approach**

*Figure 11* illustrates that EA was initiated by focusing on technology standards based on the responses to question 4a, and that EA is driven by IT in isolation of the departments, as an easy way out, based on the responses to question 4b.
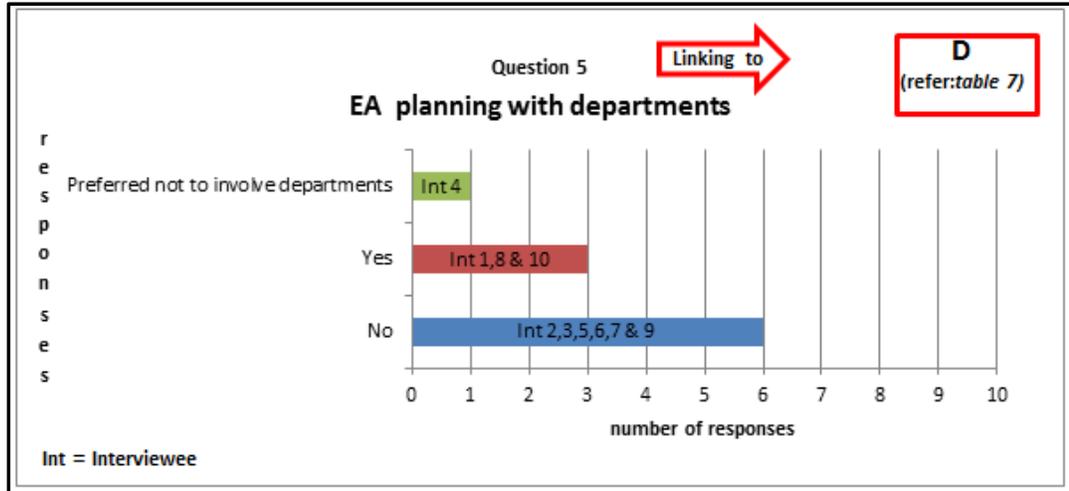
**Figure 12: EA Planning within Departments**

*Figure 12* illustrates that there was no EA planning done with the departments except for informational templates occasionally forwarded to them. Interviewee 4, highligted that the intended approach was not to engage departments directly, but rather use the department ICT Plans and IT managersrepresenting their respective departments to perform that particular function. This EA planning approach was not mentioned by any of the interviewees, except for interviewee 4, highlighted in grey above.
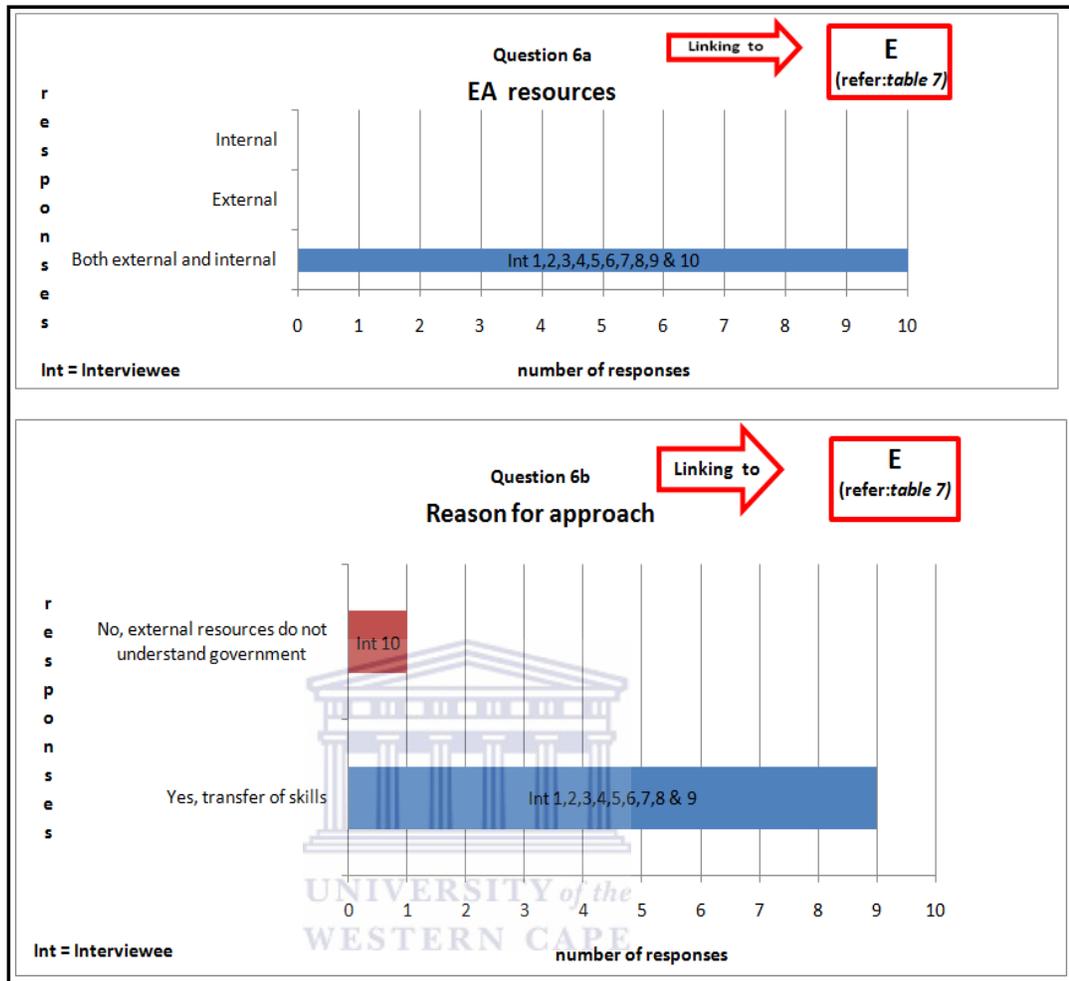
**Figure 13: EA Resources**

*Figure 13* illustratesthat all interviewees are of the understanding that both external and internal resources should be used for EA due to the external skills that should be transferred to internal staff during the EA process.
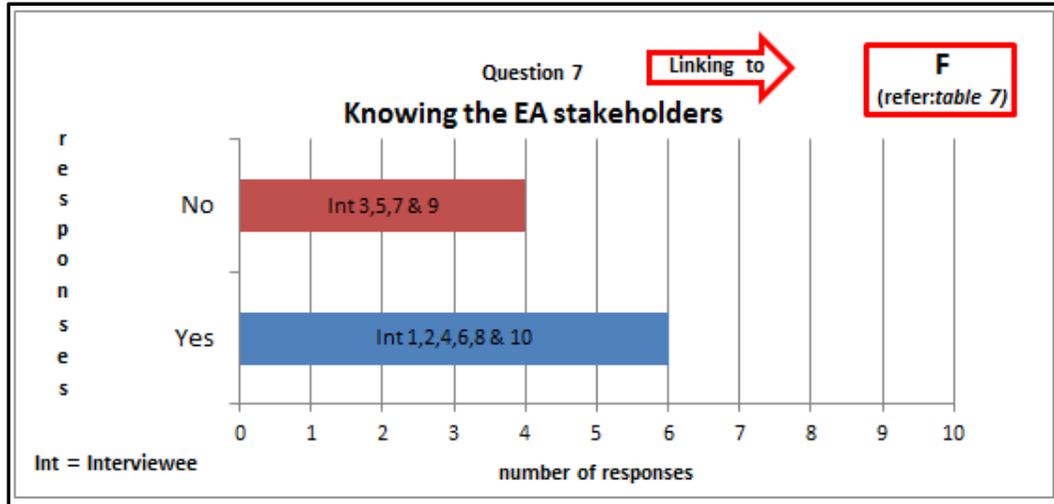
**Figure 14: Knowing the EA Stakeholders**

*Figure 14* illustrates that the EA stakeholders are not known by the interviewees highlighted in red. Although interviewees 1, 2, 4, 6, 8 and 10 acknowlegde their fimiliarity with the stakeholders, it is the method of obtaining the information about the stakeholders that raise concerns, refer to *Appendix 1,*responses to *question 7.* Interviewee 2, departments resource, refer to the Central IT committee as the EA stake holders. Interviewee 6 knows about the EA stakeholders because one of the EA architects is a "personal friend."
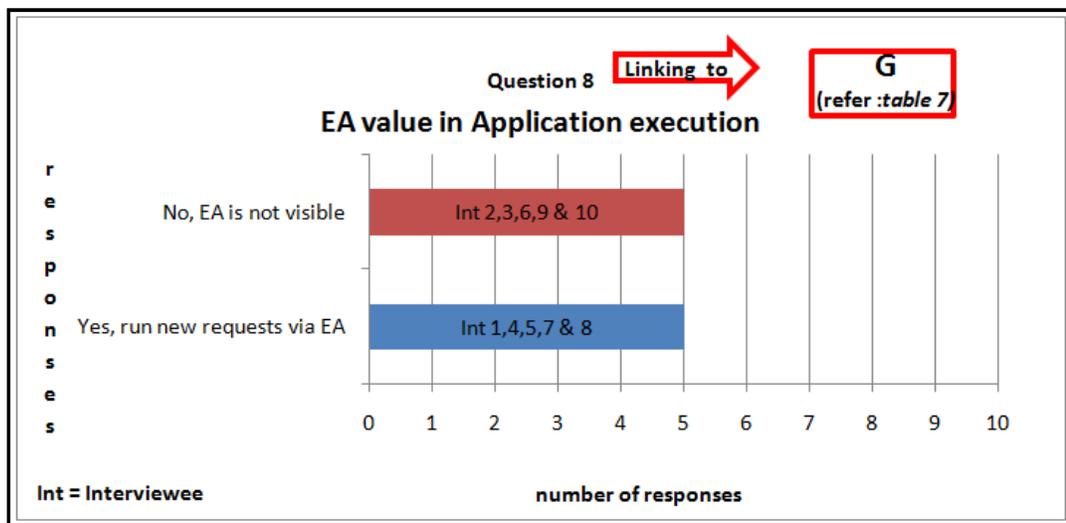


**Figure 15: EA Value in Application Execution**

*Figure 15* illustrates that not all new application requests are referred to EA or influenced by EA due to the absence of a visible central database and the fact that the departments' ICT plan plays that strategic role, refer to *Appendix 1*, responses from interviewee 2, 3, 6, 9 and 10 to question 8.
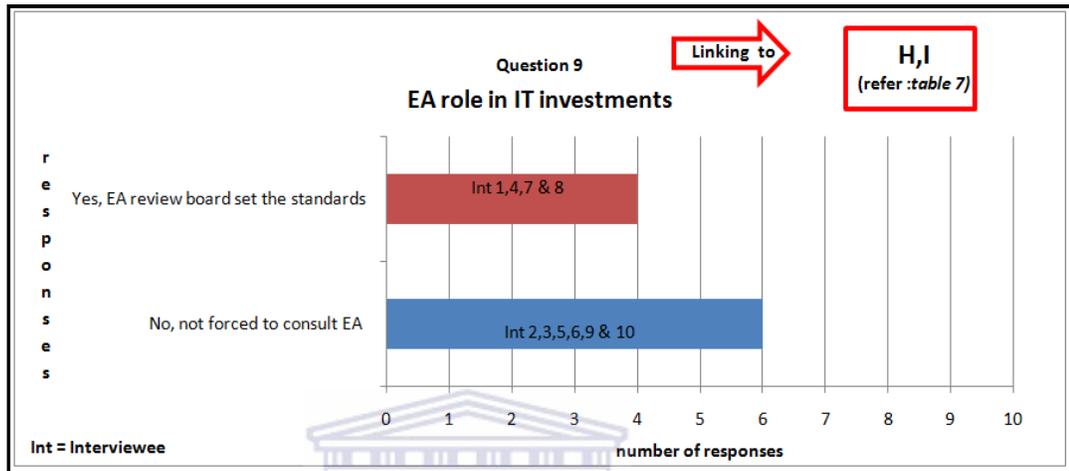


**Figure 16: EA Role in Investments**

*Figure 16* illustrates that EA has minimal influence or impact on IT requests and investments, due to the lack of EA compliance that forces the decision makers to consult EA. The only compliance visible from an EA perspective, is the technology standards implemented by the EARB (Enterprise Architecture Review Board), refer to *Appendix 1*, responses from interviewee 1, 4, 7 and 8 to question 9.
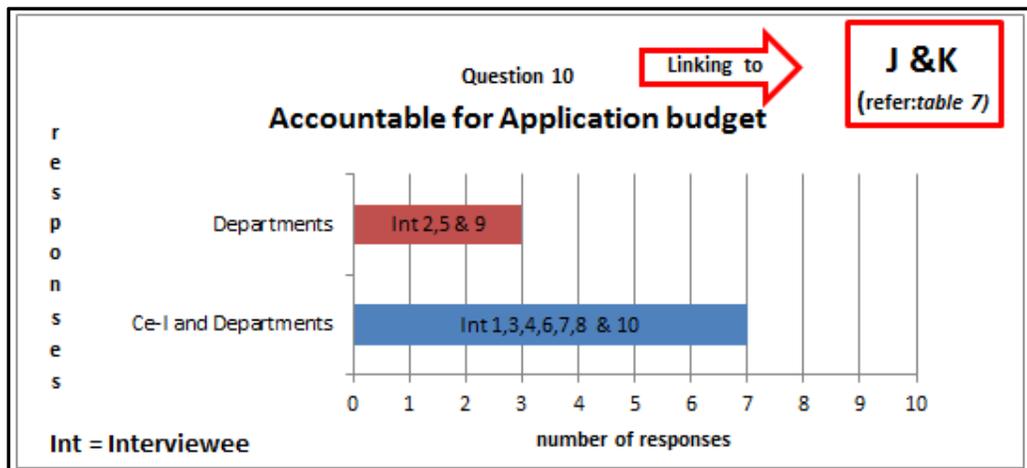


**Figure 17: Accountable for Application Budget**

*Figure 17* illustrates that Ce-I do not have full control over business application budgets of the departments. According to interviewees 1, 3, 4, 6, 7, 8 and 10, refer *Appendix 1,* question 10, Ce-I are only in control of application budgets that has a transversal nature in function (applications function used across departments e.g. Human Resource). Based on interviewee 2, 5 and 9, highlighted in red, presented in *Figure 17* above, all departments are accountable for their own business specific applications budget.
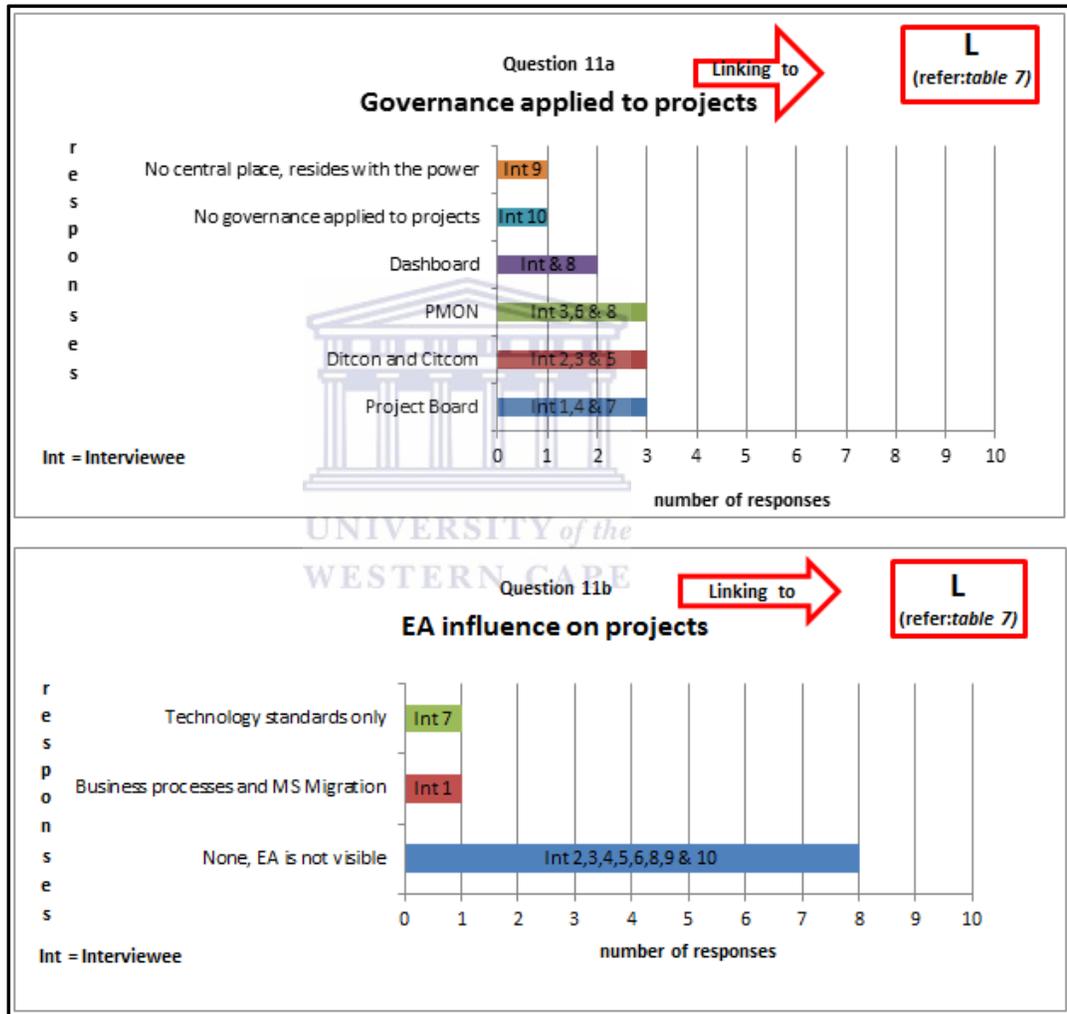


**Figure 18: Governance and EA influence on projects**

*Figure 18* illustrates that EA are not used as a governance tool applied to projects and that IT management perceive the 'ditcom' and 'citcom', project board and PMON (Performance Management Application) to play the governance role based on responses to question 11a. *Figure 18* further highlights that the current EA has

no influence on projects due to its non-visibility throughout the organisation based on the majority of the interviewees' responses to question 11b, indicated in blue.
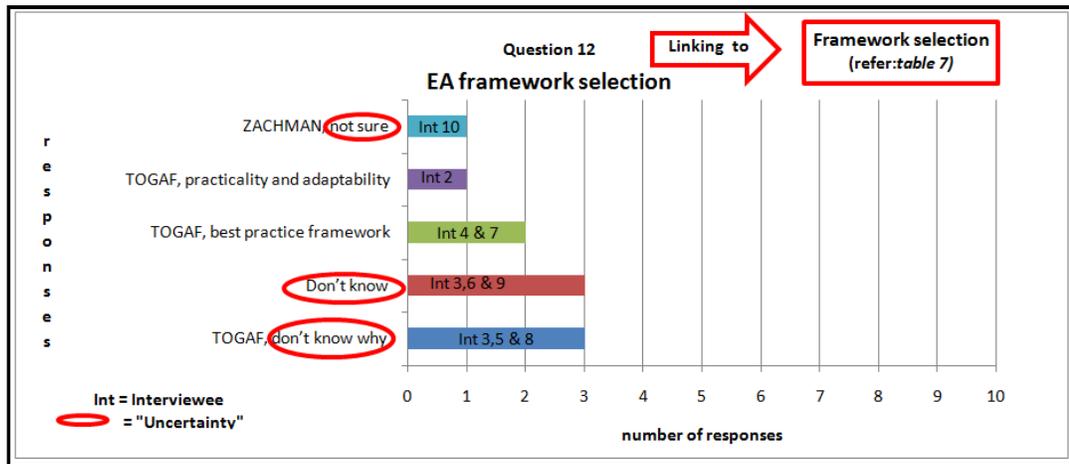


**Figure 19: EA Framework Selection**

*Figure 19* illustrates that only interviewee 7, interviewee 1 and 4 refer to *Appendix 5,* knows which EA framework was selected. *Figure 19* further highlights how the interviewees differ on the reason why TOGAF was chosen. All the remaining interviewees indicated that they "don't know", "don't know why" or were "not sure." Again that "uncertainty" displayed earlier, refer to *Figure 10* and *11*.
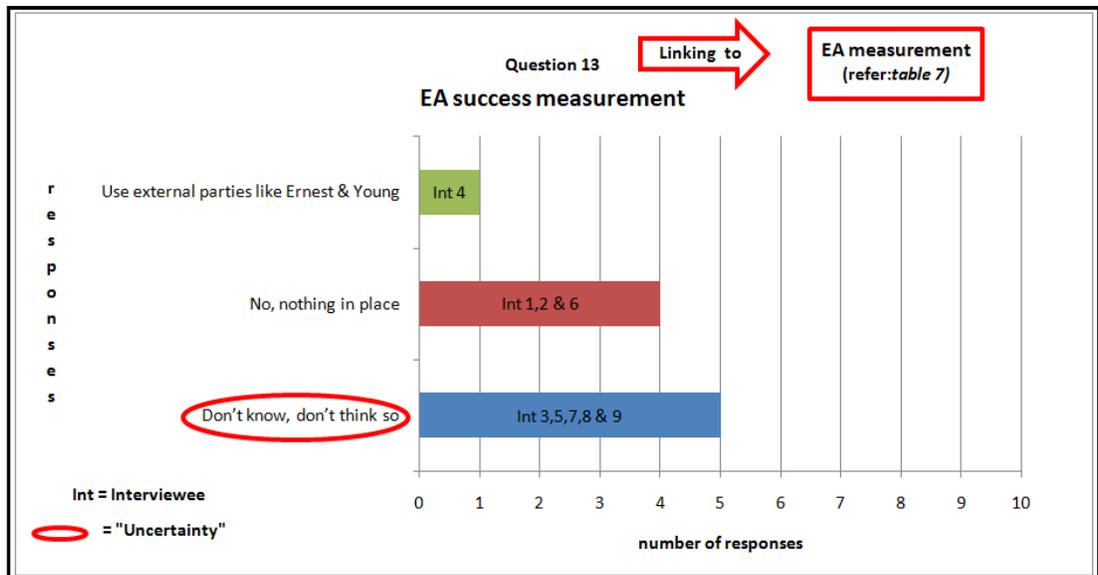


**Figure 20: EA Success Measurement**

*Figure 20* illustrates that the majority of the interviewees "don't know" if the success of EA was ever measured or whether the intended objectives were achieved. The lesser half confirms that there is no mechanism in place to measure EA success and interviewee 4 refers to an external audit done by Ernst &Young as the EA measuring tool.
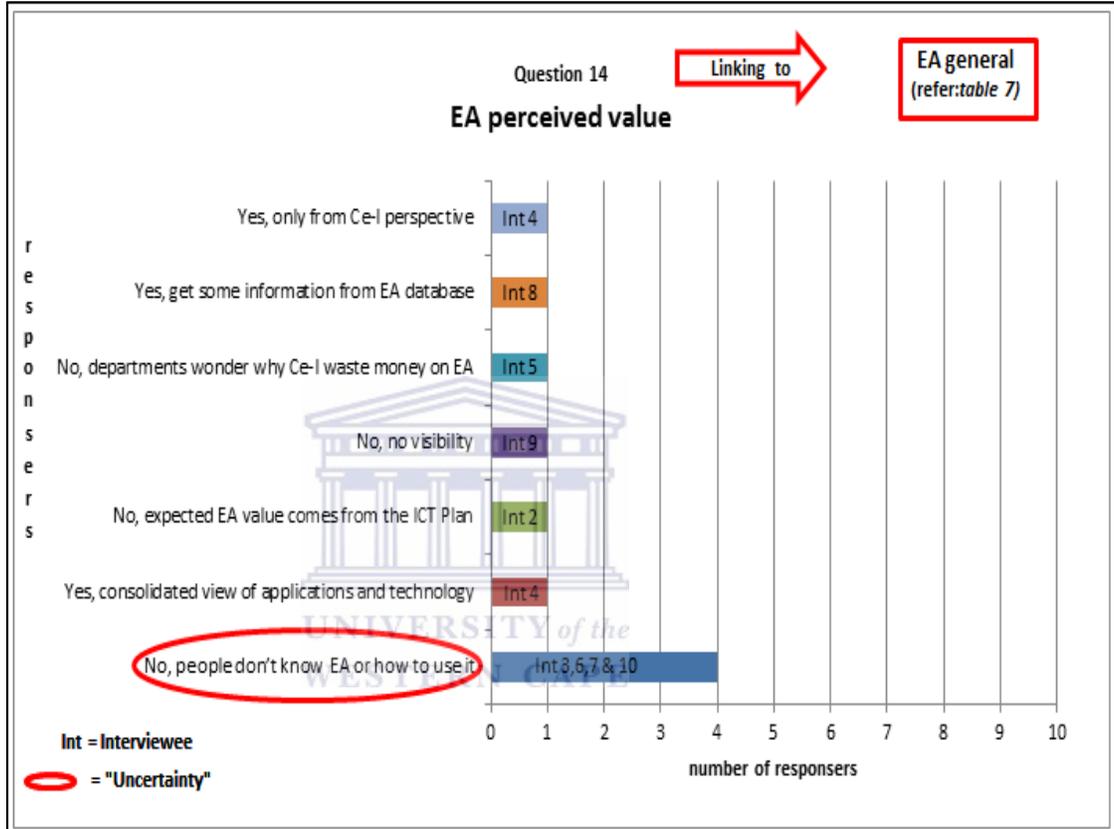


**Figure 21: EA Perceived Value**

*Figure 21* illustrates that the majority of the interviewees indicated that no perceived value came from the EA implementation due to people "not knowing" EA, circled in red, or how it should be used. Interviewee 9 and 5 highlighted that the lack of the PGWC perceived value is due to EA not being visible and that departments think that EA is a waste of money.

Interviewee 2, reflecting the department's perspective, is of the opinion that their department ICT Plans provides the value that the EA should produce. The only real value that EA do provide is to display a consolidated application and

technology view of the organisation, but only from a Ce-I perspective. This is according to the interviewees 1 and 4.
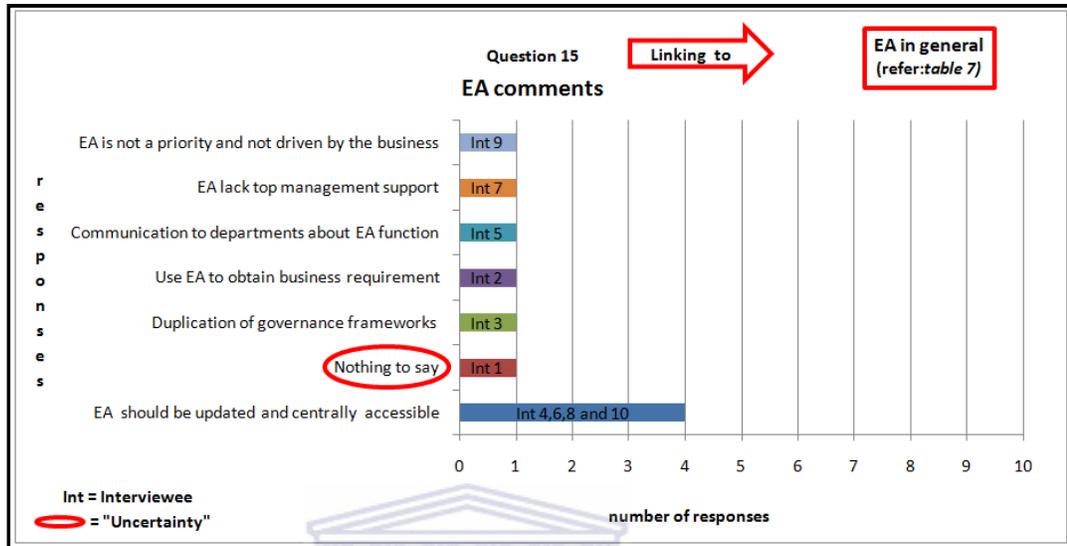


**Figure 22: EA Comments**

*Figure 22* illustrates the personal opinion of all interviewees towards the current EA implementation adopted in 2006. The most common suggestion, highlighted by interviewees 4, 6, 8 and 10, was that the EA information should be kept updated, made centrally available and be accessible for both Ce-I and departments. *Figure 22* further highlights key comments from individual interviewees' perspective that negatively impacts on EA within the PGWC:

1. Duplication of governance framework (interviewee 3)
2. EA is not used to obtain business requirements (interviewee 2)
3. Lack of EA communication to departments (interviewee 5)
4. EA lack top management support (interviewee 7)
5. EA is not a priority, driven by business (interviewee 9)

By linking the outcome of *Figure 8* to *Figure22*to the origins of the questions, refer to *Table 7*, the following facts can be summarised as a reality within the PGWC, with regards to their EA adoption:

1. Identifying duplication was the key reason for EA adoption (refer to *Figure 8*)

2. No formal EA process was defined except via ditcom (refer to *Figure 9*)

3. EA is driven by Ce-I and "uncertainty" exists with regards to its priority (refer to *Figure 10*)

4. EA emphasis is on technology standards instead of business strategy (refer to *Figure 11*)

5. EA team is focusing on one specific area and loses business focus (refer to*Figure12*)

6. Lack of EA stakeholders information to Ce-I and departments (refer to *Figure 14*)

7. Lack of EA influence with regards to application execution(refer to *Figure 15*)

8. No EA compliance on IT investments except for technology standards (refer to*Figures16 and 17*)

9. Departments control their own IS budget for business specific applications (refer to *Figure 17*)

10. No measuring tool exists to confirm EA current status(refer to *Figure 20*)

11. EA produces no perceived value from a business perspective (refer to *Figure 21*)

12. EA visibility and accessibility is the major challenge within PGWC (referto*Figure 22*)

All of the above evidence can be supported due to their linkage to the EA leading practice's concept, created during the literature review, refer to *Table 5*, Section 2.11. It is the "uncertainty" factor highlighted by the red circles in *Figures 10*, *11, 19, 20* and *21* that is not mentioned in any of the EA literature based on the success or failure of EA implementation. This emphasises the need to broaden the scope of the literature with the aim to support the 'uncertainty' evidence.

With the above in mind, all facts presented, including further investigation into the 'uncertainty' factor will play a major role in identifying the reasons for EA not addressing application duplication within PGWC and recommend the best way forward.

# Chapter 5: Findings and discussion

The purpose of the research was firstly to determine the reasons why the EA implementation introduced to PGWC in 2006did not address application duplication, and secondly to recommend the best way forward for the current EA in order not to invest in another governance framework like COBIT to achieve the intended objective.

The EA literature presented in Chapter 2 looked at both private and government sector leading practices for EA implementation and even went so far as to extract EA critical success factors from actual case studies to highlight key factors that directly impacts the success or failure of EA implementation globally, refer *Table 4*. This EA critical success factors then formed the  foundation in constructing the research within PGWC by selecting a small subject audience, refer to *Appendix 5*, specifically involved in decision making with regards to new business application requests, with the aim to link back to EA leading practice concept, refer to *Table 6*, to strengthen the validity of the evidence.

The results presented in Chapter 4 section 4.1, refer to *Table 11*, briefly sketched an idea of EA awareness among IT management in 2009 by highlighting the fact that only the enterprise architect interviewed at the time acknowledged EA as the central database to identify existing solutions (Gamiet, 2009).

With the above in mind, Section 4.2, *Figures 8* to *22,* present the results of the interviews performed, when using a similar subject audience identified by interviewee numbers 1 to 10, and categorised by their functions performed in the respective departments. With reference to *Appendix 5,* that displays the reasons for EA not addressing duplication within the PGWC. *Table 12* below, further highlights the outcome of the research in respect to the key EA critical success factors, A to L, refer to *Table 7,* also presented in the conclusion of chapter 4,and displays the reality within the PGWC:

| EA critical success factors | EA critical success factors not considered by PGWC |
|---|---|
| A | EA is driven by Ce-I and "uncertainty" exists with regards to its priority |
| B & C | EA emphasis is on technology standards, instead of business strategy |
| D | EA team is focusing on one specific area and loses business focus |
| F | Lack of EA stakeholders' information to Ce-I and departments |
| G | Lack of EA influence with regards to application execution |
| H | No EA compliance on IT investments except for technology standards |
| J | Departments control their own IS budget for business specific applications |

**Table 12: Reality within PGWC in relation to EA critical success factors**

*Table 12*highlights the key EA critical success factors that were not taken into consideration when adopting an EA initiative within the PGWC and can be the contributing factor in EA not achieving the intended objectives. Critical success factors G, H and J specifically speaks to application duplication. If EA does not influence the decision making with regards to business applications and just focuses on technology standards, the reuse of the existing application in other departments won't be encouraged. This supports the majority opinions by the interviewees, refer to *Figure 22*, in highlighting the availability and accessibility of EA as the key reason for EA not addressing duplication. This evidence supports the poor EA perception amongst IT managers with regards to identifying EA as a central database to check for existing solutions.

The evidence further highlights the existence of the "uncertainty" factor; refer to *Figures 10, 11, 19, 20*and *21* that exists amongst the interviewees with regard to EA within PGWC. Ce-I managers representing the respective departments and acting as a Ce-I ambassador in guiding business in ICT decision making, responded during their interviews that they "don't know" or "are not sure" of:

- The priority of EA within PGWC.

- If EA initially addressed technology standards or business requirements.

- The criteria for EA framework selection.

- Whether a method to measure EA current state exists.

- If EA produces any perceived value to business.

This "uncertainty" is not supported by the literature presented in Chapter 2 and is indicative of the lack of knowledge and understanding of the theory relating to failure or success of EA implementation. This study will therefore present a brief summary of literature relating to 'uncertainty' in order to support the newfound evidence with regard to EA implementation as the limitation of this study.

## 5.2 Uncertainty

Most research on environmental uncertainty has been based on theory, due to the lack of methodologies to strengthen the reliability and validity of the evidence (Duncan, 1972; Downey *et al.*, 1975). Most theorists, on the topic, reach the same conclusion. That is, by defining environmental uncertainty as being the lack of sharing information regarding the cause and consequences of events, the shortcoming, in determining the correct results of decisions made and the inexperience to correctly project a probable cause in the occurrence of future events (Duncan, 1972).

The uncertainty factors mentioned above are not necessarily caused by change, nor the rapid speed at which change occurs, but from the unexpected changes in organisations (Frances, 1987: 141).

The source of uncertainty is defined as the area of the environment that the decision makers are uncertain about. It highlights the three types of uncertainty about the environment to be (Frances, 1987: 138):

**State uncertainty:** Management does not have enough information about the nature of the organisation.

**Effect uncertainty:** Management does not have critical information about the effect of change on the organisation.

**Response uncertainty:** Management does not have enough information to realise the value of each event that occurs, in order to ensure that the organisational objectives are achieved.

It is evident that all three types of uncertainty occur due to the lack of certain types of information with regards to the environment and the ability to deal with organisational change. To further support the evidence of uncertainty that exists within PGWC, refer to *Figures 10, 11, 19, 20* and *21,* this study will perform further data analysis using the data collected during the interviews. With reference to *Appendix 4,* that highlight some of the reasons for this uncertainty, influenced by change during the PGWC EA implementation.

The starting point to manage organisational change is by identifying the obstacles that avoid the change from happening. He further states that the resistance from the employees is a key factor in determining the success or failure in applying change (Del Val & Fuentes, 2003).

## 5.2.1 Resistance to change

The key reasons why individuals resist change can be summarised as being (Stone, 2002: 579):

**Fear:** Not knowing or understanding the reason for change and the impact on themselves.

**Disrupted habits**: Anxious for changing the way things were done previously.

**Loss of confidence:** The incompetence to deliver under new methods.

**Loss of control:** Feeling like a victim instead of a participant.

**Poor timing:** Overpowered or affected by the paste at which change occurs.

**Work overload:** Inability to deal with the physical/mental demands.

**Loss of face:** Ashamed because the new way is preferred to the old way.

**Lack of purpose:** Not understanding the necessity for change.

**Economic loss:** Questioning the remuneration package and job security.

By identifying the reasons for the resistance, allows for the management of the resistance to change (Del Val &Fuentes, 2003).

## 5.2.2 Managing resistance to change

A specific process to overcome resistance to change can be implemented in the following 6-step format (Swanepoel *et al*., 2008: 740):

1. Encourage participation by identifying the business problems to establish a shared view of implementation.
2. Strategise towards a common vision and define clear roles and responsibilities to employees in achieving their tasks.
3. Encourage acceptance and enforce support for the vision.
4. Communicate intentions and request feedback from a departmental perspective.
5. Apply governance in formalizing policies, structure and systems that allows for change.
6. Implement a monitoring and evaluation committee, represented by all business units, to respond to any problems and adjust strategies accordingly.

By including the abovementioned 6-step method into an Organisational Change Management process, will help to effectively alleviate uncertainty and the changes associated with it.

The existence of uncertainty that was discovered during the research can only be supported by the above literature. This would provide evidence of how 'uncertainty' impacts on EA implementation that would conclude the findings of this study, which will be presented as Concept B. The outcome of Concept B will contribute new knowledge to academia with regard to the existence of uncertainty and its influence on EA implementation.

## 5.3 Contribution to Knowledge

Based on the literature presented on uncertainty and the newfound evidence, refer to *Figures 10, 11, 19, 20*and *21*, this study will validate the reasons and influence of uncertainty as a contributing factor as to the reason that the PGWC's EA implementation failed to eliminate duplication and thereby conclude the findings of this study.

## 5.3.1 Presentation of Uncertainty and change (Concept B)

Further data analysis had to be performed to highlight that uncertainty is also considered as being the cause for duplication by:

- Extracting specific quotes from the data collected during the interviews, refer to A*ppendix 4,* highlight the types of uncertainty that exists in the PGWC, as well as identifying key organisational changes occurring during the EA implementation causing the uncertainty, refer to *Table 13* below.
- Extracting quotes from all interviewees only pertaining to Question 15, refer to *Appendix 4,* as this presents evidence that specifically capture the feeling towards the EA introduction in 2006 to identify the reasons for resistance, refer to *Table 14*.

*Appendix 4* displays the questions and full responses of the evidence presented in *Tables 13* and *14*.

| Uncertainty caused by Change(Concept B) | | | | |
|---|---|---|---|---|
| Question | State uncertainty | Effect uncertainty | Response uncertainty | Interviewee |
| 1b | "Everyone is out there **doing their own thing**." | | | 4 |
| 4a | | "EA is not a priority "as **new heads, or there is a change in politics, change in** | | 9 |

| | | | | |
|---|---|---|---|---|
| | | **heads, change in departments** and so forth." | | |
| 4b | "You know that there were **people who were busy with EA, they sort of seem to have disappeared** into the woodworks." | | | 4 |
| 5 | | | "**A lot of changes were happening.** The people driving it at the time do realise that **they should have consulted a lot of people and departments.**" | 7 |
| 6b | "We were developing two of them, **they left**. Now we got **two juniors on board** you know, so that is his risk at the moment." | | | 4 |
| 7 | "In **2006 it was the flavour of the month**... sorry to | | | 9 |

| | | | | |
|---|---|---|---|---|
| | use that term, but **I think it just dimmed out, you** know." | | | |
| 10 | "Government being the **monster it is.**" | | | 10 |
| 12 | | | "**The initial framework** that was chosen before my time was apparently a combination of things the **FEAF and Zachman etc. After I came on board we had to do a review.**" | 1 |
| 15 | "Somewhere along the band wagon the **priorities have changed. Due to the political** conditions we found ourselves, could be one of the reasons for the **re-engineering** processes happening all | | | 7 |

| | | | |
|---|---|---|---|
| over." | | | |

**Table 13: Evidence of uncertainty and the changes that caused it**

Based on the evidence of the types of uncertainty and the organisational changes, specifically highlighted in bold, refer to *Table 13,* proves that the reasons for uncertainty in the PGWC can be due to:

- Political climate and its impact on the EA programme.
- Lack of EA understanding at the top management level.
- Lack of commitment and clear direction of the EA programme.
- Poor consultation strategy regarding the EA programme.

*Table 13* further provides evidence of the unexpected organisational changes occurring during the PGWC's EA implementation, namely:

- Change of key resources involved in the EA project (interviewee 4).
- Change due to the appointment of new management (interviewee 9).
- Political change (interviewee 9).
- Re-engineering (interviewee 7).
- Change in EA framework (interviewee 1).

The evidence presented in *Table 14*, were quotes extracted from responses to question 15 from interviewees 3, 4, 5, 7 and 9, with the aim to highlight their feeling towards EA adoption:

Question 15 was:

Are there any additional comments that you would like to contribute to the topic at hand?

| | Resistance to change (Concept B) |
|---|---|
| Interviewee | Responses to Question 15 relating to EA adoption |
| 3 | "I think there is a period when there is **overwhelming**, currently everyone is going with governance." |
| 4 | "We are not **getting to the point** where we are trying to do, trying **to improve it**." |
| 5 | "The main thing is that we **must communicate** more with EA team, more to the departments and to the business to **tell them precisely what they are doing and why they are doing it**." |
| 7 | "I think EA was identified years ago, right**, the failure of applying or deploying EA is the support of senior management, a lack of understanding strategic goals or ego** for that matter, **individual influences**." "Government find themselves to be a very volatile area, and because **there is no stability** around political politics." |
| 9 | "In our organisation is when a certain things are seen as priority the other stuff seems **to go as a back seat** you know. That is unfortunate and everybody concentrates their energies on that particular thing. **"We just apply it and see where it can fit, it should fit the other way**." The senior management walking in they want **to accommodate us, they really don't see the value of what we can actually help them achieve their objectives."** |

**Table 14: Evidence of reasons for resistance towards EA adoption**

Based on the evidence of resistance to change, highlighted in bold as presented in *Table 14,* it can be proven that the resistance to EA adoption, from an individual perspective in the PGWC, was due to:

1. Anxious about how EA will change the normal way of working (interviewee 3).

2. Lack of management understanding to drive EA (interviewees 4 and 9).

3. Do not understand why EA was adopted and its impact (interviewees 5 and 7).

4. Can't cope with mental and physical demands of EA (interviewee 7).

5. The introduction of EA makes them feel insecure about their jobs (interviewee 7).

6. Fear of not understanding the impact on themselves (interviewees 7 and 9).

The fact that the evidence presented in *Tables 13* and *14* emanates from the responses of IT managers directly or indirectly involved with the EA program within the PGWC, and further supported by the literature presented in Section 5.2, validates the influence of uncertainty on PGWC's EA implementation. All of these factors will contribute new knowledge to academia.

Based on the findings presented as Concepts A and B, the following statement is evident:
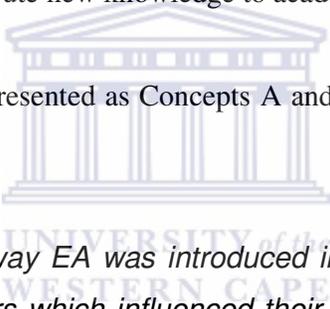
*IT is clear that the way EA was introduced in PGWC caused the uncertainty amongst IT managers which influenced their ability to successfully implement EA and ultimately resulted in the failure to address duplication.*

The findings of this study are further simplified in Figure 23 below, by presenting it using a casual loop diagram template (Senge, 1990); refer to *Appendix 8*, to highlight the inter-relationship and cause-effect of the evidence presented as Concepts A and B, in terms of the PGWC's EA implementation.
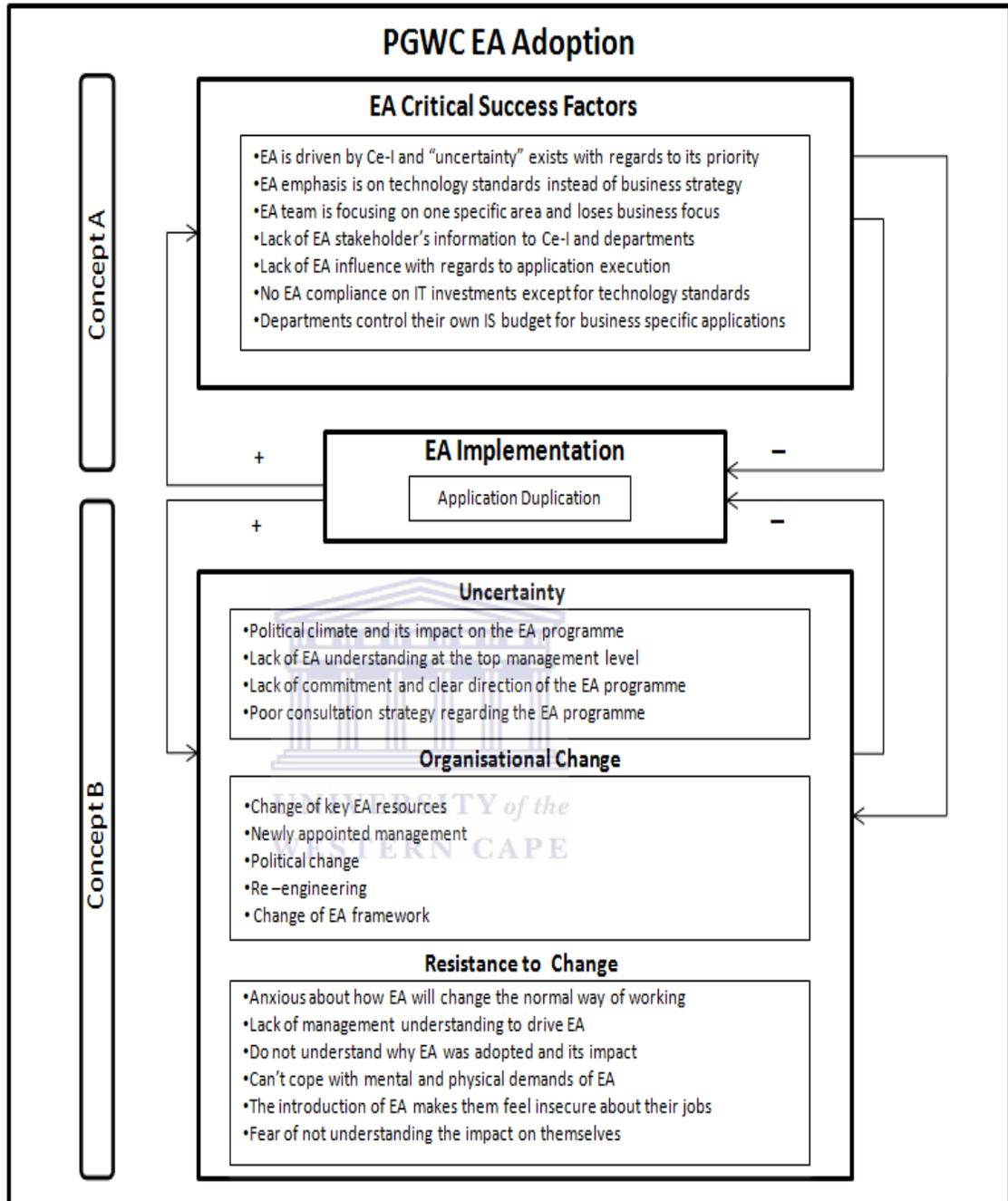
**Figure 23: EA and Uncertainty factors influencing duplication within PGWC**

*Figure 23* summarises the findings of this study by highlighting the EA critical success factors not considered by PGWC. Also, the uncertainty that exists amongst the Ce-I management due to organisational change which ultimately influenced the success of their EA implementation.

# Chapter 6:Conclusion

The aim of this study was determine why the EA implementation within the PGWC failed to address application duplication. According to the literature presented, most organisations adopt EA to ensure inter-operability of different processes and information systems to avoid duplication (Janssen & Hjort-Madsen, 2007).

The literature further highlighted that not many organisations, especially the public sector, have succeeded in their EA implementations and failed to reap the EA benefits. Hence the literature provided in Chapter 2, presented the best practice EA implementation processes, refer to *Table 1*. With reference to *Table 5,* it also highlighted the critical success factors*,* constructed by not only research but actual EA implementations globally to address the EA challenges in future. This EA critical success factor guidelines were used as the foundation in constructed the questions for the case study within the PGWC.

The study provided evidence of key critical success factors that were not taken into consideration during their EA implementation, refer to *Table 12,* which formulated Concept A. These factors could be useful to the EA project team, particularly the importance of EA when used as a governance tool to enforce compliance at all departmental ICT committees, and thereby forming part of the decision making process of all new application requests.

Although the implementation of EA governance was highlighted as a key critical success factor, the new 'uncertainty' evidence discovered, refer to *Figures 10, 11, 19, 20* and *21*, resulted in further research on this 'uncertainty' to support the new found evidence, refer to Section 5.3. The literature provided on uncertainty, refer to Section 5.2, supported the newfound evidence as being the result of unexpected organisational change that occur during new system adoption, resulting in employee resistance and ultimately project failure.

Further evidence was presented, refer to *Tables 13 and 14,* which not only highlighted the organisational changes that occurred during the EA implementation, but also the reasons for resistance to change which caused the uncertainty within the Ce-I. This evidence was presented as Concept B, refer to Section 5.3.1.

The findings presented in *Figure 23 as* concepts A and B, proved that both the critical success factors that were not considered and the uncertainty that was caused by the organisational changes during the EA implementation, influenced the ability of EA success and ultimately failing to address application duplication within the PGWC.

Based on the outcome of the research, it is recommended that the PGWC's EA project team focus on the critical success factors not taken into consideration during their current EA implementation, refer to *Table 12,* and encourage their adoption to assist in reaping their intended EA benefits. A good starting point would be to assess the maturity level of the EA current-state by using an EA maturity model as presented in section 2.8. Communicate and make available and accessible an organisational view of all existing PGWC applications, their functions and technologies. Then include an EA governance process or alignment to an existing governance model to implement compliancy at the ICT committees to encourage reuse of existing application or EA technology standards amongst the decision makers.

It is further recommended that a change management process be considered at a strategic level in order for the PGWC to manage the impact of organisational change due to a dynamic political environment which contributes to 'uncertainty'.

## 6.1 Research limitation

This study adopted a qualitative approach which can result in formulating subjective opinions of the individuals interviewed and not necessarily based on fact. The focus area was aimed at key Ce-I management within the PGWC involved in guiding departments with regards to all their ICT initiatives to enable

their business objectives. Other Ce-I managers, operational resources and department staff except for one resource representing a department, did not form part of the subject audience. This is why the findings are limited to Ce-I, the PGWC and not necessarily to other public or private sector organisations. Based on the 'uncertainty' uncovered on the subject during the interviews, raises some speculation on the impact of extending the scope to other managers or at an operational level. This however must still be investigated.

## 6.2 Research Value

Public sectors are driven by political motivation which creates an environment of continuous change from a political party, strategic intent and organisational structure perspective. This has impact on the entire administration.

The 'uncertainty' uncovered during this study, refer to *Figure 23*, highlighted the negative impact of organisational change on EA implementation within the PGWC. This model can be used to assist other government organisations in South Africa to create an awareness of 'uncertainty', not only limited to ICT investments but also to other departments. Also, specific investments that could be affected due to organisational change, resulting from a dynamic political environment.

It is therefore recommended that a further study should be considered to investigate the impact of organisational change from a strategic to an implementation level to better manage potential 'uncertainty'.

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# Appendices:

## Appendix 1: Data analysis "Concept A"

| Questions | Similarities | Differences | Interviewee |
|-----------|-------------|-------------|-------------|
| "Concept A" | | | |
| 1a | Address duplication | | 1,3,4,7,8,9 and 10 |
| | Identify business requirements | | 1,2,3 and 6 |
| | ICT Strategic Tool | | 2,4 and 7 |
| | IT Governance | | 3,6 and 10 |
| | Standardisation | | 5 and 7 |
| | Information Management via a central repository | | 7 and 8 |
| | | Organisational view of IT | 4 |
| | | Improve decision making | 7 |
| 1b | Yes, definitely a need for EA within PGWC | | 1,2,3,4,5,6,7,8,9 and 10 |
| 2a | DITCOM | | 1,5,8,9 and 10 |
| | | Adhoc in smaller ones | 6 |
| | | Each department do their own thing | 2 |
| | | Word of mouth. No one is forced to use EA | 3 |
| | | Sometimes consult EA team | 4 |
| | | No formal process, no document that refers to it | 7 |
| 2b | Yes, internal system | | 1 and 5 |

| | | | |
|---|---|---|---|
| | repository | | |
| | No, not from the departments, we check the EA | | 2 and 8 |
| | | Yes, word of mouth and some check the EA | 3 |
| | | Yes, it happens now | 4 |
| | | Yes, only the bigger departments | 6 |
| | | Yes, via a template | 7 |
| | | No, not based on what was used before | 9 |
| | | Yes and No, depends what the client wants | 10 |
| 3a | Don't know, not sure | | 2,3, 8 and 9 |
| | No, it is being driven by IT | | 1 and 5 |
| | | Yes, it is supported by the CIO | 4 |
| | | No, everyone is working in isolation | 6 |
| | | It was a priority in 2006/07, not currently | 7 |
| | | No, not being taken seriously by Ce-I management | 10 |
| 3b | Both IT and business | | 2,3,8 and 10 |
| | IT | | 4,5 and 6 |
| | Business | | 1 and 7 |
| | | Should be business, but is currently driven by IT | 9 |
| 4a | Technology | | 2,3,4,5,6,7,9 |

| | | | |
|---|---|---|---|
| | standardisation, its driven by IT people | | and 10 |
| | | Does not know | 1 |
| | | Firstly standardisation, secondly business needs | 8 |
| 4b | It is what the IT people know, they took the easy way out to get the job done | | 2,3,4,9 and 10 |
| | Ensure standards to prevent duplication | | 5 and 8 |
| | | EA speaks about business requirements | 1 |
| | | Projects are being run in isolation | 6 |
| | | IT identified the EA requirements | 7 |
| 5 | No, only involvement was communication via presentations, completing of templates | | 3,5,6 and 7 |
| | | Yes, as EA architect forming part of the EA team | 1 |
| | | Yes, had to provide key information | 8 |
| | | No, the departments see EA and ICT Plans as one | 2 and 9 |
| | | No, chose not to approach departments | 4 |

| | | directly, use the ICT Plan, IT manager as the interface | |
|---|---|---|---|
| | | Use the ICT Plan, IT managers as the interface it was just to get something in place without involving too many people. It was mentioned not enforced | 10 |
| 6a | Combination of external and internal staff | | 1,2,3,4,5,6,7,8,9 and 10 |
| 6b | Yes, external staff can transfer skills to internal staff | | 1,2,3,4,5,6,7,8,9 |
| | | No, external does not understand government business | 10 |
| 7 | No | | 3,5,7 and 9 |
| | Yes, via the stakeholder map | | 1 and 4 |
| | | Yes, it's the Central IT committee | 2 |
| | | Yes, EA consultant is a close friend of mine | 6 |
| | | Yes, via interaction with Ce-I staff | 10 |
| | | Yes, not sure of the departments | 8 |

| | | | |
|---|---|---|---|
| | | | |
| 8 | Yes, run new application requests via EA | | 1,4,5,7 and 8 |
| | No, EA is not available , nothing forces you to consult EA and departments see their ICT Plans as EA | | 2,3,6,9 and 10 |
| 9 | Yes, EA board sets the technology standards | | 1,4,7 and 8 |
| | No, not forced to consult EA | | 2,3,5,6,9 and 10 |
| 10 | Both, Department for business specific and Ce-I for transversal applications | | 1,3,4,6,7,8 and 10 |
| | Departments pay for all their applications | | 2,5 and 9 |
| 11a | Project Board | | 1,4 and 7 |
| | Ditcom and Citcom | | 2 ,3 and 5 |
| | PMON | | 3,6 and 8 |
| | DashBoard | | 6 and 8 |
| | | No governance applied, EA is not fully in place | 10 |
| | | Governance is not applied via a central place, its where the budget resides at the time | 9 |

| 11b | None, EA is not visible | | 2,3,4,5,6,8,9 and 10 |
|---|---|---|---|
| | | Influence business processes and MS Migration | 1 |
| | | Influences technology standards only | 7 |
| 12 | TOGAF, don't know why | | 3,5 and 8 |
| | TOGAF, best practice framework | | 4 and 7 |
| | Don't know | | 2,6 and 9 |
| | | Not sure, think it's ZACHMAN | 10 |
| | | TOGAF, practicality and adaptability | 1 |
| 13 | Don't know, don't think so | | 3,5,7,8 and 9 |
| | No, nothing in place | | 1,2,6 and 10 |
| | | Use external parties like Ernest & Young to check maturity status | 4 |
| 14 | | Yes, consolidated view of applications and technology | 1 |
| | No, people don't know EA or how to use it | | 3,6,7 and 10 |
| | | No, expected EA value comes from the ICT Plan | 2 |
| | | No, departments wonder why Ce-I waste money | 5 |

| | | on EA | |
|---|---|---|---|
| | | No, no visibility | 9 |
| | | Yes, get some information from EA database | 8 |
| | | Yes, only from Ce-I perspective | 4 |
| 15 | | Can't think of anything | 1 |
| | | The new hype in PGWC is governance; TOGAF is the EA governance framework. We are adopting other governance frameworks like ISO etc. Until IT decides on a single governance framework and implement it, we are also duplicating | 3 |
| | EA information should be current and made centrally available to access remotely for both Ce-I and departments before making decisions | | 4,6,8 and 10 |
| | | Take EA into the | 2 |

| | | | |
|---|---|---|---|
| | | departments to identify their business requirements, processes and people to obtain real value | |
| | | More communication from the EA to departments to inform them what they are doing and why | 5 |
| | | EA failure is due to lack of top management support | 7 |
| | | EA is not a priority and therefore takes a backseat to other projects. We got IT staff working on governance frameworks like COBIT, ISO and KIng3 but we don't know the type of priority because the main stakeholders, our clients, are not driving it | 9 |
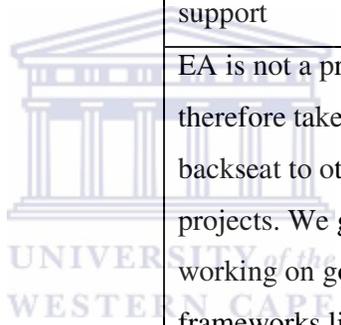
## Appendix 2: Application duplication within PGWC (Gamiet, 2009)

"A" to "G" indicates the specific department and the yellow and green colours highlights the applications that perform the document management and HR function within and across the respective departments.

| Application | Department | Department | Department | Department | Department | Department | Department |
|---|---|---|---|---|---|---|---|
| **Application : Document Management Function** | **A** | **B** | **C** | **D** | **E** | **F** | **G** |
| DWS | | | | | | | |
| LiveLink | | | | | | | |
| Cmats | | | | | | | |
| Jtrack | | | | | | | |
| FileTracking | | | | | | | |
| Rooi | | | | | | | |
| Blou | | | | | | | |
| Groen | | | | | | | |
| Hlumanathi | | | | | | | |
| Correspondence Tracking System | | | | | | | |
| DOC | | | | | | | |

☐ Document management function

| Application | Department | Department | Department | Department | Department | Department | Department |
|---|---|---|---|---|---|---|---|
| **Application :** **HR Function** | **A** | **B** | **C** | **D** | **E** | **F** | **G** |
| PERSAL | | | | | | | |
| Verlofbeheer | | | | | | | |
| Paysheet Control system | | | | | | | |
| Provincial Human Resource development System | | | | | | | |
| Vacancy Lists System | | | | | | | |
| Admin Vacancy | | | | | | | |
| Unemployment Educator System | | | | | | | |
| LMS | | | | | | | |
| Leave and Overtime | | | | | | | |
| Salaries | | | | | | | |

: management function

## Appendix3: Questions and data analysis (Gamiet, 2009)

Question 2 asked to 8 interviewees extracted from preliminary study relating to EA:

Question 2:

In the case of a new business requirement, is there any information that one can reference in the organisation to identify if the solution already exist?

If Yes – Please elaborate?

(To asses if there are any existing technologies in place e.g. central repository or spread sheets to support decision making. Focus on central repository and technology standards, linking to EA).

| Interviewee | Answer |
|---|---|
| 1 | "No central database currently exists of applications within departments. No functional architecture exists to indicate existing business functions and relationships." |
| 2 | "No, there is no formal process for this. One generally has to use your own initiative to find out if there are any." |
| 3 | "Not currently in place but working on a central application database." |
| 4 | "No direct database where systems info can be accessed, but there was a requirement for EA to list systems info but is not up and running, rather, we cannot access the EA." |
| 5 | "No, not currently." |
| 6 | "No, no current process that forces you to identify existing solutions." |
| 7 | "No, I engage in an informal manner with the IT managers to verify." |
| 8 | "Yes, EA in place to provide a view of all applications supported by the various IT managers." |

Source: Gamiet, 2009

## Appendix 4: Interview questionnaire

All department and interviewee names will remain anonymous due to the sensitivity of the data. All data collected will be used for the purpose of this study. This study is based on a preliminary case study conducted by Gamiet (2009) where the findings concluded in identifying the lack of ITG as being the major cause for application duplication within PGWC. The case study also highlighted the existence of an EA initiative adopted in 2006 within PGWC to address duplication. Thus, the intension of this interview is to gather information that will assist in identifying the reasons for EA not addressing application duplications and determine the best way forward.

| Number | Question |
|--------|----------|
| 1 | a) In which way do you think EA adds value? <br> b) Do you think there is a need for EA in PGWC? |
| 2 | a) What process is used within PGWC when a request for a new business application is made? <br> b) Are any analyses/assessments done to check that existing solutions can accommodate new business application requests? |
| 3 | a) Is implementing EA in the province currently an executive management priority? <br> b) Do you think driving EA in the province is a business or IT accountability? |
| 4 | a) Do you think the existing EA was initiated by focusing on technology standardisation by identifying business needs? <br> b) Why do you think this approach was adopted? |
| 5 | To your knowledge, were you or the departments you engage involved in any planning related to the current EA, and if so, what were the key outcomes? |
| 6 | a) Is the EA project resourced by PGWC staff, external contractors or a combination of both? <br> b) Do you think this is the right approach for an EA project? |

| 7 | Do you know who the EA stakeholders are and was any information about them provided to you in the context of the EA project? |
|---|---|
| 8 | Would you say that the current EA plays an important role in adding business value especially, regarding application decision making? If yes, how? |
| 9 | Is EA currently included in the consultation and decision making for IT requirements and investments? If so, what is its role? |
| 10 | Who is accountable for the business application budget in your organisation? |
| 11 | a) How is governance applied to projects within your organisation? b) In your opinion, how and to what extent does EA influence projects within your organisation? |
| 12 | Do you know which framework was chosen to implement EA and what the primary considerations were in selecting the framework? |
| 13 | Are there any monitoring and evaluation processes to determine whether the application of EA in your organisation is meeting its intended objectives? |
| 14 | Has EA provided any perceived value within the organisation since implementation, and if so, how? |
| 15 | Are there any additional comments that you would like to contribute to the topic at hand? |

## Appendix 5: List of interviewees

| Interviewee | Organisation | Appointment |
|:---:|:---|:---|
| 1 | PGWC | 07 March 2011: 09:30 |
| 2 | PGWC: Department | 17 March 2011: 12:00 noon |
| 3 | PGWC | 17 March 2011: 14:00 |
| 4 | External Contractor | 22 March 2011: 08:00 |
| 5 | PGWC | 23 March 2011: 14:00 |
| 6 | PGWC | 23 March 2011: 13:00 |
| 7 | PGWC | 24 March 2011: 13:00 |
| 8 | PGWC | 31 March 2011: 11:00 |
| 9 | PGWC | 06 April 2011: 13:30 |
| 10 | PGWC | 18 April 2011: 15:30 |

**Abbreviations used in the above table:**

PGWC        Provincial Government Western Cape

## Appendix 6: Interview data collection

Question 1:

a) In which way do you think EA adds value?

b) Do you think there is a need for EA in PGWC?

| Interviewee | Answer to Question 1 |
|---|---|
| 1 | a) "In which way, a number of ways, firstly I think if you have an understanding, given the fact that we are a big organisation, consists of thirteen Departments, so given the fact that you have a view of the complete organisation across PGWC. You can already identify a number of duplications with in systems and also gives you a good understanding in terms of what the business requirement is or where the business wants to go. Then obviously the technology that is required for the business" (Interviewee1, 2011). <br><br> b) "I think definitely there is a need as the need has already been identified and in terms where we are sitting, we try to promote the understanding of EA across the organisation, to answer the question there is definitely a need because again it speaks to the previous question, that it gives you an organisation view of all your business applications, business processes and technology" (Interviewee1, 2011). |
| 2 | a) "I think EA adds value in terms of the Department when it comes to its IT needs and its business needs as the two must come together. It will add value to the ICT Strategy" (Interviewee2, 2011). <br><br> b) "There is definitely a need for EA, not only on a corporate level between Departments and within the Department itself" (Interviewee2, 2011). |
| 3 | a) "EA if it is used as it supposed to be used and every process and we are forced to use the EA then it really can bring of great value then |

| | |
|---|---|
| | you will exactly no what system is there. You would not duplicate a system you would not have to develop systems because you could easily grab systems that have already been developed from there. So if it is used properly the way it should be or the way it is intended I think it could add great value" (Interviewee3, 2011).

b) "Definitely in PGWC, there is a need for EA as there is a lot of duplication going on at the moment, where people develop the same wheel over and over. But once again if the EA that we have worked properly we wouldn't need to go through all this duplication. We would have already eradicated a lot of duplications. There is a need" (Interviewee3, 2011). |
| 4 | a) **"**Now there is the text book responses to EA and value that it has, if you look at it truly, practically, you are never going to able to determine the direct value of EA because of the nature. It is a strategic function in your business, so if you want to measure direct value, you go down to project level. EA will influence what is happening at a project at that level. When you go and look at value or business impact, it comes from the project. There is that school of thought, people are always out there trying to find value for EA, so if you try to go measure it directly but using ROI and your normal instruments, you are never going to be able to measure it. People get upset when I say that because EA, but that is the reality but like all good things right, if you go build a house, your foundation what value does it add to your house, right you don't see it, you see the walls, you see the inside but you forget the about this thing that sits underneath there. That is not right, then the rest is going to crumble over time, it is the same thing with EA.  It puts together the foundation, IT operations going forward. It is most probably a different perspective for you. People go out and deplonk duplication decease in cost of ownership, cut down on time to market, improve decision making, turnaround times and all of those things, but ultimately if you go look at all those things it is not EA does that because EA does not actually go and implement it. We |

would recommend it and say that here is duplication, you could do the following. It is not up to us to implement, business would go ahead. People intend to forget the fact that EA is actually a strategic management tool not so much an operational tool. So for me when people ask me about the value you know of EA, at the end of the day you going to have different values popping up depending on the maturity of the organisation. If you go into an organisation where everything is ad-hoc, right, absolutely anyone and everyone does whatever they want to. By putting EA in place and getting invisibility, just providing that visibility in the first instance of what is happening in your organisation not just from an IT perspective, asset perspective, but also from how IT operations is aligned to where business wants to go. You get that visibility, so there would be that value for the organisation in that, ok. But at the end of the day every single year you still have to set concrete objectives for yourselves, as to what it is that you want to achieve and that is how you go to measure you valve, baby incremental steps. You might have overarching ideas to where you want to go. When you start in EA it is normally a good thing, one of the first things is to say, I am going to use this specific maturity framework and use that as a basis because that becomes my tool for one, managing performance my EA practice, but it also helps me to grow my organisations maturity within EA, over a period of time. That is one of the things we did. We opted to use the EARB, we did an assessment in the beginning where we started it EA and every year subsequently to that we have set specific objectives to what it is, you know here are different dimensions in that maturity framework. From business impact to basic things around the interaction of business, you know how well wide spread it is, known from tools to resources etc. different dimensions. We have picked specific areas that we wanted to work on every single year. So it will tie in one of your questions around performance management. How do you check, so that is what we used as our internal basically metric, where we are going and what is happening within EA practice?" (Interviewee4, 2011).

| | |
|---|---|
| | b)"There is a need for EA in any organisation, you know, where you have the kind of complexity in the province and more so you have 12 Departments, whether Treasury is counted in or out. There are 12 departments each autonomous you know, but there are certain areas where there is a need for information to be shared, and when you have that you cannot not have some kind of structured way in which you are going to manage that kind of interaction. Apart from just the supporting information that needs to be shared, there is a real need for some of your departments, clusters to work together operationally and if everyone is out there doing their own thing, sorry to say you sit with what you have at the moment, that we are trying to undo, the spaghetti" (Interviewee4, 2011). |
| 5 | a)"It adds value in that the standards can be pinned down for all departments they can follow that in all their procurement processes. It can help with that" (Interviewee5, 2011).<br><br>b)"Definitely yes, it will stop people from procuring wrong things and we will all go in the same direction" (Interviewee5, 2011). |
| 6 | a) "More structured, more managed approach within the business and IT requirements, structured framework as well as methodology to comply too" (Interviewee6, 2011).<br><br>b)"There is most definitely a need for EA within PGWC environment, due to the lack of conformity and the lack of standardisation. There is loads of duplication and EA can probably render some sort of assistance or solution in the interim" (Interviewee6, 2011). |
| 7 | a) "EA in a lot of cases right, housed organisations, I am not just talking about government perspective, I am talking about organisations to make either better informed decisions around certain business processes or direction where they want to go strategically. That is one area why EA should be implemented as well. But mostly it |

| | |
|---|---|
| | is the value brings around is the information that it gathers to us to make better decisions, with regard to strategy, and standardisation and prevent duplication" (Interviewee7, 2011).<br><br>b)"Yes there is a need, but I won't just stop at PGWC, I will say in any organisation, depending how the organisation is structured, obviously, and the amount of people and I am not referring to SM&E's, talking about organisations where there is a strategy, capital, lot of investment, they should have a EA" (Interviewee7, 2011). |
| 8 | a) "EA adds value in terms of making sure that there is no duplication within PGWC, when it comes to application solutions, ok. And also what it also will add value to is when it comes to information management to have one single central place where they store common information for example employee details, instead of 10 applications carrying that information, it can be centralised in a single meta data environment where we actually can record it and all the applications can actually grab it from that central point, that will not only just, the data base that's not duplicated but also the data information" (Interviewee8, 2011).<br><br>b)"Definitely" (Interviewee8, 2011). |
| 9 | a) "EA in its true form I think will obviously when it is implemented according to what was supposed to be implemented then it will definitely look at reducing, at least reducing duplication to a large degree, within the context of PGWC I fail to see that EA actually being talking about my experience within my own department, I don't think it really add to much value on our department, not because of its framework or structure of EA, but because there is a bit of history in specific department [omitted, identifies a department], where traditionally I think IT before never had the capacity to address all the needs of the business, IT business or the IT needs. It couldn't get addressed fully, in the department [omitted, identifies a department], |

| | |
|---|---|
| | because of capacity, so what has happened is [omitted, identifies a department] they actually started to sort of have their own IT Shop, their own contractors just to explain for good reason, IT at the time, talking at the time plus minus ten years ago or a bit more. IT couldn't address all the needs of the various aspects of public works, transport, roads, all these infrastructure, they could not re-address, don't want to repeat myself, because a lack of capacity. So if systems started coming up from almost a need basis, within branches of the departments, and there these things actually started to grow,    ok, these applications, systems, started to grow and so forth. IT couldn't keep track of that but because in IT sort of wisdom, as an IT shop, talking about across the province, had to put in a, need to adopt an IT principles and obviously EA is one of them that I can mention in 2006. Now EA obviously is as I mentioned in itself at the beginning of my talk, will address duplication and really in its true form will do that, but like I just mentioned, when it is tried to apply in the context of [omitted, identifies a department], I fail to see that it actually will work" (Interviewee9, 2011). |
| | b)"No of course, there is definitely a need and I think it is the application of EA that actually needs, there is a lot of work to be done, how we can actually apply EA within the province you know, because of the various 12 departments that we have, the way they work, the way, history got a lot to do with the way we can actually adapt almost can we say, EA. Definitely there is a way we just have to workshop that and see how we can apply it and the proper, I don't want to go in solution mode, but just to say if we have the proper representation from the various departments and together with but also have the buy-in, that we will stick and adopt EA in its purest form in the way it should be done then it will definitely also answer your first question, it will have a benefit" (Interviewee9, 2011). |
| 10 | a) "That is an open question as you know, EA adds value to IT in terms of, it governs the way we do things, right, because it takes care |

of, takes away duplication in many aspects and one of those aspects are, one of the things EA at most people think, it standardise processes, but it doesn't look for instance being an application development manager, it doesn't look applications that need to be standardise. The fact that not necessary applications but procedures and processes or for that matter sequel statements if I can call it that, can be standardise. You can have for instance, one application can have a budget aspect, a budget procedure in it, and that can be duplicated in to another project. Reuse instead of going to reinvent the wheel as such. One of the things that are most common is for instance is the log in script applications. The Auditor-General requires our log on statements to have certain set of criteria. It must have all the various carry fishing numbers and all of those kinds of things. It needs to be, the password needs to be renewed, every 90 days for instance, but each of us write our own script and those are one of those things that can be in a common area within EA. Everybody can call that log on script, for instance. So from me an application developer aspect, EA in that sense will add lot of value if it is managed within applications properly" (Interviewee10, 2011).

b) "Most definitely, specifically within the application development arena, there are other aspects that it should adhere too, EA remember it takes care of, what is the what is the framework, the common one up there, the…..I cannot think of the framework,………………now…………FEAF, TOGAF, any ways, within that there are a lot of aspects, one, for me the concern is applications. EA is needed, yes, most definitely" (Interviewee10, 2011).

Questions 2:

a) What process is used within PGWC when a request is made for a new business application?

b) Are any analyses/assessments done to check that existing solutions can accommodate new business application requests?

| Interviewee | Answer to Question 2 |
|---|---|
| 1 | A )"A Business application still sits within Departments, when the request goes through to the Ditcom, where the business has identified what they need in the application. What has been happening in certain of our areas is Service Managers comes to us and check whether there is an application of that nature on the application register. An inventory list of all applications, a broad description of what the application does and we will check against what the request is. Ditcom process via your IT Manager" (Interviewee1, 2011). <br><br> b) "Yes, again in terms of the previous question, when we gauge with the person, the person says they require a leave management system, is there something like that in the Province, or a correspondence management system. We will then look at what is in the repository already and how does that fit, the request which came through. In some instances it was successful that we can identify applications that are there already. In other instances we have identified that the business has to go out and draw up a, go out on tender" (Interviewee1, 2011). |
| 2 | a) "A business application, the processes haven't been mapped out properly or as it should flow. When one gets an application, request for a new thing, you got to follow the due process, if you haven't got a business case and budget, how can you carry on with the case. When a request is made, there is no particular process, each Department and each individual of each component will come and do their own process so, there is no set process" (Interviewee2, 2011). |

| | |
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| | b) "There should be an analysis/assessments but it is not coming through from within the Departments. To check what the solutions are and what is out there is another story you know" (Interviewee2, 2011). |
| 3 | a)"At the moment I think it is word of mouth where developers would ask each other but do lack the situation where you don't ask the one who already have invented that wheel.  So you could find where developers invent the wheel. There is no way that at the moment that you are forced to use the EA. They become where you start to see something maybe if that is in place part of the process but at the moment it is word of mouth" (Interviewee3, 2011).<br><br>b) "Analysis is done but like I said word of mouth, if you think you have heard something similar you would go and check in that environment. I haven't seen a lot of developers using the EA, to go and check there first, if there is a system similar. So you have to send an email sometimes to the person that works with EA and say is there something like that and I am not sure if they know all the systems as there are no search options" (Interviewee3, 2011). |
| 4 | a) "We have actually as part of us you know, institutionalising governance, it has become actually we have become more involved in that process. So from where I sit at the moment whether it comes from the service manager whoever, typically they would be this business case, we invariably dragged in, purely from a planning development perspective. Because one of the first steps would be to document the business requirement and they normally come to us for business analysis. At the moment what happens is that within EA the business architecture domain is actively getting involved. We are using that as a means of actually building the building architecture component in the province you know. One of the reasons we have opted for that approach part of the practical implications is also people see a lot more value because there is a tangible deliverable at the end of it. There is a department who has a specific need, so they are far more incline to |

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| | work with you when you have that kind of approach. So from that perspective my standing is you know, the business case, you know, it has to be completed, if that is accepted and there is budget for that, typically they would get a business analysis to dot eh business requirement and from there the question is do you, just say for instance it is an application that is required, you would typically go through the feasibility study, I know that is not a formal process. There is still something that needs to be worked on. But by some point in time someone makes a decision and say this is it, ok fine, we are going into our internal, develop internally you know, or we are going to outside so that the whole RXQ thing, that goes out. But as part of that process, informal feasibility if I can call it that, they do come to us in terms of the EA perspective. To make a determination, within the province are there any applications that fulfil the specific requirements. So there is also link back if you looking for a value perspective. They have started to recognise or acknowledge the fact that in the EA repository we now actually at the point where from an application is sematic or technology perspective there is a reusable resource you know and it is actually being used actively, regularly" (Interviewee4, 2011).<br><br>b) "It happens now" (Interviewee4, 2011). |
| 5 | a)"They follow out the Ditcom process where the fill out, complete an application form, gets approved by their departmental IT committee, then it comes to CE-I for an investigation and checking within standards and all that" (Interviewee5, 2011).<br><br>b) "Yes we check with internal systems and also with SITA, who is our government supply" (Interviewee5, 2011). |
| 6 | a)"That will depend on the department that you dealing with. The more corporate department there is a process in place. It will be via |

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| | your steercom committees or your department heads, where the project will be registered, at heard too, and find out if it is an actual business require or a need for it. An investigation will happen there. Within your smaller isolated smaller departments it is on an ad-hoc basis, where the call is logged with the service desk, no research is done; request just gets done and expects things to get done" (Interviewee6, 2011).<br><br>b) "Once again it depends on the department, your corporate department, does do your base line analysis then an investigation on the software or the device that they are going to do the procurement on, as well as historical value and previous successful implementation" (Interviewee6, 2011). |
| 7 | a)"Now based on, now this is also limited to my knowledge, right, there should be a formal request, now currently I haven't seen a document that states this formal request. I haven't seen a document but I know it, how it should work. In most cases is currently right, departments should engage with their Ce-I representative or if I may say IT person, right saying that there is a particular requirement. What I implement my side might be relevant, practically do. I for instance have a business requirement specification and a user requirement specification which is a standard document that we developed in provincial government under Ce-I, 2006 already, under the project office. The intention there was that when there is a formal request, when an application whatever the department must complete this document; it is a small variable of a business case. From that particular environment there is also the annual performance programme, where departments got to deliver accordingly those things. They must take that information, put it into a business case and say this is my requirement, my IT requirement, my IT strategy. Now obviously that was then, it has evolved; departments are still developing their IT strategy. Based on that the department must now establish a priority on business applications that business application is completed and |

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| | document template I will tell you that becomes the official request as such. What happens there is confusing, this is what I need and this is what I am going to deliver. That document is going to decide yes and no, and that is for me the formal request, that I apply on my side. If the whole provincial government does that, that I cannot say. So for me there is a formal process, but if it is under governance, I am not sure" (Interviewee7, 2011).<br><br>b) "As I was explaining to you just now, in that document there is assessment, the GAP analysis, against what is currently there, where they want to go. If there is an application and a department requires an application, the person who is investigating, will then fill in this template, and say where is your current situation and where do you want to go too and this is your GAP analysis and this is my assessment and that document addresses all of that.   In reality I don't think this is happening, bottom line in my experience like I said, I know I apply it, but I cannot speak for everybody.   That is where you get the information from, business requirement specification document" (Interviewee7, 2011). |
| 8 | a) "Firstly, obviously EA, will play a key role in this, but normally we have different governance boards, like Ditcoms, that where departments have to get approval from their Ditcom board to actually start with a new application and based in that, that is the first process where we can continue but once you have that Ditcom approval you have to make sure that you link it up with EA" (Interviewee8, 2011).<br>b) "From a department perspective no, I don't think so, no because they don't have access to provincial government data where they can view and see that there are a common data base. So from an E-I perspective we normally, I will normally go to EA and ask them if there is any system like that in place, because they have the data, they have gathered the data as you said they have been there since 2006. Some of that data might not be up to date but most of it is there so we can actually just cross reference with them, before we start a new |

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| | application" (Interviewee8, 2011). |
| 9 | a) "I can only speak in terms of [omitted, it identifies interviewee] that is my area of, which I am familiar with, service manager for that area. When a new application comes up, yet again I hate to harp on this, it will more than likely come out of a bed of existing systems that was already put in place before and contacts and networks, consultants in those fields will be contacted again you know. People don't necessarily go to IT first, and ask excuse me I need system A, do you have a data base and a project office where we can check to see, it is just a culture. It has been adopted; it has just been the culture of people and obviously senior management that is existing in our business unit or department, most of them has come over the years, ten, fifteen years, although some of them have resigned, not top structure, I think there is still very much in place, so when a new application systems need to be designed, they tend to go back to old habits, if we can put it like that. The culture is let us use our consultants that we used before, it is for good or bad right or wrong, this is really the culture. They then will apply that and then, once the consultants have been appointed in a sense, will they approach IT and say well we have got this need, how are we going to take this application that we have procured that we have gone through our DITCOM, we have already gone through our approval systems, in a sense with or without IT's involvement we want a system from IT now, we got a system, we they in a sense have done all BA work and all that's around it, in a sense, obviously not truly because they are business not really IT, not their core focus but because they have all this consultants that's current there, there are many of them, they will consult them because they sit on their floors you see" (Interviewee9, 2011). |
| | b) "I will be cautious to say well maybe, you cannot apply it to all systems, it depends in which area but mostly I can say sort of no. Analysis has not been done entire across and where it has been used, like I say certain systems will just adapt and carry on, and if there is a |

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| | new model required they will just get a new model. It is not based entirely on what is already been used, at a central IT project office for instance. Where all IT's projects are being registered for various departments. That is not normally the first point of reference; put it to you that way. So what happens is that the department will if there is an existing system and it needs an additional product or alignment or something, because of a new business requirement, the first approach would be to go back to the consultants and say can we have this additional to my system to make sure that business is operating, because of that business need. Like a say it is a bit of a culture thing, I think it latches on to our previous question. And from there, once you actually sit down in the DITCOM it is as almost as if the decision has already been taken, that is the type of mentality or culture that has been adopted over the years. It is very much still the same" (Interviewee9, 2011). |
| 10 | a) "There are formal processes but the processes in place are, for me it is just a paper exercise to get approval for things. There is no checks and balances, the application the common one as you say would be Ditcom, where effectively if that is the mandate, to go ahead and do the project, but there are no checks and balances to see is it really required, does it exist within a other area" (Interviewee10, 2011).<br><br>b) In some instances yes, there are investigations done, but it comes down to our clients unfortunately, we are ruled by our clients in some sense. Our clients insists I want my application, there are in some instances and in some instances not, depending on what the client wants the end of the day. Point in case I am going to, you can use this. There was a leave application within the province that was bought by the one department and shown to another department, it was a huge cost, and the other department said I want my own. In that case IT should have insisted on IT governance and go back to those departments and said unfortunately IT governance determines that there shall be only be one leave application, but it is not being adhered |

| | too" (Interviewee10, 2011). |
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Question 3:

a) Is implementing EA in the province currently an executive management priority?

b) Do you think driving EA in the province is a business or IT accountability?

| Interviewee | Answer to Question 3 |
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| 1 | a)"We have now established a visibility within EA, at that level; we are now taking the necessary documentation to the Director-General and to the Superintendent-General first, then the DG, in order to take the EA forward. Because as we know, EA really sits with the business. At this point in time CE-I has been driving EA. Their plan is to and I think very soon is to take all the architecture vision documents and the architecture principles and those things to the SG for signature. Not lying currently at the DG level" (Interviewee1, 2011). b) "It is business accountability" (Interviewee1, 2011). |
| 2 | a) "I wouldn't know, you just might hear through the grape vine of EA and things like that. Cannot see what they implementing, I don't know if it is a management executive thing, it might be run by junior staff, their early entry into the IT field" (Interviewee2, 2011). b)"I think it should be both, business and IT, if it is one then, if IT runs your business, IT cannot dictate to the business their needs. I would say it is between business and IT" (Interviewee2, 2011). |
| 3 | a) "We say executive management if I take it from our [omitted, identifies a department], I don't think so. I am not sure if they are aware of it but more of an executive IT priority, where IT would like to have this EA, but if everyone else have not been exposed or given |

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| | the opportunity to give their opinion and eventually getting their buy-in, so it is kind of somewhat strange everyone else in business except for EI or for IT to, they are the only people who know about it, EA" (Interviewee3, 2011).<br><br>b)"It should come from both, as well as business because business eventually and IT should support business. They should make the EA available to everyone and before a business wants a system they should already go to the EA and say, let me see if there is something like this available already available and they would not come to IT, in that extreme cases they would if they have not found anything in the shelves of EA, so you know we go to look and have done our research but there is no, they do have knowledge within the sections in the department. At the moment it is now an IT accountability, where IT is holding on to EA and has not allowed anyone else to see it outside" (Interviewee3, 2011). |
| 4 | a)"I would say yes, because we do have the support CIO, so from that perspective, yes" (Interviewee4, 2011).<br><br>b)**"**At the moment it is an IT accountability**,** there is nothing wrong with it. It is one of those things once again depending on the maturity of your organisation, very often it originates in an IT environment, if you look at it, traditionally EA was seen as an IT thing, hear, even though speaks to aligning your business strategic direction but still was managed and driven by from an IT perspective or from an CFO perspective, invariably would have found IT sits part of your financial organisation in any case. It is only now recently that you know in the last most probably five to ten years I think that a change in organisations where they have been busy with EA for about fifth teen odd years depending on the maturity or longevity of it being there. Where business is increasingly starting to say that this is actually our responsibility, you know and they have started to drive this. It comes out of business transformation whether you like it or not, some people |

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| | are actually starting to use EA more as a change management tool you know and a tool for enabling business capabilities but that will only happen once your organisation is mature enough and business are really completely and fully you know on board with this. For now it is an It accountability" (Interviewee4, 2011). |
| 5 | a)**"**It is priority, executive management, maybe not, IT management yes" (Interviewee5, 2011). <br><br> b)"It is IT"(Interviewee5, 2011). |
| 6 | a)**"**At this point in time, no. Everybody is still working in isolation. EA at the moment is a myth" (Interviewee6, 2011). <br><br> b)"Preliminary it was just based on the IT standardisation because of a lack of continuality and a lack of unified communication" (Interviewee6, 2011). |
| 7 | a)**"**I haven' seen it as an executive priority. I have seen it in the past as an executive priority but that depends who is the executive and what is their strategy. So previous management had is as an priority 2006/07, thus far I haven't seen it as a priority in the last two years" (Interviewee7, 2011). <br><br> b)"It should be business responsibility. Accountability will be with the executives, be it now the CFO, it does not matter, point is it is a business initiative, they should be driving it, IT is only part of that EA" (Interviewee7, 2011). |
| 8 | a) "It is a priority but I don't know how strong, top priority, it is a priority but I am not sure if it is a top priority" (Interviewee8, 2011). <br><br> b) "I would say both, IT and business must play a role, making sure that we don't spend unnecessary money and duplicating new information and applications" (Interviewee8, 2011). |

| 9 | a) "I wouldn't say so, although we know it exists, it has been talked about almost as a program I think. I think it exists, it is there, but I don't think it has been seen as a priority, no it is definitely not seen as a priority" (Interviewee9, 2011).<br><br>b) "EA is definitely for me a the way government operates and I am not talking about the theoretically application of EA, but EA for me should be driven from the business perspective, but at the same time the IT alignment should be there, in fact IT presence should be there from the initial start of when a certain need of the business, if a business need IT should be consulted, be part of the process so that we can avoid duplication you know. It has been driven by IT, although as we have mentioned early on, it is not priority so we cannot use the word driven, maybe that is not the right word to use. EA is a program that sits there and needs to be visited by the various departments within IT, and is almost like a process that must happen, but i don't think it is driven but yes IT is the one that actually driving it" (Interviewee9, 2011). |
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| 10 | a) "Resounding no on that one. Had it been then those legal applications would have been addressed at a higher level and not between aloud not to have happened. If management, CE-I Management taken EA seriously they would have stopped that. Say to those departments there is one application, we will change it as you require it, or adapt it but we will not give you your own one" (Interviewee10, 2011).<br><br>b) "Effectively, one of the things we, when it comes to EA, business should take ownership of it, as well. It is a partnership between business and IT, because if business understands the responsibility, again coming back to the leave application, they would have said ok, I have been made aware of the IT governance structure that I should adhere too, so if they take ownership of that, IT enforces IT governance that that would not happen, so for me it is a partnership, |

| not one, either IT or business" (Interviewee10, 2011). |
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Question 4:

a) Do you think the existing EA was initiated by focusing on technology standardisation or identifying business needs?

b) Why do you think this approach was adopted?

| Interviewee | Answer to Question 4 |
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| 1 | A )"I don't know, historically what the intention was when they started EA. I know there was a lot of work done with business, there was a consultant here that did a lot of investigations in terms of what is the business strategy say's and have tried to map that and prioritise that against the ICT initiatives, so initially I think there was a drive. I don't think it was very successful" (Interviewee1, 2011). <br><br> b) "Because EA speaks about understanding what the business requirements are. It was essential that given the diversity of the organisation to look at all the business requirements and look at what is the common requirements that come through, and then built transversal initiatives.  So only from that you can say aligning IT processes" (Interviewee1, 2011). |
| 2 | a) "Definitely not business needs, maybe technology standardisation after the fact as you said this only came about in 2005; by 2005 we have established an ICT Plan within the Department. We are starting to look at own EA at a Strategic level but when it comes down to standardisation then we had to call on the bodies basically a feel of what is happening outside. We implement our business needs in that, standardisation I think" (Interviewee2, 2011). <br><br> b)"I think it might be a thing that IT people are not business people. They got to know the business in order to, they went from their own experience in terms of IT, their on a desktop playing with application |

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| | systems and that and they used that system perspective than going into a business perspective. You got to look at the business side and the system side and the people that interact" (Interviewee2, 2011). |
| 3 | a) "Personal opinion is more done on a technology, they did not engage a lot with business to find out what business really required. They made a decision based on what they thought was best" (Interviewee3, 2011).<br><br>b)"Because it was one of the initiatives on the IT priority list and they needed to get it done" (Interviewee3, 2011). |
| 4 | a)"Technology Standardisation drove it originally, it was purely IT. I can remember when I got here they were talking about IT architecture and the provincial ICT Plan. That was the focus; I said yes, you got to be joking because you need to take one step back so that first iteration there was nothing about business architecture, hay. Within the objectives there was nothing. But to be able to derive a valid IT architecture you need to go an look at business. We had to vary the scope to the extent where had to go to get enough business architecture information to be able to complete the rest of it, It was an interesting discussion when I started to get involve, when I started to get involved in the province by hook or crook I got them to do some stuff, business architecture" (Interviewee4, 2011).<br><br>b)"Route of the least resistance and because of the legacy that came before that with the previous attempts of starting EA coupled to that just skills lost that you guys had in the province, you know that there were people who were busy with EA, they sort of seem to have disappeared into the wood works, it is a question of you leave a group of IT people to do something and would look at it from their perspective, you know, and I think it was also a question of should I say what is going to give us the quickest kind of wins and mobility to |

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| | move forward and by taking that approach, they basically had to work internally, they did not have to go out to business and then shout at them, and say you are back again, you know" (Interviewee4, 2011). |
| 5 | a) "It is more standardisation" (Interviewee5, 2011).<br><br>b)"It was to ensure   standards you know, in the province. Departments adhere to that" (Interviewee5, 2011). |
| 6 | a) "Preliminary it was just based on the IT standardisation because of a lack of continuality and a lack of unified communication" (Interviewee6, 2011).<br><br>b)"Possibly because of all the isolated projects, isolated pilots and the duplication of various information streams" (Interviewee6, 2011). |
| 7 | a) "It started as technology standardisation in 2005/06. It then evolved subsequently into where it was identified as it should be business driven and I think currently the people driving the current EA are doing a good job, unfortunately it is not highlighted in the business so unfortunately it is still an IT driver" (Interviewee7, 2011).<br><br>b)"I don't think it was an adoption but more of a coincidence, where IT identified the EA requirement it just became, because we are technological in our environment, it was then just adopted. Information was easily available, and there is where the adoption started, but it wasn't the driver" (Interviewee7, 2011). |
| 8 | a) "I would think it was technology firstly then business secondly" (Interviewee8, 2011).<br><br>b) "This approach was adopted; I would think was adopted for the mere fact that we must have standards in place, technology standards as well eliminating unnecessary duplication" (Interviewee8, 2011). |
| 9 | a) "This is my opinion that EA was initial driven from an IT perspective, from a technology perspective not necessary form a |

business perspective, being IT being driven form an IT staff and IT people, tend to think in terms of technology and in terms of business. That is why I said early that when an EA framework we should go back to the, I won't say to the drawing board we should go back and do the business with IT together and relook at this, and have the business buy-in and driven together with IT and top management, must be something that is almost driven from a Premier one of the most important projects or programs driven, you shouldn't be really sort of go out of fashion should I say, the business that we are in is politics, tends to change when there is new heads coming in then we change our focus then our five year plans also go down the drain, and then new initiatives start then EA takes a in this particular context takes a bit of a backseat. I think it has taken a backseat for the past two to three years, if you ask me, because of the type of business we are in or organisations we are in, which are obviously politically driven, but like I say the initiatives stems to go down in this case EA, it has not been seen as a high priority because it is not always been driven as new heads or there is a change in politics, change in heads, change in departments and so forth, then these initiatives don't get pulled through which is critical to the functioning, the efficiency of the organisation" (Interviewee9, 2011).

b)"That is the only thing IT really knows well, is technology they really cannot be focused on the business side, what are their business concerns really, their focus is not in business, how for example will IT know is happening on the roads, what their needs are, what their priories are, what their Minister's want, to see what is the been driven in terms of strategy in the department, It wouldn't know that, we would only know if you put in a larger sever this kind of thing, and then we will make your thing faster, that will maybe not necessary the case you know. I think IT, looking from an IT pure or technology perspective and it is not really been present in the business world, it was always reactive to the needs not proactive and sitting at a strategic

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| | level of a business when they take on or their needs, you know" (Interviewee9, 2011). |
| 10 | a) "I think it was definitely focussed on technology standardisation because from and IT perspective that would be an easy route to go. If you go on a technology standardisation, you look at, you will have the following standards in place and that is it. We don't regard the business and this is where at the moment are shortfalls are" (Interviewee10, 2011).<br><br>b)"Because it was an easy approach for IT, because IT took the responsibility, had IT brought in business as a partnership, business would have said I am not interested in the technical part of it, I want to look at my business processes and in fact I …..the platform still eludes me but looks at business processes must be defined…no man I cannot think of this thing…………not TOGAF……the other one………………..the most famous one man…………………Zachman framework………………yes it says business processes must be within your EA, because within your business processes defined you will come out what your IT requirements are, if your IT requirements are, if two business units are duplicated you will then say right guys the business processes look at, we are going to have let's say for instance tow leave applications let's consolidate and have one. And therefore just to answer the question again, why the approach was adopted because it was easy, and business was excluded" (Interviewee10, 2011). |

Question 5:

To your knowledge, were you or the departments your engage involved in any planning related to the current EA, if so, what were the key outcomes?

| Interviewee | Answer to Question 5 |
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| 1 | "I form part of the Architecture team that does the planning for EA, we do planning for EA, look at business strategy, ICT solutions that supports that business strategy, across Departments. Have not been on board in the initial stages, came on board later to look at the thirteen Departments" (Interviewee1, 2011). |
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| 2 | "Engaged or involved no, we were never engaged through, even though our Ditcom, we didn't get any engagement involved in planning relating things. We did not see the people coming around and ask these things, so is no input, the only input that I can recall is through once or twice, fill in the template, a template came through one time. We had to look at our current ICT Plan, what we in terms of our Enterprise, what systems we had and the Architecture for each individual system that we had. We ourselves in the Department were trying to bring in one architecture which is the whole focus of the ICT Plan. Our DIMIS where we look at the whole thing from basically a dashboard view where we can extract all these things" (Interviewee2, 2011). |
| 3 | "Working in IT no, there were lots of presentations done to us as an IT person, informing us of EA, and what they would like our EA to do and what they would like to accomplish.  Engagement with the department according to my knowledge, no, yet on the presentations it was said that there was engagements with departments where they found all the different systems but when speaking to departments or the stakeholders within the departments they don't seem to k now much about EA, so it is a conflicting truth where information was gathered from the departments yet, when you go into the departments and you refer to the EA as being the central depository where all systems would be they kind of ask you what are you talking about. I am not sure how the information was gathered" (Interviewee3, 2011). |
| 4 | "Once again as a result of legacy and also as a result of the fact that hate going to business and asking them the same questions, if someone else being going there and asking them the same things.  We opted not |

| | to directly approach business, our interface to business came from four areas: |
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| | 1. Strategic ICT Planning Team |
| | 2. IT Managers |
| | So one of the things, remember when I came here it was not just about building EA, but was about helping the department setup an EA capability so a unit could continue to work could be self-sustaining even in my absence. There is one of two ways you either go and save for an organisation this size, you going to need lead architect, that looks across all of the domains, and that person becomes the lead for your integrated architecture, and within each of the domains that person becomes your lead architect and you need people to go get the information, just doesn't work, and governance doesn't work to go and setup and tie a Orgs structure around architecture, doesn't make sense. So the option was to say get a core of people that could coordinate but build an extended architecture organisation, so use your existing staff that sits there and they basically they become part time members, of your architecture team. That is stuff they do in any case, you don't want to sit with the situation where you have to keep people busy, so that is part of your normal day to day tasks, you would need to get this information in any case you know. As a team you need to understand your client department technology, asset register in any case. If there are any changes you need to know about it, if they are requiring new things you need to know about it. So why are you there, so you just use that information that is being gathered, you know and makes it a lot easy and a lot more effective. So you know for us, an architecture perspective that became more sustainable way to build this architecture organisation so that you don't have people sitting there, this whole us and them kind of syndrome you know, you have this people who come and ask the same questions, etc. So there is already an interface interacting with the business you know" (Interviewee4, 2011). |
| 5 | "No not really" (Interviewee5, 2011). |

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| 6 | "There was no engagement with EA or with any of our Novell in our future plans or with any of the departments" (Interviewee6, 2011). |
| 7 | "No we were not involved with the initial planning; we were consulted for populating the EA. There was at one stage where they do realise 2007/08 maybe, there was a short coming of IT' involvement, we were then consulted after the fact. I think it was a bit late because in the same time a lot of changes were happening. The people driving it at that time do realise that should have consulted with a lot of people and departments, they didn't do. I think that was a great shortfall. They did realise the shortfall, a short coming" (Interviewee7, 2011). |
| 8 | "Yes, we were involved, they obviously they needed information so we had to assist them with that information so we were interviewed all the different roles were interviewed, gather all that information, so got that information and your second question was? I am not sure, was not part of that team. The key outcome was to have a one single view of all provincial government WC applications, EA view of application standards, technology, everything" (Interviewee8, 2011). |
| 9 | "No it wasn't really the planning, myself as well as the IT per say wasn't really and the business wasn't involved with the EA in the beginning, I think EA is almost in a sense in this organisation from my perspective almost anonymous to ICT Plans, I think the business see it as one thing, as IT they see it as a ICT/ EA perspective as one and the same thing. ICT Plans is almost like the derivative off, EA is sort of an overview and ICT Plans are something that would put in place. That is how the department sees it, you know. I think I a sense almost IT people also see it like that if I am not mistaken. So the problem is that we were never really involved in the beginning of EA. They were given slideshows and presentations on the framework of EA and departments felt like well they have to give input here and we had to slot in the way we do things and where we going to slot in to make sense to them and us so it is really on a how can I put it, there was really a sort of a mandate somehow shell I say from a IT a perspective |

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| | maybe, so that we can have these things in place but the reality of things is that it was not taken into consideration. So it wasn't really driven at all from the business, no, business was brought these things from senior management and was made aware that these things must be done in order to align to the mandates of the departments., but was not afforded the opportunity to bring in efficiencies into the place" (Interviewee9, 2011). |
| 10 | "There was from Ce-I a weak attempt to involve the rest of the staff. But again it was a matter of getting something into place and not involving too many people, because it was mentioned, but wasn't enforced" (Interviewee10, 2011). |

Questions 6:

a) Is the EA project resourced by PGWC staff, external contractors or a combination of both?

b) Do you think this is the right approach for an EA project?

| Interviewee | Answer to Question 6 |
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| 1 | a) "Combination of both" (Interviewee1, 2011). <br><br> b) "Given the way we, given the skills we and the competency levels. Think yes because through this process we are building skills, so eventually slowly we are taking more ownership of EA. We are basically looking at eventually the consultant may eventually procure a role and we are taking up more responsibility" (Interviewee1, 2011). |
| 2 | a) "The people I came across, permanent staff of E-Innovation, maybe one or two external contract workers" (Interviewee2, 2011). <br><br> b) "No, I think you need I higher dedicated, quite a strong thing. You |

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| | can use an EA for software and you need it for as a Strategy too, services, you need quite a thing especially with an organisation or enterprise or a corporate from a Provincial level, we need some high level stuff there" (Interviewee2, 2011). |
| 3 | a) "Currently accordingly to what I know it is a combination of both external and PGWC staff. There are very skilled people from the external environment, which I was informed having done EA or similar projects as in EA in other environments, yet I am still waiting for the benefits of this" (Interviewee3, 2011). |
| | b) "Having the external staff with the combination. I guess if the external person had all this skills there could be either a cross pollination of skills and the internal staff should at least gain from that cross pollination. The way I have seen it, they have been there forever. I don't know if any skills transfer has taken place. So I am speaking under correction I am not sure how many years it takes to get an EA the framework to get it up and going so that everyone can access it, but some point in time the external staff should go even in normal PGWC E-Governance and workings, it is not healthy to have external staff on your establishment" (Interviewee3, 2011). |
| 4 | a) "It is a combination of both, I am the only external the rest is internal staff" (Interviewee4, 2011). |
| | b) "Yes, I mean at the moment my involvement is coming to an end. It was about getting in external skills to enable your internal team. Now the other thing that is going to go with this is that you need to make sure that you maintain and retain that internal team. With the approach we have taken is to make sure that skills do not reside in one or two key people, by using the extended organisation it becomes a lot less impactful if one person leaves, you know, but still, at the moment from [omitted, identifies a interviewee] perspective, he has one risk. That risk sits in EARB, because you know. If EARB decides to leave |

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| | tomorrow, it is a problem, you see what happened when I got here, there was [omitted, identifies interviewees], so we were developing the two of them, equally. [Omitted, identifies interviewees]. Now we got two juniors on board you know, [Omitted, identifies interviewees]., but they are now here near where [omitted, identifies interviewee]. [Omitted, identifies interviewee]. is, so that is his risk at the moment. That is the other thing and they come from an architecture team perspective that is obviously the whole succession planning thing, you know making sure. That is not so unusual, you won't just find that in government, you find it everywhere, you know" (Interviewee4, 2011). |
| 5 | a) "Combination of both" (Interviewee5, 2011). |
| | b) "Yes, because you need external skills" (Interviewee5, 2011). |
| 6 | a) "At this point in time, it is a combination of both; we got external contractors rendering their expertise, to the internal PGWC permanently employed?" (Interviewee6, 2011) |
| | b) "Yes most definitely since seeing that it is a new field for PGWC, endeavouring the external contractors or external consultants will provide their expertise or their years of experience that they have got. It will benefit us in the long run" (Interviewee6, 2011). |
| 7 | a) "A combination of both. At the moment there are internal staffs and then there is a few contract staff on board as well" (Interviewee7, 2011). |
| | b) "For the maturity level that we have yes it was" (Interviewee7, 2011). |
| 8 | a) "A combination of both" (Interviewee8, 2011). |
| | b) "I think it was the right approach, because this was something new for provincial government, we need expert people to guide us in terms |

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| | of the best practices and then on the experience" (Interviewee8, 2011). |
| 9 | a) "Initial it was a combination of, initially it was sent from [Omitted, identifies company]., you can call them external and then the idea at the time was to transfer the knowledge which these experts in the field had, on to the internal IT people and from there to the business, we coming from the tail end of the thing you know. My opinion it should be taken from the business perspective and then from their IT should now follow, what the business wants, want are their strategies, yes there is definitely a combination, honestly I don't think IT has taken it on that well, or the knowledge wasn't transferred that well, because as I said it is not really active today" (Interviewee9, 2011).<br><br>b) "Well as I say, at the time we are going back to 2006, IT never really had the knowledge on driving or developing an EA, so it was important to get someone that understands and has gone through the paces and has experience on EA. But like I say it should have been done where for example the planning and development within the sector of our department should have gone on extensive training and together with consultants some externally and that should be driven almost continuously as improvement methodology in a sense and not something that must be handed in because it is mandated to get it in at the end of the year. It seems to me that it is more re-active than proactive.  Yes to answer the question we as IT people should all be trained in EA at various levels, I am just saying an overall understanding and some people really specialising in the field, you know as in certain units, planning & Development for instance" (Interviewee9, 2011). |
| 10 | a) "Last I heard it was that they had our internal staff and some external resources, so it is a combination of both. The problem is the staff….ok wait…………it is a bit of both it answers your question" (Interviewee10, 2011) |

| | b) "No, because your external staff does not understand government business necessarily. Government is a monster in its own, so no. I don't think it is the right approach" (Interviewee10, 2011). |
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Questions 7:

Do you know who the EA stakeholders are and was any information about them provided to you in the context of the EA project?

| Interviewee | Answer to Question 7 |
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| 1 | "We have done an EA stakeholder map. We have identified the stakeholders in the various Departments, as I said we always look at transversal" (Interviewee1, 2011). |
| 2 | "The stakeholders are the Central IT committee. Any information no, internal stakeholders are the [omitted, identifies function]. and all the components that make up these units. Our stakeholders when it comes to the wider context are difficult to find who they are. They were not part of the project, we look within ourselves. We have to get our own Enterprise Architecture within the Department right because it is our own EA and all these other" (Interviewee2, 2011). |
| 3 | "I speak under correction there are some names that I know of and I do send emails to request information from the EA. I take a chance as one of my first sentences are I am not sure that you are working in that environment. If i must answer it on that basis, no they don't advertise, they don't keep you updated who still works on the, who the stakeholders are. So you go with the last person you spoke too, regarding EA. It would actually be better if you knew who the people were" (Interviewee3, 2011). |
| 4 | "Yes, it was one of the first things we did, we did an EA stakeholder analysis and there is a whole EA stakeholder map, which is something that we use as an internal management tool to know who we have to spend lots of time with" (Interviewee4, 2011). |

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| 5 | "Not really, no" (Interviewee5, 2011). |
| 6 | "At this point in time I only know, familiar with one EA, consultant, which is PGWC, a close friend of mine otherwise I would not know, EA is otherwise not in our environment" (Interviewee6, 2011). |
| 7 | "The stakeholders, i don't know who they are, I know who the sponsors are tough, but I don't know who the stakeholders are, was not provided either EA project at this stage" (Interviewee7, 2011). |
| 8 | "Yes I know who the stakeholders and the information of the project team was provided to me and top management but I am not sure from a department's perspective" (Interviewee8, 2011). |
| 9 | "I don't know who they are.  I might have an idea but they don't stand out, as people who proclaim to be EA, architects, it has really been over the years like I said in 2006 it was a big thing because it was maybe the political flavour of the month, sorry to use that term,  but I think it just dimmed out you know" (Interviewee9, 2011). |
| 10 | "Via interaction with CE-I staff yes, there was some information available about them, but I still think we do not have the right people in place. No disrespect to my colleagues, EA it is not as small anymore, it is quite a huge aspect to take on, and I think our EA component is under staffed and limited resources" (Interviewee10, 2011). |

Question 8:

Would you say that the current EA plays an important role in adding business value especially regarding application decision making? If yes, how?

| Interviewee | Answer to Question 8 |
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| 1 | "EA plays an important role in all aspects of your business. The first thing is about strategy then you move into your applications and technology. So how does it play value, in order given the way we have previously been structured, everybody, Departments, components could do whatever they wanted to do.   We tried to change this in terms of that there are things that are very Departmental specific and things that are not. Things that touch a whole Department are the file plan, managing files, looking at correspondence, looking at leave management. Those are things that are transversal initiatives. Where it shows its value in terms of how do we capitalise as on taking those Departmental requirements, specifically the transversal requirements and elevating that into Provincial initiatives. So how do we do it currently? We have requested the Architecture Review Board, all those initiatives comes through the review board for standardisation.  So this gives us an understanding of what is happening within an organisation and is forcing people to apply their minds in terms of not going out on just procuring or buying systems as they use to do. A committee now looks at if there is something already in place or if there is try to use that to leverage that or if not, how do we go out and making sure that if the requirement is a Provincial initiative and make sure that all Departments  buy-in too it" (Interviewee1, 2011). |
| 2 | "Definitely there is no, another current thing we can rely on or latch on too. We cannot, no business value" (Interviewee2, 2011). |
| 3 | "If the EA works as it should having the central depository with all PGWC systems and we are forced to use that as the first entry before going to develop a system, then yes you would eventually usually pick up if there is such a system and I am not just talking about a name issue, you should be able to pick and say some criteria this is what the system like to do to some degree, something should pop up these are all the systems, this can give you similar systems. It will |

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| | automatically reduce duplication, alleviate development work because why would you go and reinvent, design a new system, if you already have a system 98% as you require. If you are forced to use it and if the EA works as should, easily accessible not via email but easily accessible that there is an option where you can go and do your search on your own. I think it would actually be the best benefit to PGWC and business" (Interviewee3, 2011). |
| 4 | "I think definitely that is the one area where it has happened, because what is currently happening is service managers actually contact us, you have to say a department needs xyz…….so is there, one of the first things we do is check to see is there anything similar to that you know anywhere else in the province, so that we can actually give then that kind of feedback, plus we actively getting involved in some of the feasibility studies that is now with [omitted, identifies department]., you know, and their operating licence just drag that in the process and look at the problems that they had, with that, is there anything else but we actually had to do a feasibility report basically so that will slot into solution architecture and the whole migration planning, you know, phased into the architecture, yes we are getting involved in those things now" (Interviewee4, 2011). |
| 5 | "Yes, because ensures that standards are adhere to and stops duplication" (Interviewee5, 2011). |
| 6 | "Obviously EA is a standardise structure, then definitely will add value but this point in time it is not adding value, no value what so ever, to the department or the business requirements" (Interviewee6, 2011). |
| 7 | "Yes it does play an important role because what we have in government, I am talking government experience, we have some 400 and odd applications and most of them do the same thing. If we can develop EA to bridge the gap between standard application and a rogue application, I think it will save the government a lot of money. So yes I think it is of value if you have an EA on the application |

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| | side" (Interviewee7, 2011). |
| 8 | "Yes, definitely it adds like I said eliminates duplication and having being a single point of truth for common data, where applications can actually instead of creating your own table structure if I can make an example employee details, we have just one employee details, for the whole provincial government and any new application that one can use to use, they can grab form the common table" (Interviewee8, 2011). |
| 9 | "Of course, yes definitely if it is adopted in the proper manner like I said early, it has been driven from top, down, then it will certainly add and if all structures conform to that then business needs for instance and we consult our EA together with our ICT Plan, and see if we are aligned accordingly to our what is being planned accordingly to EA, there is certain then reduce duplication reduction in departments, planning will be much better, projects won't be coming in there will be a scope creep and all of those things which happens throughout the year. Definitely it will be advantage. Definitely no, EA does not play a role. EA is not even in existence, in my department the only thing we know close to EA is ICT Plans, which basically gets visited once a year, we just update the document" (Interviewee9, 2011). |
| 10 | "No it doesn't because it doesn't effect, it is not regarded when decisions are made with applications, again coming back to point in case, the two leave applications even local applications, not local applications, applications for specific departments or components for that matter, we got variations of the applications and users again come and say I want this, I want that. We have for instance we have a training application, users request are entertained and our management within CE-I before it even go's to EA they don't even inform EA that these were new request for the same application, so no, it doesn't play a role. It comes down to our management it is going to look, sound vrot but our management is not aware of how |

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| | EA should be or application development should be part of EA for that matter. We now have an issue where one training application will be if I can say all sorts flavoured, copied for everybody because they want different flavours of the same thing and again we going to have end up with training information all over the place and not consolidated" (Interviewee10, 2011). |

Question 9:

Is EA currently included in the consultation and decision making for IT requirements and investments? If so, what is its role?

| Interviewee | Answer to Question 9 |
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| 1 | "In certain areas yes, EA is included especially in technology perspective. We are looking at what technology requirements is needed in terms of what is our current technology set and how do we try to optimise our technology set against requirements" (Interviewee1, 2011). |
| 2 | "We haven't seen them if it comes from the corporate E-innovation side. Consultations no we haven't been in consultation, decision making, no, IT requirements, no, investments no" (Interviewee2, 2011). |
| 3 | "No, I am aware of the EA, as an IT person it is another project within IT that we are busy with. The process whereby we utilise this tool of EA, no ware have I been informed of or said this is the process in place, first start at EA to find out if there is a similar system, then go here then go there, so no" (Interviewee3, 2011). |
| 4 | "At the moment yes, what we have actually done we need to actively implement that as well, the whole IT asset procurement process, you know about the automated procurement that is going to be happening. But apart from that there is something, a requirement that goes before that now, is to say that you need to have gone to the EA |

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| | review board to get clearance to say whatever specification you have put together complies with the EA standard. It is going to be in place, we have completed the process, so it is part of us you know, institutionalising EA governance, you have to understand for the first iteration since I have been involved we were just about defining EA governance, ok and now this cycle it was about starting to implement you know. So the first thing was to get the EARB charter approved, you know, and actually start working with the EARB meetings. So coming with this new financial year it is about putting more and more of those practices in place, you know, as part of projects, part of procurement you know etc. We have actually taken over custodianship of standards, as well so there is a process not only from an applications etc. you know, but also from technology standards, now has to go via the EARB, so it has been an on-going process" (Interviewee4, 2011). |
| 5 | "No, not really, no" (Interviewee5, 2011). |
| 6 | "EA is definitely not involved in any of our projects or consultation with any of the departments" (Interviewee6, 2011). |
| 7 | "Yes it is, I don't know how it's applied generally but I have been to the EA board for standardisation, to get the approval for the standards. I know there is a process" (Interviewee7, 2011). |
| 8 | "We have an EA review board, and they assist department s with decision making in terms of getting standards for provincial government, so in that way they assist and also in terms of guiding us in terms of getting a standard technology platform for our new IT solutions" (Interviewee8, 2011). |
| 9 | "No. definitely not, no" (Interviewee9, 2011). |
| 10 | "No not at all. Not accordingly to my knowledge again within applications it is not because one of the things you should be looking at is that we make use of a lot of contracting staff members, which is an expensive resource, so the money we invest in the resource, it is not a waste it is a lot of money that we are spending because we are |

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| | duplicating applications for that matter. So the consultation and decision making process no it is not happening" (Interviewee10, 2011). |

Question 10:

Who is accountable for the business application budget in your organisation?

| Interviewee | Answer to Question 10 |
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| 1 | "It various in two folds. One Departments will go out to purchase their own applications because they have a budget for it, alternately CE-I and Departments come together to co-fund an application. Sometimes CE-I will fund an application completely. Example J-Track, Departments sent through a request through and CE-I pays for that" (Interviewee1, 2011). |
| 2 | "The business application budget is, each business unit is accountable for its own budget at the moment, which falls under the CFO. Although the Department has a budget it is delegated down to the function units so it is within the Department. We get nothing from the Central IT, we have to for it ourselves" (Interviewee2, 2011). |
| 3 | "There are different kinds of applications that are developed, we get where it is business specific and they would obviously be responsible |

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| | for their budget. There are also other systems where it becomes eventually a transversal benefit to everyone. Ce-I/IT will assist or carry most of the budget because obviously it would be of a provincial wide beneficial. There is budget both sides in IT and the business" (Interviewee3, 2011). |
| 4 | "Definitely not EA, we don't control any budgets, business budgets will sit with which ever department, unless it is a transversal then it would be [omitted, identifies department]." (Interviewee4, 2011). |
| 5 | "It is the business itself, departments" (Interviewee5, 2011). |
| 6 | "At this point in time it is diverse and mainly laying with the departments. On some transversal applications in the budgets or financial implications will lie within the E-Innovation Directorate" (Interviewee6, 2011). |
| 7 | "At the moment the level is IT, that is accountable for that, but it is also that is what I know, is certain departments got that ring fenced budget for specific applications but currently the information technology department" (Interviewee7, 2011). |
| 8 | "The departments plan ICT budgets, so they must plan their resources and budgets with that IT priority, so from a department, the department must budget, from CE-I perspective we must also make provision to assist departments where they cannot assist themselves" (Interviewee8, 2011). |
| 9 | "In our case it would be the different units within the department or branches. In terms of the committee it would probably be the closest thing to that, be the DITCOM. Although in our case it has not been operative for a long time. It definitely lies with the department that is for sure" (Interviewee9, 2011). |
| 10 | "In our setup at the moment it would be the Director, the applicable Director within a component, because they got a budget that they would spend on contractors for instance, besides the internal staff, the Director with the within the relevant development area, will be responsible. Government being the monster it is, a department will |

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| | come and say for instance I want an application, I have budgeted for so much, it is a matter of the services manager discusses things with their respective departments. If a department say that, if firstly IT does not have internal resources the service manager will know, make the recommendation of getting a contractor in that sense firstly the department then should pay for all contacting staff members if not CE-I will then take up the budget. Yes both"(Interviewee10, 2011). |

Question 11:

a) How is governance applied to projects within your organisation?

b) In your opinion, how and to what extent does EA influence projects within your organisation?

| Interviewee | Answer to Question 11 |
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| 1 | a) "Governance in terms of projects specifically at CE-I have a project board and they meet once a month, actually they monitor the projects, in terms of progress, if there is any problems and highlighted every month. You can present your project or issues at the project board" (Interviewee1, 2011).<br><br>b) "Again there are pockets where EA influence projects. One of the things for example are within OD with the business processes, we played a key role in there. In terms of Microsoft migration we played a key role in there. However I don't think that every situation, so as we mature every year we do a recycle. We look at where do we need to improve and what else to do in terms of improving our process" (Interviewee1, 2011). |
| 2 | a) "In our Governance we only have is via the Ditcom, which also feeds into a centralised unit, CITCOM" (Interviewee2, 2011). |

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| | b) "The influence from an external point of view, no they haven't specially the broader line" (Interviewee2, 2011). |
| 3 | a) "Currently the business uses very little governance, when it comes to projects. They don't have much of project management, the closest thing they have, is DITCOM, where they will approve applications and say that there are funds available. From an IT perspective when they do come with the request asking for developing systems, we try and manage all the systems or deliverables or expectations of the client via the project management system. We have PMON which just follows the prints to methodology, form business very little governance" (Interviewee3, 2011). <br><br> b) "Close to little, almost none. When you work in development they have a system life cycle and know where there, is a processes have to first go to the EA. So not even our developers have incorporated in their life-cycle that you must go the EA, before you must develop. Unless this becomes a rule where everyone will start their and nothing else will be done. For example we do not start to develop without a DITCOM, as a rule. Unless they put another rule in from an IT perspective, once you receive the DITCOM you must go to CE-I otherwise you cannot develop , it is going to be of no benefit just sitting there looking all beautiful, I think they call it a white elephant. The benefit we have not seen yet" (Interviewee3, 2011). |
| 4 | a) "That is a very good question. You should ask the project officer of that because they think that having a project board meeting is applying governance you know and it is not really. We don't get actively involved in that" (Interviewee4, 2011). <br><br> b) "Up until now not greatly but hopefully with this new financial year it will be, you know, more so, because the project documentation, you know your business case one of the things that |

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| | you normally ask is which strategic objective does it support etc., now they are going to producing a section around EA principles as well. The compliance or the non-compliance to those principles so that is basically, you know where it is starting to become important and then also with the whole initiation of that project so if there are any EA or solution EA to be drafted we normally get involved" (Interviewee4, 2011). |
| 5 | a) "They follow the Ditcom processes and also CITCOM" (Interviewee5, 2011).<br><br>b) "It does not really influence projects" (Interviewee5, 2011). |
| 6 | a) "We got two systems running at this point in time, they would be the Performance Monitoring System where most of E-Innovations projects are registered although the technology is not being adopted to the various other departments something similar to that the [Omitted, identifiesdepartment]. has the Dashboard, that is only for one department. It is not run across the province" (Interviewee6, 2011).<br><br>b) "As previously stated if EA is fully structured environment or a component within E-Innovation or within the PGWC environment it will definitely add value but in this point of time I cannot comment on any value that it adds" (Interviewee6, 2011). |
| 7 | a) "I think governance is well defined in our project office. It is the practical use that differs from the theoretical use; when I am saying that, let me explain to you in context. I follow the project office governance strictly; strict rules, quality assurance, and they apply to me, because I am interested in it, and for those who are not interested won't apply it, the governance sponsors or the responsibility people they don't show interest if you don't show interest. For me it is applied strictly, it might not be from the side of the organisations perspective. So once again it comes from what your interest and who |

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| | is going to help you with it. Just to give you an example: I can go to the project office with my documentation and they will quality assure it for me. But because I am interested to make sure that I have quality assurance or is it there job.  So the question is who is responsible, even you might say it is the project office, but they have 50 there, you don't follow it up, they are not going to show interest. The other thing is I used a template that they provide, because the governance board require the template to be there.  Some people are going to say I don't want to use that template; I want to use my own template. Then also they already dictating to us that out standards are prints two which is related to  King and your other governance related models, so there is governance, it is people don't just apply it. No it is not, and maybe that is a shortcoming. It is the fact that governance process  only for E-I, the department, [omitted, identifies department]., Centre for E-Innovation and the greatest difference there is, other departments within governments, I don't know their level of maturity where governance is of concern, so there is a big difference in that since everybody is not on the same maturity level. You going to find that most things will be applied where the maturity is higher and lesser a things are going to apply where the maturity level is lower" (Interviewee7, 2011).<br><br>b) "EA only influences currently in my environment knowledge, basically on the standards level on a duplication level as well. I have engaged with EA on so many occasions where departments asked me for an application and also there is a standard across EA board, so I can utilise EA in my projects, where I know there is departments requesting their applications, don't know if everyone does the same thing.  I contribute my action to the fact that my knowledge because I know it is there, it is easier for me to apply. So awareness becomes a big issue as well" (Interviewee7, 2011). |
| 8 | a) "Well we have a very strong methodology, applied governance in terms of project management. We have an internal system PMONT, |

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| | PROJECT MONITORING AND A DASHBOARD SYSTEM. That focuses on strategic and APP projects. Good project methodology is in place. The dashboard is extended to departments and we make the PMONT available to departments if they want to really focus on the departmental unique projects" (Interviewee8, 2011). |
| | b) "I haven't seen them came out so strong, but with your projects you need to at least have one of them on your stakeholders so that you can beware but it hasn't been practised or the processes haven't been clearly stated as such" (Interviewee8, 2011). |
| 9 | a) "It is a very difficult question and because I say the ownership and the responsibility or accountability of various applications is not necessarily vested in one place in other words in the framework of EA or the framework of the way governance role more, we know should be vested in terms of IT applications, vested in CIO. He is the accountable person in our case that is not necessary the case because of firstly the distribution of the budget. Where the budget lies, where the control lies, with our case it lies within the department. Now where the control there is definitely power and where there is power and control it comes together with accountability. So that lies within the departments within the various heads, responsible units that signed off on the various applications and processes. It is scattered and is not in its place, not centralised at all" (Interviewee9, 2011). |
| | b)"EA is not visible at all. EA is something people don't even know about. I think the closest people that know about EA is ICT Plans maybe and maybe just a few. It is not something that is on the tongue of everyone, every department, departmental head or section head or branch head; it is not seen as a priority at all. I think they are departments and the branches themselves see strategy in terms what is deliverables for them and they adapt whatever takes along with that. It is not necessarily consulting a central area to see when |

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| | something has been done in this particular regard then we follow suit, no, it is more, we got an issue, a challenge we got a new need, what have we got here, how we can do it you know, we just slap on the application or the process on top of it. It is not necessarily govern from a central place where certain things are worked out for the year you know, and how we are actually going about doing these and looking at the blue print and so forth. There is no blue print looked at" (Interviewee9, 2011). |
| 10 | a) "Not, because EA is not fully in place, governance is applied very loosely. There is no adherence, there is no for instance, one of the requirements of EA would be that there would be a standard of developing languages if I can call it that and there is none at the moment, we got at our last IT forum we counted, we have about close to ten developing languages of which four are I think $3^{rd}$ or second generation, small applications, clipper so governance is not applied" (Interviewee10, 2011).<br><br>b)"At the moment EA, one of the things are that we should be looking at, in my component we looking at a commons area, just the fact we have Persal information that is being used across the province in multiple applications, point in case I can think of now is PERMIS, which is one of our major applications, then there is our training administration, leave applications, now the fact that if I am going to draw a profile of Farouk Gamiet, I will have to go to more than one place to draw that profile, so it does not influence it at all, because the fact that [omitted, identifies interviewee]. details is available in more than one application makes it difficult for me to get a single profile. If EA had any influence on it [omitted, identifies interviewee].  would have been in a central common area" (Interviewee10, 2011). |

Question 12:

Do you know which framework was chosen to implement EA, and what the primary considerations were in selecting the framework?

| Interviewee | Answer to Question 12 |
|---|---|
| 1 | "The initial framework that was chosen before my time was apparently a combination of things the FEAF and Zachman etc. After I came on board we had to do a review in terms of, does this framework still works for us and what we have to look at going forward. We have looked at something more practical in terms of giving us a guideline and also in terms of how too. We have standardised on TOGAF 9 as a framework and what this also means that we align to the National Government which is also using TOGAF as a framework. So both as in terms of Provincially, what is it what we have to do, we came up with TOGAF 9. Within that we coming up with unconsciously aligned with the National thing. There were a number of things we looked at in terms of the practicality of the framework, how adaptable is it, those types of things. Not a restrictive framework but rather a prescriptive in terms of how you can do things. We have obviously adopted it more to make it more specific to PGWC" (Interviewee1, 2011). |
| 2 | "We don't know what the framework was used or from my experience, my knowledge there is hundreds of these frameworks. Each one got its own because when they do systems within, development etc. hey go into company's sometimes they have to use hybrids or add on's or ad hoc to provide the business needs within the thing. So the framework looks like an interesting field but to confusing when you have too many" (Interviewee2, 2011). |
| 3 | "I do know the framework as shown on the presentation, EA is following the TOGAF, maybe on the fine print was a reasoning how they got to that TOGAF governance, I was not part of the project, I was not consulted, I don't know how they came to it" (Interviewee3, |

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| | 2011). |
| 4 | "Obviously you know it is TOGAF 9 that was chosen. The primary consideration for picking TOGAF 9 was wanted a vendor neutral framework. Secondly we needed that was widely accepted internationally that we know was going to be maintained, you know and at the moment TOGAF is the day factor one, other something like FEAF just about which is really just about the federal EA framework that the US government uses, you know. So TOGAF and the other thing the third one is nationally the national GITO council, also opted to develop the government wide EA framework using TOGAF" (Interviewee4, 2011). |
| 5 | "I know they using TOGAF, but I don't know why they chose that one" (Interviewee5, 2011). |
| 6 | "No information was distributed to us so therefore I cannot answer that question of any framework that was adopted" (Interviewee6, 2011). |
| 7 | "If I remember correctly, TOGAF was selected, one of the most recommended best practice for EA at the time. Currently I don't know is there something better than TOGAF but I know it was internationally best practice, one of the best practices, or guidelines, of EA. I don' believe that we should adopt any particular best practice, and we should adopt our own based on others, but I also trial and error. TOGAF might have been the basic standard but you might find today that we have our own model track record based on government, based on your business requirements" (Interviewee 7, 2011). |
| 8 | "They have informed us that TOGAF, before that they had a case I don't know if that, I am not so familiar with that, I know that have informed us that they use TOGAF. I was not involved" (Interviewee8, 2011). |
| 9 | "I cannot even remember to be honest with you. Because EA wasn't much talked about for the last two years in my department, I don't |

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| | know, I forgot" (Interviewee9, 2011). |
| 10 | "I am not too sure about that. The last time I spoke to the relevant parties I think it was the Zachman framework, but I am not sure that they have standardised on the Zachman framework" (Interviewee10, 2011). |

Question 13:

Are there any monitoring and evaluation processes to determine whether the application of EA in your organisation is meeting its intended objectives?

| Interviewee | Answer to Question 13 |
|---|---|
| 1 | "There is nothing that I can formally think of other than people coming out of their own and requesting is there a system like this in place already. We are looking to address that however there is nothing in place that I can think of" (Interviewee1, 2011). |
| 2 | "There is no implementation so you cannot monitor. There is no report back. It is not on any agenda in the governance framework. Even in our own Ditcom we have an EA, if anybody comes with a new system or a new requirement" (Interviewee2, 2011). |
| 3 | "I have not heard of it and I don't think there is, because if there was someone monitoring and evaluating the system I think by now they would have come up with a big report saying it is a great idea, the system but is not utilised therefore it is just an idea. So based on that we have the EA is on someone's list that no can read from accept sending an email, personally you do not get the stuff, therefore there cannot be a monitoring and evaluation process currently" (Interviewee3, 2011). |
| 4 | "At the moment it is really just the maturity assessment you know, so it is that framework that we using, the other thing is that [omitted, identifies interviewee]. is increasing is started to use is to get in |

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| | external parties to do assessments like Ernest & Young and Gardner" (Interviewee4, 2011). |
| 5 | "No not that I know of" (Interviewee5, 2011). |
| 6 | "No, there are no measuring factors in place" (Interviewee6, 2011). |
| 7 | "To my best of ability I don't know if they got an auditing facility to ensure that they are applying EA within government. I do know people that I engage with occasionally ask me how do I apply it. In my case it is easy to show, but generally across government I don't think there is something that audits that. There is also the annual performance that can be monitored can be used as a monitoring tool depending what they have to deliver for the department, EA generally applying it, so it can be used as a monitoring tool" (Interviewee7, 2011). |
| 8 | "I got no idea" (Interviewee8, 2011). |
| 9 | "I don't think so, definitely no, based on what I just explained before" (Interviewee9, 2011). |
| 10 | "I would not be privileged to that information that would be probably the EA team will know about that, but should be made available to everybody, so that myself as a application development manager should know what I am being measured at to make sure I apply or adhere to the standards of EA. There is nothing from my perspective. If there is I should be made aware of it" (Interviewee10, 2011). |

Question 14:

Has EA provided any perceived value within the organisation since implementation, and if so, how?

| Interviewee | Answer to Question 14 |
|---|---|
| 1 | "There is a number of value items that has come out. Number one there is consolidated view applications, we looking at a consolidated view of technology. We also have done a number of business |

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| | processes. One of the key areas is lacking in this organisation, is business processes, nobody clearly understands what they should do or how they should do it, so in terms of that I think there is a lot of value that is being added thus far" (Interviewee1, 2011). |
| 2 | "It has not been implemented. The perceived value that we are getting out of our Strategic ICT Plan, with the little models we have in there. Where we getting slowly in the Department is that the business units are taking to each other, now we getting modules within the thing to support other units within the Department or business operation so that they can latch on and get the thing of cost scale in developing platforms so that we can also share information. The perceive value for us, we are getting there but in terms of our own ICT Plan" (Interviewee2, 2011). |
| 3 | "If you asking about perceiving right now then I will say no. I think if I must put me in the EA group shoes then the EA the expected perceived of the EA is to benefit all, prevent or alleviate duplication, which is too expected. We are not even close to the expected, the people do not know about EA, unless you work in IT. After these years even now business don't know what it is. It is difficult to explain to business what it is, as we cannot show them the benefit thereof" (Interviewee3, 2011). |
| 4 | "Well that ties back to what we said earlier. At the moment the perceived value is Ce-I bound that is because that has been the exposure. It has been about making life a bit easier for the IT manager you know, that we need to move beyond. So this is the focus of this reiteration for this coming financial year" (Interviewee4, 2011). |
| 5 | "There is not much value really that from feedback from departments, they are really not up to, they don't know why we are wasting so much money or spending so much money on that" (Interviewee5, 2011). |
| 6 | "No, the furthest I got with EA was them asking one document that |

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| | was a few years ago, that was it. Nothing else came from that framework" (Interviewee6, 2011). |
| 7 | "In my opinion I don't know what the rest of the organisation perceives EA, a lot of people are sceptical because they don't know what EA is, they don't know how to apply it and they don't know how to use it, generally for themselves. So based on the individuals knowledge you can apply it, so that perception is still based on that individuals knowledge if he doesn't have the knowledge his perception is going to negative. It can be biased towards it as well, so individual knowledge has an impact of the perception. At the moment you have to do a survey to see what people perceptions are, maybe. I perceive EA value in any organisation as I can perceive any information that can contribute to the improvement of the organisation, especially when it comes to service delivery. All of these things are interlinked knowledge management, business intelligence, EA, all of them ERP systems, is there to obviously to improve the services or benefits of the company. The problem I have with organisations is like provincial government right, is that the organisation is so big that it each silo in the organisation perceives what it business strategy is going to be and unfortunately in the organisation they also perceive that IT is another function or more a hindrance than actually an assistance. The reason for this is that they haven't seen the value of IT but all boils down to understanding of what we need to do. AE for instance if you apply it properly and populate it with the correct information, the first thing it should impact the decision making process. It should take away those difficulties around decisions making. The other thing that it should impact is your cost; it should reduce your cost on applications and duplications right. The other thing that it should impact is also your governance, where you go. The EA all this under one umbrella but it is not adopted properly because the perception is wrong. Individual perception has obviously an intention on behaviour and intention of use. So all of those things implicates or have an impact on EA, the |

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| | deployment, application and understanding" (Interviewee7, 2011). |
| 8 | "In some of the projects that have been involved, yes it definitely has because they have got a lot of information there that we can use, to sort of assist departments with information that they needed.  On an Ad-Hoc Basis they have really assisted me with getting information from a central point. We, if we really want to stream line we need direct access to that data base and we don't have that, to confirm with people, they need to come back to us, no real live access to it" (Interviewee8, 2011). |
| 9 | "EA has been under the radar if I can put it like that for a long time, so what value has it brought to the fore. Not because the EA has not been a good model or framework, but because it hasn't been visible, that's, all" (Interviewee9, 2011). |
| 10 | "No not at all, it has not any perceived from my side if I may I don't know if you going to omit this I had, we did a assessment of EA within provincial government in one of my studies and what  I did was that I gave my team, there was an investigation and after the investigation discussions we effectively came into to the perception that EA in government is not at the moment not adding any value at all" (Interviewee10, 2011). |

Question 15:

Are there any additional comments that you would like to contribute to the topic at hand?

| Interviewee | Answer to Question 15 |
|---|---|
| 1 | "Nothing I can think of" (Interviewee1, 2011). |
| 2 | "I think it is an interesting field, look, it's got to be dynamic framework or model that you can latch on. Now, where are we going with ICT, it is a trend for ICT, internet, web-based, getting our cell phones into the web-based. Any entertainment, anything we do |

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| | outside with family is to do with, you got to have EA in a business side, its services its process and its people. Move to the future, I think as a field there is lots of jobs, fields, academic, courses. I think EA we get real value out of it, satisfaction" (Interviewee2, 2011). |
| 3 | "We are currently in a governance era, I think there is a period when there is overwhelming, currently everyone is going with governance. We have many different governors' portions; EA is a depository for all the systems. Business also said you come to us, we do the ICT Plan and we dive you all our system requirements what we would like as well as what you are currently busy with. So aren't we as IT also not duplicating. Then we come to as you asked about governance of EA, which is TOGAF we have have ISO we have other governance frameworks. Is it adopted but why are we adopting so many different kinds of governance if we are one IT. Why don't we personally non duplication of governance within our environment because we take on different governance, which one are we going to implement eventually in IT and follow. We got………….that is now in our governance framework that we have to follow. So even in IT we seem to maybe not a system but in other areas we duplicate" (Interviewee3, 2011). |
| 4 | "One of the biggest problems is  in EA is just making sure that the information that you have in your repository remains current, so we have a case wide depository which at the moment the problem is that only one person could access it at a time, and you could no access it remotely. We are now getting to the point where we are trying to do trying to improve it. You remember I told you that we have an extended architecture organisation where the IT managers are actually factor architecture members, you know. At the moment they do not have access to that repository but that it is about giving them access so that they can take ownership of their own data. Once they have that you are available, already starting to see, you don't always want to sit in front of an excel spread sheet, you want to go on-line |

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| | from wherever you are an actually update and maintain your own information, that for me is key. That is one of the focus areas for us and then obviously also about publishing it. Making that information available, not just to management who like to see things spatially and lots of nice pretty pictures but also to the guys who are actually using that information, like your IT managers" (Interviewee4, 2011). |
| 5 | "The main thing is that they must communicate more with EA team, more to the departments and to the business and tell them precisely what they doing and why they doing it" (Interviewee5, 2011). |
| 6 | "Well EA is a lucrative business that can be utilised within PGWC, will add great benefit, but only once the foundation has been established and crucial information has mitigated and transferred to the rest of the departments, out in PGWC" (Interviewee6, 2011). |
| 7 | "If I can just scope it to our organisation right, so I am going to take it from the perspective of provincial government and my general opinion. Within the provincial government I think in EA was identified years ago, right, the failure of applying or deploying EA is the support of senior management, because it could be a lack of understanding or strategic goals or egos for that matter, individual influences, so hence provincial government has already identified that EA should be a priority. The lack of it being implemented is senior management, right that is where that ends because if senior management and I am not talking about immediate, I am talking about senior management executives, if they could see the value of it, we would have been a priority, it wasn't there then, somewhere along the band wagon the priorities have changed. Due to the political conditions we found ourselves, could be one of the reasons or the re-engineering processes happening all over, new strategies coming on board but that is one of the many influences we have as environmental control that impacts deployment systems typical like EA. The organisation within provincial government finds themselves to be very volatile area, and because there is no stability around |

political politics, automatically impacts administration. A couple of years ago in the early nineties, there was a big difference, IT was the big driver in the government sector, the only reason it was, because admin and politics were separate. Since the fusion of administration and politics you have that as a direct impact on IT as well. And even more so when IT was linked to a political environment, previously it wasn't linked to a political environment. So whatever the political environment has to deliver, they could use any vehicle to achieve this objective and unfortunately IT is one of them, unfortunately provincial government, but if you should separate those two things, IT can deliver more on its own, so because of its volatile environment we find ourselves, we don't have stability because we don't have stability we can't find foundation, so if you don't have foundation you cannot build anything on a unstable foundation as it will collapse constantly. So the foundation is important and whatever you going to build on top, if you don't have stability you got a collapse constantly and the reason why I am saying that because the people driving it constantly changes and it constantly changes, everybody is going to have their own perception. So that Is in the provincial government perspective. In the private sector I find it very few companies, I know that there is a lot of companies that have implemented EA and very successful as well. If you look at the success rate of those particular environments is because top management saw the value of it but for their business needs and then took it as driver from business side and that is what I have in my research read about, that I found is a key driver is business, because business ultimately decides the success or the failure and the value of the information, and that information is going to lie in the EA system or a ARP system or a knowledge management system, all of them together is the value, not the framework, is the value of the information and from that particular we can make informed strategic decisions and that conforms to as an impact on where we take the company or the organisation. Being the

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| | company what to do a cost driver, a cost initiative of a cost saving, or they want to increase their profits or their client base. There is a brilliant company who prove that to be true, as small company in Sweden, what they did was they wanted to move their company out to China, they started using the fact that they do a cost saving but the actual impact was that or we want to get into the UA, market, and their clientele wanted to improve and they took the EA, knowledge management, all of that and they made a decision. Even though it is going to mean that we have to cut down on our employees, because it was based in Sweden, so unemployment rate will go up, but my business will be improved, so value again, they took the information and made a strategic decision based on the information. So you can see that there is value in it" (Interviewee7, 2011). |
| 8 | "As I stated I would like to have a sign on data base where I can go in and do searches on certain key words, what duplication there is, if I want a system on an online job application system, need to go in to this whole knowledge data base and just grab all the applications that is linked to something similar to that" (Interviewee8, 2011). |
| 9 | "No from the line of questioning you can see that and from what I can add now, it EA is a key thing, we as technologist or IT people know that, I think it just doesn't have it. It didn't really get the platform or the, didn't enjoy the full potential what it actually should enjoy. There are many reasons for that, like I said I think what happens in specifically in our organisation is that when a certain things are seen as priority the other stuff seem to go as a back seat you know. That is unfortunate and everybody concentrates on energy's on that particular thing. I know for instance that are mechanisms in place, governance models and I remember there is, are people working on frameworks that will instil governance such like COBIT, ISO Standards and the King 3 report. We actually had those things but I don't know if it actually takes the type of priority that it should be taken and also if it should be taken as a priority by |

IT, certainly it does not go to the main key stakeholders which are our clients. That is actually where it should be driven and that is the problem we seem to apply, we take what supposed to be out there in terms of the governance model. We just apply it and see where it can fit, where as it should fit the other way. We must go to business and say listen we have to work accordingly to certain governance not prescribed by IT, but prescribed by business. And for that we got the tools to help your business, to achieve that. So I think we got   cat by the tail and we should be driving it the other way around. That is a more positive spin on things and I don't want to blame out IT people, I think just in terms of the culture this has always been the case. We got all the tools you know; we just don't know where to apply it. We have all the tools, we come with the tools but business doesn't know what we are talking about. They haven't seen this kind of tools before as we should be talking about and haven't seen these kinds of tools before as we should be talking to the business and asking what are their needs. What is your strategy's, how can we assist from the word go, and we show them that we have a blue print. We show them the EA how it applies to their needs and how it addresses their objectives. From there we can drive out and install, apply a governance models and frameworks and we can reduce duplications and we can improve efficiencies so from that way we can plan much better. We are sort of at the end, rear end of the thing that is why we really, we should take all these models like COBIT, ISO King 3 all this and take the things we know so well and really go the business and start talking to them at the time when you start to do strategic, running with their strategic meetings, and start planning then we start engaging at that particular level and have the input and support from senior management level and force it down in a sense lower management so everybody can align to it, so we are trying to achieve or the business, because that is what we are trying to do, we are here for the business not just to apply certain delegations because we have to apply it, you know. We are trying to add more value to the

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| | business by being with the business driving and helping them to achieve their objectives and then we use the tool you don't first use the tool then tell them use this tool, you know. They don't want a tool really, just accommodate us, because the senior management walking in they want to accommodate us, they really don't see the value of want we can actually help, how we help them achieve their objectives" (Interviewee9, 2011). |
| 10 | "EA should be made available as I said should be a partnership not only with business but with all the relevant IT role players so that application development managers are aware of what is required, at the moment I am sure if you ask any application development manager the fact that you have a log on script, do you think that, that should be at a central place, he is probably going to tell you why, so they are not aware of the fact each and every bit of information or code that we have should be in a central location because if somebody else is looking for any algorithm of what so ever sort, that it can be in a central place, we have to, calling for this service for instance. In my component I am looking at having internet services that would call for instance a log in script a Persal dater, any common type of thing, that could possible happen in our applications, to stage in it a common area and in that sense whatever we are doing should be duplicated or replicated in an EA structure and then everybody else would be calling. Let's say for instance Health is going to do a new application, they don't have to go and code a log in script, they will say log in script services from commons in EA for instance and should get access to that. In that case have and not duplicate then. For technical side all technical applications service managers for instance, business should all be part of the EA team so that we can take ownership of it in our respective areas" (Interviewee10, 2011). |

# Appendix 7: Research permission letter from PGWC

**CENTRE FOR e-INNOVATION**
Provincial Government of the Western Cape

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| Enquiries | Mr F Gamiet | |
| Reference | | **Department of the Premier** |
| Extension | 2765 | |

**CIO: e-INNOVATION**

**Attention:** Mr L Williams (Deputy Director-General: Ce-I)
Mr H Arendse (Chief Director: Strategic ICT Services Ce-I)

**RESEARCH PROPOSAL:** EA as a Governance tool to address duplication

I hereby wish to apply for permission to conduct research on EA and its ability to address duplication within PGWC.

**Title of research project:** EA as a Governance tool to address duplication
**Description:** In large organisations individual departments implement initiatives to solve problems which are made in isolation because it is easier not to influence the organisation as a whole (Sanders, 2004). One of the major concerns large organisations are faced with, is the "reinventing the wheel" scenario, especially with regard to application duplications.

According to the Centre of Excellence in Enterprise Architecture (CEISAR) (2008), EA describes how an organisation operates and transforms by the sharing and reuse of elements. Liimatainen (2007) stated that government organisations mostly adopt EA for the following criteria:

- Integrate organisational, information and communication technology silos.
- Increase reuse across public sectors with the aim to reduce duplication.

Thus, the research will mainly focus on the best practice guidelines for organisations adopting EA as a governance tool in reducing application duplication by investigating the best practice "do's" and "don'ts" of EA, EA case studies and to present a EA methodology guideline for success.

**Period of research:** 1 October 2010 to 30 October 2011

Kind regards.

Farouk Gamiet (53995457)
Date: 21/10/2010

Recommend:

Hilton Arendse
Date: 2010-10-21

Approved:
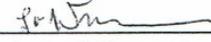
Lance Williams
Date: 21/10/2010

## Appendix 8: Casual loop diagram "Shifting the Burden"

Symptomatic
"Solution"

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Problem
Symptom

**(+)**

Side
Effect

Delay

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Fundamental
Solution
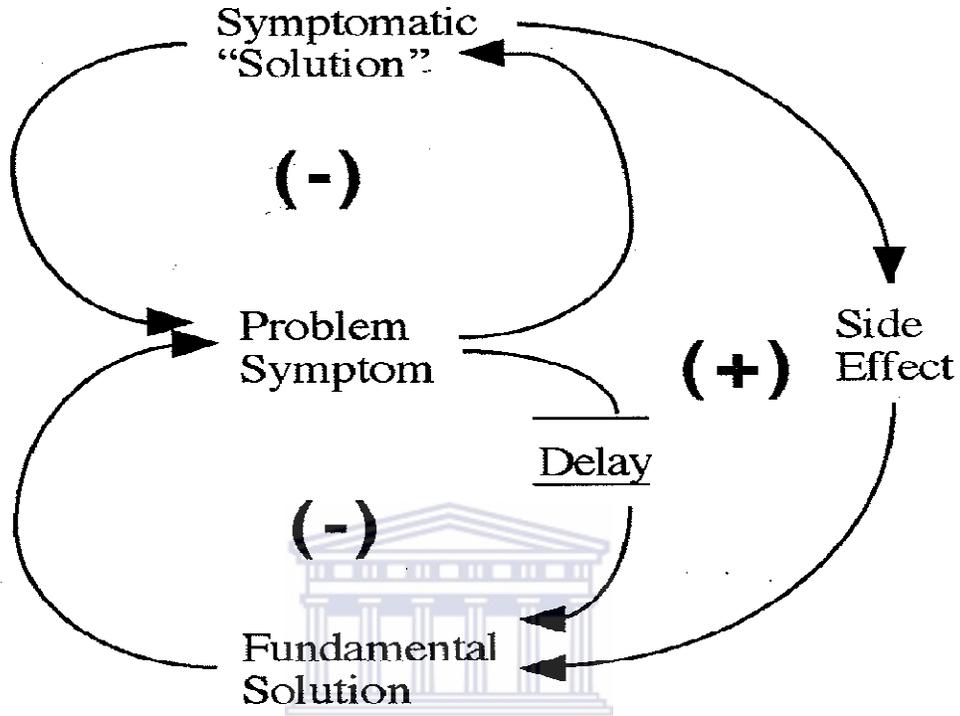
**"Shifting the Burden"** **(Senge 1990:p455)**

## Appendix 9: Information Sheet and Consent form

**Farouk Gamiet:**

**Enterprise Architecture (EA) as a governance tool to reduce application duplication: A case study of a South African Provincial Government**

**Information Sheet:**

This study is based on a preliminary case study conducted in 2008 within Provincial Government of the Western Cape (PGWC), Centre of e-Innovation (Ce-I),where the key purpose of the researcher was to identify the reasons for application duplication (Gamiet, 2009).

In that study, it was recommended to research "*Whether the Enterprise Architecture (EA) implementation approach within PGWC was according to best practices and the success thereof would be a great topic for further research to add to this study*" (Gamiet, 2009).

The purpose of this research is therefore:

1. To determine the reasons why EA implementation introduced to PGWC in 2006 was not effective in addressing application duplication, and

2. To recommend the best way forward for the current EA implementation in order not to invest in another governance framework like COBIT to achieve the intended objective.

With the above in mind, this study will use data analysed in the preliminary studyto highlight the EA perception of the IT managers involved in decision making with regards to new applications, as well as conduct research in order to determine the ineffectiveness of EA to address application duplication.

The research will conclude by recommending the best way forward for PGWC to implement EA and present a guideline model and further critical success factors to assist in the successful implementation of EA in the PGWC.

The researcher has obtained the permission from the Western Cape Government to conduct this research - please see the attached permission document: *Permit to conduct research within the Western Cape Government.*

## CONSENT TO PARTICIPATE IN RESEARCH

**Title:**

**Enterprise Architecture (EA) as a governance tool to reduce application duplication: A case study of a South African Provincial Government**

You are asked to participate in a research study conducted by MrFarouk Gamiet from the Department of Premier, Western Cape Government.

This research study is partially conducted towards the completion of the researcher's MCom (IS) thesis at the University of the Western Cape.

You were selected as a possible participant in this study because you are government ICT services manager.

The researcher has obtained the permission from the Western Cape Government to conduct this research - please see the attached permission document: *Permit to conduct research within the Western Cape Government*.

## 1.     PURPOSE OF THE STUDY

The aim of the study is to research the current perception of EA implementation within PGWC in order to identify the reasons why the EA implementation is not effective at addressing application duplication.


## 2.     PROCEDURES

If you volunteer to participate in this study, we would ask you to do the following - to:

1. You will be supplied with the interview questions so that you can prepare for face-to-face interview.
2. You will realize that the interview is semi-structured and will enfold depending on your answers.
3. The interviews will be recorded using the tape recorder, with your permission.

The meetings will take place in my office, room number 402, 4 Floor, in the UtilitasBuilding,1 Dorp Street, Cape Town, during a time suitable to you.


## 3.     POTENTIAL RISKS AND DISCOMFORTS

No potential risks are envisaged at this stage.   However, if something might come up, it will be dealt with in a sensible and sensitive manner.


## 4.     POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY

This study aim to help the Western Cape Government to more efficiently and effectively use its ICT and particularly various applications – thus, provide better services.


## 5.     PAYMENT FOR PARTICIPATION

No payments to the participants will be made.


## 6.     CONFIDENTIALITY

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission. Confidentiality will be maintained by means of referring to the interviewees as Interviewee 1, 2, 3, etc, and by means of themes and categories that will be identified and used in the analysis and discussions of the findings and

the outcomes, in the research report, the thesis, and in conference papers and articles that would be submitted for possible publication in academic journals.

The researcher further pledge that any information given by participants will be handled in the strictest confidence, and that the information students give will not be used to reflect negatively on them in any way. The information will be stored in files that will be locked in the filing cabinet of the researcher, in his office.

## 7.    PARTICIPATION AND WITHDRAWAL

You can choose whether to be in this study or not.  If you volunteer to be in this study, you may withdraw at any time without consequences of any kind.  You may also refuse to answer any questions you don't want to answer and still remain in the study. The investigator may withdraw you from this research if circumstances arise which warrant doing so such as you not attending the monthly meetings over the course of the research period.

## 8.    IDENTIFICATION OF INVESTIGATORS

If you have any questions or concerns about the research, please feel free to contact me at (021) 483-2765 (o); (cell) 083 449 2658; e-mail farouk.gamiet@westerncape.gov.za

## 9.    RIGHTS OF RESEARCH SUBJECTS

You may withdraw your consent at any time and discontinue participation without penalty.  You are not waiving any legal claims, rights or remedies because of your participation in this research study.  If you have questions regarding your rights as a research subject, contact DrZoran Mitrovic, Development of Information Systems, room 4.38, Level 3, EMS building, UWC, or telephonically, (021) 959-2162; or via e-mail at zmitrovic@uwc.ac.za.

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| SIGNATURE OF RESEARCH SUBJECT OR LEGAL REPRESENTATIVE |
|---|

The information above was described to *me, the participant*by MrFarouk Gamietin *English* and *I am the participant* in command of this language. 1 was given the opportunity to ask questions and these questions were answered to *my* satisfaction.

*I hereby consent voluntarily to participate in this study.* I have been given a copy of this form.


_____
Name of Subject/Participant

_____
Name of Legal Representative (if applicable)

_____                    _____
Signature of Subject/Participant or Legal Representative          Date

| **SIGNATURE OF INVESTIGATOR** |
|---|

I declare that I explained the information given in this document to
_____ [*name of the participant*].*H*e/she was encouraged and given ample time to ask me any questions. This conversation was conducted in *English* and *no translator was used.*

_____                    _____
Signature of Investigator                              Date