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Pragmatic approaches to enterprise architecture in the financial services sector.

Naidoo, Luciano Irvine

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Pragmatic approaches to enterprise architecture in the financial services sector

Luciano Naidoo

A research report submitted to the Faculty of Commerce, Law and Management, University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Business Administration

Johannesburg, 2015

ABSTRACT

Organisations are increasingly failing to implement enterprise architectures that align information technology activities to business strategy and objectives. The large gap between IT and business supports the idea that the promise of EA is a long way off from the reality experienced in the financial services sector. The purpose of EA is to drive alignment and collaboration between business and IT through an all-encompassing framework, but organisations give the impression that traditional approaches, no longer aid the alignment, nor assist businesses achieve value. The intention of this study is then to investigate the claims that traditional EA no longer fulfils its function; in addition this paper will provide alternatives to traditional frameworks by reviewing pragmatic approaches that are more suited to the flexible and agile nature of organisations.

This study is conducted by means of interviews, evaluated through the use of cognitive maps to investigate the pragmatic approaches to support the better implementation of enterprise architecture within financial institutions. It extends to discuss challenges pertaining to the implementation of enterprise architecture. These aspects are analysed through the views of both senior management in Information Technology as well as practitioners who operate in the area of architecture and enterprise architecture.

The analysis concludes that organisations continue the pursuit of EA, despite the state of it in practise. Organisations are well aware of the issues and challenges associated with traditional approaches and therefore actively seek to implement frameworks through practical and pragmatic means. EA has also matured significantly to the point where the majority of its implementations are being driven by business. With the increase in collaboration and business's implementing EA through scalable, light-weight and agile means; organisations are achieving more success, through better dealing with the largely, non-technical, EA challenges.

DECLARATION

I, Luciano Naidoo, declare that this research report is my own work except as indicated in the references and acknowledgements. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

Signed at ……

On the …….. day of …… 20…..

DEDICATION

This research study is affectionately dedicated to my wife, Tarryn Naidoo, whom without; I would never been able to achieve. Thank you for allowing me to pursue this journey and for motivating me every step of the way. Thank you for being my rock in both the good and tough times. I also dedicate this work to my son, Luke, who was born during the research process. The thought of Tarryn's unwavering support and Luke's existence kept me working tirelessly to complete the report. I would like to extend thanks and appreciation to all family and friends who provided constant support and encouragement to both my family and I, words cannot explain my gratuity.

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CHAPTER 1. INTRODUCTION

1.1 Purpose of the study

Enterprise Architecture (EA) has been in existence for almost three decades since its inception in 1987, yet its idealistic promises have seldom been achieved. Ivar Jacobson, an acclaimed computer scientist, well-known for his contributions to unified modelling language (UML) and object orientated software development, noted that EA has been pursued by many financial institutions and he has aided many in an effort to prevent them from making bad mistakes, sadly it has been to no avail, as most of these initiatives continue to fail (Jacobson, 2007). The purpose of this research is to identify and explore pragmatic approaches, better suited to the reality of complex information systems in organisations, to meet the objectives of enterprise architecture. Furthermore, it will discuss or unpack particular challenges which subsequently contribute to the failure of this practise, in the context of the South African financial services sector.

1.2 Context of the study

EA is the process of developing enterprise wide IT architecture. An EA focuses on a holistic and integrated view of the why, where, and who uses IT systems and how and what they are used for within an organisation (Armour & Kaisler, 2014). There are many reasons as to why organisations are unable to successfully implement EA and reap the associated benefits. Some of these reasons include misalignment of EA and business strategy, complexities associated with integrating business processes to EA, lack of sponsorship or involvement by top management in both IT and business, lack of appropriate skills and organisations dependency on particular frameworks or tools. When exploring the situation within organisations who have attempted to undertake the implementation of an EA, the majority of the results paint a dismal picture.

In a study conducted by Broer and Roeleven (2008), they identified, that two thirds of enterprise architecture initiatives fail. The study included 89 organisations that were spread across various industries, the majority of which included: Banking, IT Services,

Government and Insurance sectors. This sentiment was shared by Gartner, who in 2007, predicted that by 2012, 40 percent of 2007's enterprise architecture programs will be stopped (Gartner, 2007). One of the most common EA methodologies is the Federal Enterprise Architecture (FEA). The FEA is a framework that was published in the late nineties, which was essentially an attempt to implement an EA for the United States federal government (Gaver, 2010). In the mid 2000's, the US General Accounting Office (GAO) released several iterations of reports detailing the failure of the FEA and a general lack of success across the federal government (2012). These findings were also identified in Gaver's report (2010) which detailed how the federal government spent billions of taxpayers' money on an unsuccessful attempt to put Enterprise Architecture into practise across the government. The report raised the main challenges and themes that were seen to result from a lack of shared and common understanding, confusion about what EA is, the problems associated with federal EA compliance reporting due to the fact that fundamental change was required to make the framework function. In light of this, what may be argued, is that even a first world government as sophisticated as the United States, had been unsuccessful in implementing and utilizing an EA framework or methodology.

This problem is not unique to the United States, and has certainly been observed in other parts of the world too. Government-wide EA (GEA) is an application of EA in the public sector. The Korean government adapted GEA as a meta-modelling approach and developed the Korean government-wide enterprise architecture (KGEA). Kim, Kwon, Lee, and Shin (2013) state that in 2009, the Korean government wasted in excess of 50million USD on duplicate IT projects. It further states that the KGEA meta-model 1.0 was unable to satisfy the information needs from government-wide IT policymakers. They were not concerned with how agencies introduced EA deliverables, but rather on how national IT strategy was aligned and populated in the form of IT projects, information systems and other IT assets throughout all agencies. Once again, the designed EA was not aligned to, nor fulfilled the business requirements it originally set out to address. The authors affirm that the EA needed to allow autonomy of government agencies and at the same time, ensure compliance to a set of common requirements of government-wide enterprise architecture. The report concludes by stating that KGEA meta-model 2.0 (a new iteration) had to be developed to address information requirements from a

government-wide level to allow for flexibility at both the government and agency levels to ensure a working EA for the Korean government.

To bring the point closer to home, the problem is more widespread in Africa and South Africa, due to a lack of skill and maturity within the IT sector. Abraham and Enagi (2013) reported that IT investments by the Nigerian government have failed due to several reasons; the most prominent being failure to adopt the use of enterprise architecture in the alignment of business and IT. The report details that the Information Technology Association of Nigeria (ITAN) estimated Nigeria's IT market at over 105billion USD in 2009 with a total of 24 percent of the IT projects considered failed. This means that a probable 36billion USD was wasteful expenditure as a result of the failed projects. Projects were largely classified as failed due to its lack of adherence to guidelines, standards and strategic policy plans. All causes which could have been avoided if a functioning EA was put in place and adhered to.

A study in the financial services sector conducted by Matthee, Tobin, and Van der Merwe (2007) indicated that when comparing South African organisations to international respondents, the international respondents demonstrate a higher level of maturity with respect to EA implementation as the study (Schekkerman, 2005) showed that the respondents illustrated a shift in responsibility of EA from IT to business, which was not the case in SA. The major factors contributing to why international firms implemented EA at a higher level was because South African organisations demonstrated lower levels of maturity in their approaches to management of EA practises and processes, and there were many differences in approaches with respect to ownership of EA initiatives and the type of framework and modelling techniques used. Matthee et al. (2007, p. 14) discussed that "lower maturity levels were informed by the fact that in organisations surveyed, EA was predominantly driven by the CIO and IT managers instead of the CEO and business managers, and there was a low level of business and technology strategy alignment and involvement of executive management". Enterprise architects within the surveyed organisations often specialised in a sub architecture by training (e.g. technology or application architecture etc.) and did not have the broader skillset which should span across all spheres; business, application, data and technology. These architects were mostly self-educated or capacitated by in-house training which contributed to deviation

from set standards of frameworks and modelling techniques. A clear example of wasteful expenditure on failed EA in South Africa was reported in IOL News; the *Who Am I Online Project* whereby the JSE listed IT firm, Gajima, contracted with the Department of Home Affairs and failed to deliver on a 360million ZAR project, one of the deliverables being the delivery of an EA whereby the firm was remunerated 31.8million ZAR (2014) for an EA that was never theoretically delivered.

After reviewing the state of EA both globally and locally within South Africa, it is evident that the condition of IT projects is a long way off the promise that accompanied EA. A common trend becomes apparent from implementations abroad, which manifests even more against a South African backdrop. It is made up of challenges such as; misalignment between EA and business, lack of involvement from business, particularly top management, lack of skills within IT and maturity levels of the organisation when conducting IT projects. The challenge of lack of skills is more prevalent in SA due to the crisis facing the country. A report released by Deloitte & Touché in June 2007 indicated that “81 percent of companies have trouble finding appropriate staff; roles illustrating a particular shortage included chartered accountants, IT specialists, sales and marketing personnel and scientists” (Deloitte & Touché, 2007, p. 5). This factor compounds the problem as IT specialists with the required skillset are one of the key foundation points of a successfully implemented EA.

1.3 Problem statement

1.3.1 *Main problem*

The objective of this research is to identify pragmatic approaches to EA in financial services institutions in SA.

1.4 Significance of the study

The current reality of EA in South Africa as well as the world is not a reflection of its promise. De Vries and Van Rensburg (2009, p. 9) reports that “EA integrates core operations and processes with all IT functions of an organisation; this fundamentally

supports the thinking that integration by EA between IT and business, provides a planned managerial approach to information and communication technology management, planning and development". These sentiments are reiterated by a prior paper published by Banda, Darries, and Keats (2005) who express the view that EA should be considered the master plan of action that associates business planning characteristics such as goals, visions, strategies and governance principles and translates it into organisational structures, processes and data. My intention is not to contest these findings, but rather articulate that the reality in organisations shows that EA's promised benefits are curtailed. If organisations are to implement EA efficiently and align it with the IT blueprint to the business' strategy, then yes, the rewards will be achieved, but this is not the case. According to Chandiwana, Oni, and Owei (2010), EA implementations have become a new solution that organisations are venturing into without adequate knowledge as to the suitable direction for sustainability within the organisation, which consequently aid EA's under delivery. Chandiwana et al. (2010) report motivates this suggestion as it states that organisations find it difficult to keep up with the fast paced changing world of IT and because EA is a fairly new concept that has become part of organisations it is not completely understood. Lam (2005) suggests that optimal usage is often affected by the complexity of the information systems employed by the organisation. Complex systems are difficult to fully utilise due to their disparate nature; they span departmental boundaries resulting in multiple stakeholders with different view-points. The task of achieving consensus among multiple departments is usually difficult, the complexity increases tenfold if legacy systems are involved, which is usually the case, especially in South Africa. This research paper has analysed the gap between EA's promise versus its reality and in what follows, it will explore new approaches other than the conventional frameworks that assist to address the shortcomings.

A few of the factors that contribute to the shortfall of EA are skills and IT maturity within organisations. Schekkerman (2005) draws a parallel between South African organisations and international respondents, his research reveals that South Africa demonstrates a much lower level of maturity with respect to EA implementations. The study also highlights South Africa's lack of enterprise architects and speaks to the shortage of these roles within many organisations (Matthee et al., 2007). These

challenges, along with misalignment between EA and business strategy, and lack of involvement of business, has been analysed in the report to aid pragmatic approaches to EA, to support the shortfalls within implementations in the financial services sector in South Africa.

Financial institutions were selected to be researched due to the significance of these organisations on the Johannesburg Stock Exchange and the role they play in the South African economy. These institutions do not deal with physical products, but rather a variety of services offered; both tangible and intangible, adding to the advanced and sophisticated nature of the systems that they use. The demanding and cutthroat environment, in which they operate, also foster a need and dependence on information systems to aid with communication, operations and decision making to allow the organisation to compete and be able to adapt to what the market requires. Financial institutions rely heavily upon IT and its alignment to business due to the majority of businesses operations and activities being dependant on the function. This emphasises the dire need for IT deliverables to be aligned to business strategy which can be achieved through EA. There are also major cost implications associated with failed EA implementations, reinforcing the need for the organisations in this sector to deploy EA's efficiently.

1.5 Delimitations of the study

The study is delimited in its findings in the following ways;

- Organisations surveyed in this study have only included organisations that operate within the financial services sector in South Africa
- Financial institutions included exist in the size of medium to large enterprises, employing a minimum of 200 employees
- This research has not undertaken the review of technicalities of individual EA methodologies such as Zachman, The Open Group Architectural Framework (TOGAF), Federal Enterprise Architecture (FEA) and the Gartner methodology. The report focused on the analysis of the commonality of approaches, the individual methodologies has only been acknowledged and briefly discussed, but the detail not assessed

- The qualitative study only includes individuals who are based in Johannesburg due to the convenience and access to these people.

1.6 Definition of terms

The term *pragmatic approach* refers to an implementation method of EA that adopts a flexible, light-weight and agile manner in its execution. Smith (2011) summarises it concisely as “cutting EA to the bone, yet delivering real business-value fast”. A pragmatic approach will allow management to obtain a holistic view of IT and all spheres that reside within architecture, including business, and allow them to rapidly increase their maturity by aligning the IT objectives to the business strategy. This will ensure that IT adds true business value and increases its effectiveness and efficiency in delivering services to the business. Traditional approaches are commonly referred to in this paper; the term is synonymous to traditional EA approaches. It refers to organisations that adopt EA through the implementation of traditional frameworks such as TOGAF, Zachman and the other popular methodologies listed. A traditional approach typically illustrates an organisation that implements one of the a fore mentioned methodologies in its entirety; continues to abide by the rigidness prescribed by the methodology, does not adapt the methodology to custom fit the organisation and follows all processes and prescriptions step by step.

Hill and Spewak (1993) were among the forerunners in EA and are noted as the first subject matter experts to define the term enterprise architecture. In his seminal book (1993, p89), he describes EA “as a conceptual map of an organisation from many perspectives including business, applications, information and technological points of view”. Armour, Kaisler, and Liu (1999a) and Ekstedt, Johansson, Johnson, and Simonsson (2006) share a similar view, defining the concept as a discipline focusing on not only the technical aspects but also on the organisational context in which IT systems operate. EA is said to be one of the key drivers to control fast paced IT changes and system complexity within the business environment, its key roles being the alignment between business requirements and information systems; the interface between business and IT.

EA models serve as maps with information of the current situation and strategies for future directions of the company (Armour et al., 1999a). The term model is often interchangeable with framework and methodology. Enterprise Architecture models can help decision making on issues such as IT and business alignment (Bolles, 2004). The Open Group (2002) provides one of the most comprehensive reviews of EA models, stating the following as the most popular; The Open Group Architecture Framework (TOGAF), Zachman Framework for Enterprise Architecture, Enterprise Architecture Planning (EAP) and Federal Enterprise Architecture (FEA). “In recent times, the Gartner methodology has also become more popular and is included in the list of most frequently used frameworks” (MSDN, 2007). One needs to be careful in the categorisation of these methodologies as some qualify as processes while others such as Zachman, as taxonomies. This topic will be further discussed later in the paper as it informs one of the challenges which cause the complexities associated with the implementation of EA within organisations.

An enterprise architect is an individual who integrates or oversees the various streams of architecture to ensure that the delivery of the IT solution considers all aspects of IT to appropriately and efficiently address the business problem. Du Preez (2003) and EWITA (2006) define the sub-architectures of EA as business architecture, application architecture, information and data architecture and technology architecture. The authors therefore advise that an enterprise architect is a person with a unique, but more importantly, broad set of skills overseeing all architecture types.

For the purpose of this research, financial institutions or organisations termed as operating in the financial services sector, include only banks and insurance organisations and exclude all other traditional financial institutions.

1.7 Assumptions

The following assumptions have been made in relation to the study:

- Participants in the qualitative analysis will answer honestly and accurately, because anonymity and confidentiality will be maintained and the participants may withdraw from the study at any time and with no consequences
- The views illustrated in the interviews conducted, represents those of the respondent interviewed and are not a reflection of the organisation

CHAPTER 2. LITERATURE REVIEW

2.1 Introduction

The purpose of this literature review is twofold; firstly to analyse the promise of enterprise architecture versus the realities which includes the review of pragmatic approaches, and secondly, to evaluate the challenges experienced within EA which hinder its success.

Chandiwana et al. (2010, p. 1636) research illustrates the following extracts as truths contributing to EA's inability to deliver on its promise; "Enterprise architecture is a fairly new concept that is inherently becoming part of our business organisations. The ever changing world of ICT is making it difficult for organisations to keep up technology versions. Organisations with complex legacy systems have difficulties when they migrate to new systems as some either carry over unnecessary data or leave out critical data. And inadequate information on EA implementations can result in compromised security". When shifting from realities to the actual challenges experienced, Chuang and van Loggerenberg (2010, p. 4), notes "that challenges experienced with enterprise architecture, are largely non-technical in nature". The challenges in the study are identified as communication between EA stakeholders, obtaining buy-in from stakeholders, ownership of the EA components, perceptions of the EA architect, organisational politics and other challenges which include technical issues (including integration of legacy systems, limited modelling tools and interfaces needing to deal with multiple data sources).

The promise of EA compared to its reality, will include the review of several aspects. These include the motivation or experience that informed the pursuit of EA, the true experience of EA within organisations, and most importantly, pragmatic approaches that can be used to solve existing EA problems. Pragmatic approaches are addressed at two levels; the organisation's plan to fix EA and the thoughts of specialists within the field as to how businesses can address the shortfalls experienced. As part of the challenges experienced in EA, the literature review will assess: skills shortages, lack of organisation maturity levels, misalignment between EA and business, and lack of involvement from business, IT and senior management.

2.2 Enterprise Architecture

The man often referred to as the forefather of Enterprise Architecture is John Zachman (Zachman, 1987). His EA framework, *Zachman Framework for Information Systems* (Sowa & Zachman, 1992) later renamed to, *A Framework for Enterprise Architecture* (Bernus, Nemes, & Schmidt, 2003), is plausibly one of the most referenced and discussed methodologies by both practitioners and researchers. In his publication (Zachman, 1987, p. 276), he defines EA as simple as: "A framework for information systems architecture". Zachman's framework was later refined by Van der Klashorst (2001, p. 11) who stated that: "enterprise architecture typically consists of four key components, namely business architecture, information (and/or data) architecture, application architecture and technical (or technology) architecture". This sentiment was shared and supported by the authors, Du Preez (2003), EWITA (2002), Koch (2005) and Harris-Jones and Pelz-Sharpe (2005).

A more comprehensive definition is that provided by Schekkerman (2004, p. 32); "Enterprise Architecture is a complete expression of the enterprise; a master plan which acts as a collaboration force between aspects of business planning such as goals, visions, strategies and governance principles; aspects of business operations such as business terms, organisation structures, processes and data; aspects of automation such as information systems and databases; and the enabling technological infrastructure of the business such as computers, operating systems and networks". This definition is somewhat summarised as an approach for controlling the complexity and constant changes in the business environment of an organisation, enabling a real alignment between the business vision, business requirements and information systems (Armour et al. (1999a); Armour, Kaisler, and Liu (1999b); Frank Armour, Kaisler, and Valivullah (2005)).

Hoogervorst (2004) and Frank Armour et al. (2005) defines EA as a blueprint that identifies the focal parts of the organisation (such as people, business processes, technology, information, and information systems), as well as the means that identify how these different parts collaborate to achieve the desired business objectives. Frank Armour et al. (2005) and Hoogersvorst further elaborate that over and above the alignment between IT and business, an ideal EA provides a holistic, enterprise-wide and

consistent view of the organisation instead of looking at it from the point of view of a single application or system which is an issue commonly experienced by organisations where no formal EA has been applied.

All sourced definitions are aligned, re-iterating EA's need to support the requirements of business to all aspects of IT; information, application and technology, which would ensure that IT as a whole is able to deliver on business strategy and maximise value. Some definitions refer to complexities experienced when attempting to integrate a multitude of platforms, systems and environments while others mention the challenge of keeping up with rapidly changing IT technologies. For the sake of this paper, Schekkerman's (2004) definition provides the most descriptive meaning, noting the most important key points, however in an effort to eliminate confusion due to the length of his definition, I will adopt Armour et al. (1999b) and Frank Armour et al. (2005) illustration of EA as it concisely summarises Schekkerman's version. Focusing on the two focal attributes: managing business complexity and change, and alignment of business requirements together with the delivery of IT systems, this version will then be adopted as the working definition for the rest of this paper.

Enterprise Architecture Frameworks

In this section, the terms; framework, model and methodology are all used interchangeably. Individual frameworks do not fall within the scope of this paper. These frameworks are purely discussed to explain their relation to EA and to illustrate the issue experienced across frameworks that contributes to challenges. EA frameworks came into existence because enterprise architecture takes a model-based approach to its objectives (Ekstedt et al., 2006). There are a number of frameworks that are available to aid organisations with the implementation of EA. Renowned models include, but not limited to, the Zachman framework for enterprise architecture, The Open Group Architecture Framework (TOGAF), the Federal Enterprise Architecture (FEA) and Enterprise Architecture Planning (EAO). Organisations select and implement frameworks at their discretion, but the study conducted by Chandiwana et al. (2010) discovered that many adopt an industry or common methodology. He continues by reaffirming the prevalent frameworks as: "TOGAF, Gartner's Framework, The Zachman Framework"

and lists the “Federal Enterprise Architecture (FEA)” and “Department of Defence Architecture Framework” as additional commonly used models (Chandiwana et al., 2010, p. 1633).

Akhavan, Jafari, and Nouranipour (2009, p. 730) state: “these frameworks embody organisational processes that seek a synergistic combination of data and information processing capacity that interact with the creativity and innovative capacity of human beings”. The Open Group (2002) explains the model’s function as describing high-level abstractions of enterprise entities and how they relate to each other. This includes technical entities such as data, functionality, physical infrastructure, applications, and interfaces, as well as organisational entities such as business processes, goals, organisational units, and workflows. Although the two definitions are somewhat similar; articulating the alignment of business objectives and IT functions, at a high level, the first definition defined a framework as a process, while the second spoke to a framework as a model illustrating the relationship between various entities or architectures (IT and business) within an organisation. Examples of the different approaches undertaken by frameworks are the differences between TOGAF and Zachman. Mrdalj and Urbaczewski (2006) and Sessions (2007) define the TOGAF Framework as a process, stating that the framework places emphasis on the integration of different architectures such as business, data, application and technical. This view is also shared by Marney (2009) of Sparx Systems. The Zachman Framework for EA on the other hand is defined by Sessions (2007, p. 12) as; “a taxonomy that can be summarised through the Zachman Grid approach”. Gottlieb and Iyer (2004) and Matthee et al. (2007) further state that the Zachman Framework can be defined as a multidimensional visual checklist that emphasizes the six viewpoints of an organisation.

Herein lays one of the challenges, MSDN (2007) states: “when examining each of these methodologies in depth, one is struck by the fact that none of these approaches are really complete. Each has strengths in some areas and weaknesses in others. For many enterprises, none of these methodologies will therefore be a complete solution”. Organisations should therefore review the possibility of using what MSDN (2007) refers to as a “blended methodology”, incorporating aspects from various frameworks and modifying them to ensure that an organisation’s needs are addressed entirely. Another challenge that results from incomplete methodologies are organisation’s committing to a

specific framework, thus creating a dependency on the framework, where the organisation and its processes remains rigid and does not steer away from the selected model's approach; choosing adherence to the model over delivering on business needs. According to Burton (2009, p. 4); "Organisations can come up with tailor made taxonomies to suite their organisational needs. These frameworks are supposed to be used to guide and not to dictate the implementation process".

2.3 The promise compared to the reality of EA

The first portion of this research will analyse the promise of enterprise architecture versus the realities that it has delivered to businesses. Reynolds, Seddon, Shanks, and Tamm (2011, p. 141) list the most commonly cited EA benefits as "increased responsiveness and guidance to change, improved decision-making, improved communication and collaboration, reduced costs, and business-IT alignment". Simultaneously, (Reynolds et al., 2011) this study also shows that despite there being a vast amount of published literature that proclaim benefits realised through the implementation of EA, there is little supporting evidence backing these claims. The study illustrated that of the 50 organisations reviewed, the majority mentioned a number of EA benefits, but the significant finding is that "only six studies provided empirical evidence (often limited) to support the benefit claims". Aziz and Obitz (2007) and Babu and Obitz (2009) noted that organisations experience difficulties attempting to substantiate their EA investments, which they have realised is associated with a lack of clear understanding of EA benefits. Boar (1998) states that a contributing factor to EA not delivering on its promise is due to the existence of "larger organisations with more complex IT environments", these organisations experience problems because of the issues encountered when trying to align complex processes with the organisation, a process referred to as organisational alignment (Reynolds et al., 2011). EA is seen as a "vital management instrument by many large organisations, but generally has not reached the desired result" (Perdeck, Soetendal, van der Raadt, & van Vliet, 2004, p. 533). EA has been used for more than three decades, but it still suffers from immaturities as detected in the Slot, van der Raadt, and van Vliet (2007) study.

Section 2.2 and *Enterprise Architecture Frameworks* explain the purpose that EA is traditionally intended to fulfil within organisations. The literature review proceeds to articulate in section 2.3 how EA has failed to deliver on its mandate. The first proposition consequently develops by suggesting that even though EA is largely used in practise, it fails to realise business value:

Proposition 1: Traditional Enterprise Architecture approaches

The practise, Enterprise Architecture, is largely used within organisations, but organisations find that implementing EA through traditional methodologies does not aid IT to contribute the expectant business value.

2.3.1 *Motivation that prompted the pursuit of EA*

One of the main influences that encouraged organisations to implement enterprise architectures is because it has been one of many instruments used in an attempt to get a grip on the current operational environment and the implementation of IT changes (Van Der Raadt & Van Vliet, 2008). Van der Raadt et al continues by stating that EA provides standardisation, and sets a clear direction for the future to guide changes. Organisations therefore pursue EA in an attempt to obtain a standardised, integrated, flexible and manageable landscape of aligned business and IT process, systems and procedures. They pursue EA for the desire of control over projects and changes in the operational environment to allow IT to deliver solutions that perfectly match business requirements, unfortunately, this is seldom the case.

Moreover, further reasons that motivate the pursuit of EA include: EA providing a system view by describing systems, their components, interactions and interrelationships (Handler (2004) and Theuerkorn (2004)); EA assisting organisations by providing a “blueprint for directing the company” in terms of processes and IT capabilities (Boar (1998) and Robertson, Ross, and Weill (2006)); EA providing structured principles that govern the design and evolution of systems (Theuerkorn (2004) and Luijpers, Van Den Berg, Van Steenbergen, and Wagter (2005)) and finally a means that provides tools, processes and governance structures to implement enterprise-consistent IT architectures

(Frank Armour et al. (2005) and Schekkerman (2004)). In sum, the focal factor prompting organisations to pursue an EA is the promise of business and IT alignment to ensure control and delivery of business objectives to add value to organisations.

This section explains the principal aspects that drive business to implement enterprise architecture within their organisations. Proposition 2 is hence a product to validate the perceptions of practitioners, to see if they are truly aligned with the literature findings.

Proposition 2: Pursuit of Enterprise Architecture

The primary influence prompting the pursuit of EA is the advantage of business IT alignment; ensuring that IT delivers on business strategy and objectives. The pursuit is further motivated by the general perception that EA contributes to IT delivering value.

Proposition 3 focuses on an aspect partially related to the pursuit of EA; it performs a test to assess that, in organisations' pursuit of EA, are the plans of an organisation aligned to that of the views of the individuals (senior managers and practitioners) view of how EA within the firm can be more optimally implemented.

Proposition 3: Misalignment between organisation and individual's view of EA

Organisations' plans to rectify EA implementations differ to the views of practitioners who function within the organisation. There is a misalignment between the measures organisations seek to implement to ensure EA contributes to business objectives and the ideas of EA practitioners.

2.3.2 *Perception of success of EA by organisations*

A study conducted by Van Der Raadt and Van Vliet (2008) discovered that stakeholders perceive EA success based on the following lower level goals; EA conformance, support to decision making, provision of to-be and as-is insights, assurance of close cooperation between IT resources, translation of EA plans into objectives, quality assurance and

acceptance of change by the organisation. These lower level goals help achieve four distinct values which is predominantly used to measure the success of an EA within an organisation. Van Der Raadt and Van Vliet (2008, p. 103) defines the success values of EA as: “(1) Realisation of strategy; achieving a situation which is as closely possible to the planned to-be architecture and the company’s strategy. (2) Horizontal alignment; coherent and consistent (standardized) implementation of changes among the different generic domains and specific BUs. (3) Monitoring of changes; the overview of the current activities (projects and programs) within an organisation to supervise change/project status and how these activities can result in a particular future state. (4) Operational continuity; the assurance of the quality (e.g. continuity, stability) and effectiveness of the current core- and supportive operations in both business and IT”.

A contrasting approach was used by Dietzsch, Kluge, and Rosemann (2006) who identified, through the adoption of the DeLone and McLean model of information system success, the design of a value realisation model specific to Enterprise Architectures. Their model identified: “service quality and actual use as two major catalysts fostering an Enterprise Architecture’s overall success”. Their paper (Dietzsch et al., 2006) presented an EA value realisation model focusing particularly on non IT-related stakeholders. The two studies yielded a different result, no consistent trends were discovered in the literature reviewed relating to this topic.

2.3.3 *Pragmatic approaches for solving EA problems*

Agievich, Becker, Gimranov, and Taratukhin (2012) identifies one of the challenges as EA and solutions architecture (SA) functioning independent of one another; acting in different scopes and activities. Agievich et al. (2012, p. 87) explains that “EA comprises the whole enterprise (or a part of it according to the EA scope) and SA acts on the level of automating particular processes of the enterprise and describes mostly information systems and data (at a lower, more technical level)”. The alternate approach suggested by Agievich et al. (2012) is for organisations to use EA and SA together to effectively build an architectural landscape and reap the benefits of a maximum degree; essentially using SA as an interconnecting link between EA and business architecture ensuring closer alignment. These sentiments are supported by Ricca (2013) who states that EA and SA function in the same business facet, architecture, and can be integrated with a

minimum level of effort to achieve maximum gains. Agievich et al. (2012, p. 90) concludes by saying: “if we have information in the repository and make SA and EA models using a unified toolset based on unified building blocks, we may present an integrated EA as a projection of business architecture and solutions architecture of the company”.

Cardwell (2008) suggests going back to basics to deal with present day complexities. In his paper, he (Cardwell, p. 47) states: “Simple system structures enable people to see how the systems work to achieve company goals”. (Cardwell, p. 50) suggests structuring EA “in a simple set of process hierarchies so the IT function can implement the appropriate software packages in a way everyone can understand”. The study (Cardwell, p. 53) advocates the “adoption of a generalised EA framework and build simple structures so that everyone in the organisation will see where they fit in and how their activities contribute to success”. Cardwell promotes organisations not becoming dependant on a single EA framework, but speaks to the views shared by MSDN (2007) that suggests the use of a “blended methodology” or hybrid approach to ensure that a complete EA solution is in place. The report (Cardwell, 2008) also made it apparent that it found process-like frameworks more beneficial than taxonomy’s or mere models suggesting EA artefacts and roles within IT.

In a paper presented by Peyret (2013, p. 5), he discusses new EA methodologies and segments them into 3 main scenarios; “Redefining enterprise architecture foundations, extending Lean and/or Agile methodologies practises to architecture and integrating with other best practises such as COBIT and ITIL”. He argues that pragmatic EA’s aligned to these scenarios are being developed as a result of traditional methodologies planning and development taking too long, methodologies having difficulty dealing with multiple strategies, innovation occurring outside EA and because of the need for agile methodologies. The new methodologies shift their focus away from EA principles and document templates to ensure IT fuelling business innovation, IT operations becoming part of business operations and to ensure agility of the extended enterprise.

The question “Does a traditional EA approach add business value?” has already been assigned to proposition one. In light of the answer being returned as a yes, proposition four seeks to support the premise that pragmatic approaches are more frequently used

in practise and furthermore, achieves more success than that of the traditional approaches.

Proposition 4: Pragmatic Approaches deliver business value

Traditional EA approaches are no longer valued. Pragmatic approaches are therefore more frequently used. Pragmatic approaches are more successful in aiding IT deliver business value through EA.

Many applications or methods of pragmatic approaches have been discussed in section 2.3.3, *Pragmatic approaches for solving EA problems.* Proposition 5 looks to argue the three most prevalent approaches, to evaluate if practitioners agree with this observation or not;

Proposition 5: Application of pragmatic approaches

Extending Lean and Agile methodologies as a means of a pragmatic EA approach, contributes to the success of EA deployments in an organisation. Integrating enterprise and solutions architecture aid the EA function more effectively. Furthermore, integrating EA with best practises adds to the success of EA and closer aligns IT to business.

2.4 Challenges experienced with Enterprise Architecture

The following segment explores factors contributing to why EA's realities and promises are not aligned. Kappelman and Zachman (2013, p. 82) summarised context explaining the key challenge; "This fact is probably why, to some extent, the responsibility for EA in most organisations has been assigned to IT people — they were already doing a reasonably good job architecting and engineering IT. But since the architecture of the enterprise includes strategies, business models, boundaries, policies, timings, organisation structures, job descriptions, rules, and more, there is no reason to believe that EA remains within IT; although, managing the suite of modelling and repository tools will likely remain an IT responsibility. Perhaps also the IT analyst/architect roles, which provide IT professionals with a fundamental link to the business and thus are likely

essential to IT earning and keeping a seat at the strategy table as well as being critically important to achieving and sustaining business-IT alignment". This summary explains many of the root causes of the challenges; EA is predominantly managed by IT, which in the event of a lack of IT skills, the EA of an organisation will suffer. As Kappelman and Zachman (2013) explain, business perceives EA as being a solely IT function and hardly gets involved, even though a large part (usually more than fifty percent) relates to business strategy and objectives, lack of their involvement results in the failure of EA within organisations. Misalignment of IT and business requirements in EA is usually a consequence of the previous point; lack of involvement by business. In the study performed by Broer and Sven Roeleven (2008), they identify that lack of alignment does not only pertain to business, but also include IT and senior or executive management; in some instances the CEO, others the CIO and sometimes both. The literature review (Matthee et al. (2007); Iyamu (2009) and Chuang and van Loggerenberg (2010)) identified the following topics as the challenges which have been found to be the most common in EA implementations, especially in South Africa.

2.4.1 *IT Skills shortages*

It is a well-known fact that skills shortage is a problem that has been facing South Africa for a long time. IT specialists are a role or skillset that is particular lacking in the employment market. Matthee et al. (2007) has found that there is a larger shortage of enterprise architects within organisations. These resources do exist, but they are trained in a specific discipline in architecture with technology and application architects being the most common. There are very few enterprise architects who possess an all-encompassing architecture knowledge that is able to effectively deploy EA within organisations to ensure the correct level of alignment with business strategy.

Chandiwana et al. (2010, p. 1) highlight a key challenge as: "Poor technical and customer support". The study explains that complacent organisations are dependent on vendors and consultants to provide long term sustainable support, but the problem experienced in developing countries such as South Africa is that experienced experts are always moving to developed nations in search of perceived greener pastures and better life prospects. The problem then manifests as a result of "few IT specialist with appropriate experience in EA being available in South Africa". The CIO consultants

interviewed in Chandiwana et al. (2010) study advise that their only response is then to hire expatriates from developed economies which add another dimension of increased costs for the implementation of EA.

2.4.2 *Organisations IT maturity levels*

Jakovljevic, Labuschagne, and Marnewick (2008) have conducted research on the IT project maturity of organisations in South Africa. Their findings illustrate that the overall IT maturity in organisations have increased since 2003 and at the same time show a decline in the success rate of IT projects for the same period. The authors therefore conclude that: “there is no correlation between maturity and success” (Jakovljevic et al., 2008) . I disagree with this finding, on the basis that my experience within IT and EA lead me to belief that IT maturity levels in organisations have a significant effect on project and EA success. This view is supported by the following studies, reviewed as part of the literature review.

Chuang and van Loggerenberg (2010, p. 7) study on South African organisations findings give details to; “In the opinion of some architects, business executives frequently have made up their minds about a specific solution before the architecture is designed. The result is that they unwilling to be convinced otherwise even if it is to protect their ego’s. It requires architects to be skilled in the arts of negotiation and diplomacy to convince powerful individuals of their convictions”. This finding expresses the low level of maturity within organisations where high profile individuals who serve as project sponsors derail attempts at EA due to their unwillingness to compromise or lack of understanding of the ultimate goal of EA; IT and business strategy alignment. Chuang and van Loggerenberg (2010, p. 8) continues by stating: “Enterprise architects therefore require the skills to deal with organisational politics if they want to be successful in their EA efforts. EA is being perceived as a political game and unless the architects are skilled in playing the game, their chances of success are seriously jeopardised”. In another South African study completed by Iyamu (2009), it is proven that employees use power to manoeuvre activities and processes within the organisation, power that was originally mandated for the interest of the organisation in the practise of EA was incorrectly exercised to protect individuals and group interest. Iyamu (2009, p. 223) proceeds by stating: “Employees both in the IT department and in the business units often view

architects with suspicion. This is because they resent the fact that they may no longer be empowered to make key technology and related decisions. They also perceive a threat to their job security and resource control. These factors manifest themselves to acts of organisational politics, which result in lack of trust and cooperation. The factors have a negative impact on the relationship between the business and IT departments on one hand and on the other, between the IT specialists and Architects" further confirming the insufficient levels of IT maturity within organisations. To conclude, the research prepared by Matthee et al. (2007) found that because businesses surveyed, though aware of the growing importance of EA, still perceived IT as being the sole custodian of it; "indicates a general lower maturity index profile of EA governance in the companies".

2.4.3 *Misalignment between EA and business*

In many of the papers reviewed, the most common problem experienced is cited as the connection between EA and business strategy. Broer and Roeleven (2008) research, which conducted interviews with C-level management illustrated that EA was particularly tough to align to business due to the time frame associated with the benefits realisation thereof. The respondent's feedback were summarised as; EA results usually take longer to become visible which creates a considerable risk factor for EA, especially with regards to the alignment of business requirements or strategy. Broer and Roeleven (2008, p. 13) research further noted some of the causes as: "not enough support from management, limited commitment from interested parties, not enough EA awareness inside the organisation, financial and political issues that thwart EA projects and setting up an architecture takes longer than expected". Maglio and Spohrer (2008, p. 238) have a different view; they attribute the misalignment to the point that: "IT often tends to focus on creating technical capabilities and neglect other important aspects such as the business model and organisational change that will make the technology an effective solution to address the business challenges". Maglio and Spohrer (2008) make a valid point, because without technology utilisation, the implemented technology is deemed useless, as organisations can only obtain value add through employment of technology.

Reynolds et al. (2011) reaffirms the previous authors view by stating that: "EA leads to organisational benefits through its impact on four benefit enablers: organisational

alignment, information availability, resource portfolio optimisation, and resource complementarity" with all four benefit enablers relating to the alignment of EA to business requirements and objectives.

2.4.4 *Lack of involvement by stakeholders (Business, IT and senior management)*

A common thread that arises as both a cause to some of the challenges listed, as well as being identified as an issue on its own, is the lack of involvement by stakeholders. Throughout papers reviewed, these stakeholders are identified as business, IT and senior managers across departments. Schekkerman (2005) demonstrated that international organisations showed higher levels of maturity as the study detected a shift of responsibility for EA from IT to business, to board members in particular. Matthee et al. (2007) found that the same was not the case for organisations in South Africa. Chuang and van Loggerenberg (2010, p. 6) also identify business buy-in as a challenge, the reason thereto is stated as; "introducing EA into an organisation is often very time-consuming and it involves the participation of a large number of stakeholders, such as the management, system champions, data owners, policy owners, users, developers, and enterprise architects. As a result, this often creates complexities when there is a conflict of interest among the stakeholders. These are all reasons which contribute to issues with obtaining stakeholders' buy-in". Chuang and van Loggerenberg (2010, p. 9) findings show that lack of involvement is not only experienced by business, but includes IT and other departments across the organisation. The study further states that an additional contributing factor is "when organisations or individuals have had previous unsuccessful experiences, the stakeholders tend to be quite reluctant to offer their support to the EA initiative".

Iyamu (2009, p. 224) echoes these sentiments by advising that business' buy-in is often not achieved due to EA not being understood. Iyamu states that the problem is a result of "IT's emphasis on technical architecture, increasing the lack of interest and understanding of EA by the business". EA is supposed to address this very gap, but due to it not being supported or sponsored by business, it continues to fail to achieve its objectives.

After reviewing the most predominant challenges that hampers successful implementations of EA, proposition six attempts to suggest that the challenges are largely non-technical in nature. It further elaborates on the lack of IT skills and maturity contributing to the failure of EA:

Proposition 6: Challenges experienced in EA

Challenges experienced in EA are mostly non-technical in nature. The shortage of IT skills and experience contributes to the failure of EA. A lack of IT maturity is experienced within organisations and further contributes to the failure of EA.

2.5 Conclusion of Literature Review

This literature review has analysed several academics and subject matter experts' views on the objective of the study; with a view to identify pragmatic approaches for EA in financial services institutions in SA and simultaneously analysed challenges experienced within EA that contribute to its ill delivery and implementation..

The review unveils a high level of agreement between authors on the sentiment that EA has not delivered on its promise to align information technology to business objectives. Authors also illustrate consensus on the key challenges that contribute to why EA has not delivered on its mandate, these challenges include; skills shortages, lack of organisation maturity levels, misalignment between EA and business and, lack of involvement from stakeholders.

The rest of the paper looks to support the following propositions to further support the views of authors noted in the literature review.

2.5.1 *Proposition 1: Traditional Enterprise Architecture approaches*

The practise, Enterprise Architecture, is largely used within organisations, but organisations find that implementing EA through traditional methodologies does not aid IT to contribute the expectant business value.

2.5.2 *Proposition 2: Pursuit of Enterprise Architecture*

The primary influence prompting the pursuit of EA is the advantage of business IT alignment; ensuring that IT delivers on business strategy and objectives. The pursuit is further motivated by the general perception that EA contributes to IT delivering value.

2.5.3 *Proposition 3: Misalignment between organisation and individual's view of EA*

Organisations' plans to rectify EA implementations differ to the views of practitioners who function within the organisation. There is a misalignment between the measures organisations seek to implement to ensure EA contributes to business objectives and the ideas of EA practitioners.

2.5.4 *Proposition 4: Pragmatic Approaches deliver business value*

Traditional EA approaches are no longer valued. Pragmatic approaches are therefore more frequently used. Pragmatic approaches are more successful in aiding IT deliver business value through EA.

2.5.5 *Proposition 5: Application of pragmatic approaches*

Extending Lean and Agile methodologies as a means of a pragmatic EA approach, contributes to the success of EA deployments in an organisation. Integrating enterprise and solutions architecture aid the EA function more effectively. Furthermore, integrating EA with best practises adds to the success of EA and closer aligns IT to business.

2.5.6 *Proposition 6: Challenges experienced in EA*

Challenges experienced in EA are mostly non-technical in nature. The shortage of IT skills and experience contributes to the failure of EA. A lack of IT maturity is experienced within organisations and further contributes to the failure of EA.

CHAPTER 3. RESEARCH METHODOLOGY

This paper is undertaken as a qualitative study to assess the propositions identified as part of the literature review. A qualitative approach was selected to conduct the study, as the sample size is not large which allowed for manageable descriptive analyses by the means of cognitive mapping. The study is based on organisations that operate within the financial services sector in South Africa.

3.1 Research methodology / paradigm

The qualitative analysis is conducted in the form of unstructured interviews by means of cognitive mapping and the findings thereof translated to composite maps for further analysis. A qualitative technique is selected due to the flexible nature of the method. “It can address quite focused questions about aspects of organisational life, for instance, specific decision-processes such as selection decisions” which the research undertook to obtain answers specific to pragmatic approaches to EA (Cassell & Symon, 2004, p. 21). The authors further states that the qualitative research interview is ideally suited for examining topics in which different levels of meaning need to be explored. This is something that is very difficult to do with quantitative methods. Cassel and Symon conclude by saying that the research interview is a method which most research participants accept readily due to its familiarity and more importantly, most people like talking about their work, whether to share enthusiasm or discuss complaints, but rarely get the opportunity to do this with outsiders. Bogdan and Taylor (1984) add that qualitative methods in the form of open ended interviews or questions stimulate free thought and does not box respondents in by forcing specific answers or limit feedback. According to Gummesson (2006), a qualitative approach to research allows researchers to deal with complexity, context and persona and their multitude of factors, relationships and fuzzy phenomena, aspects which conventional statistical methods usually fail in. The literature reviewed made it evident that qualitative methods are most useful in addressing complex situations; particularly where it is unclear what variables or relationships between variables are likely to be important. This was ideal for the analysis as it allowed respondents interviewed to create their own relations, between challenges

experienced with EA and associate them to pragmatic approaches unique within their organisations used to address these challenges.

Kaplan and Maxwell (2005, p. 30) states that “Qualitative research methods are being used increasing in the evaluation studies, including evaluation of computer systems and information technology”. They further express that “Qualitative methods are excellent for features of information technology, the organisation, the user, and the information needs generally are treated as independent, objective, and discrete entities”, this fits in with the proposed study, although the main aspect analysed is pragmatic approaches to EA, there are many non-technological aspects which is included such as shortages of skills, organisational IT maturity and misalignment of business and IT, which allows the qualitative study to better address, than what a quantitative study would. Avison and Myers (1997, p. 1) state that “in Information Systems (IS), there has been a general shift in IS research away from technological to managerial and organisational issues, hence an increasing interest in the application of qualitative research methods”. This view is supported and contributes to why a qualitative assessment was selected.

In conclusion, of the many articles and text reviewed as part of the literature review for pragmatic approaches to EA and challenges experienced, more than 80 percent of these published works employed a qualitative study, further supporting the selected method of research.

3.2 Research Design

The research design selected is an exploratory study, in the form of unstructured interviews of individuals practising in the field of EA. The process that is utilised is cognitive mapping which revolved around the theme of pragmatic approaches to EA, the cognitive maps was used “to investigate and depict thinking” (Cassell & Symon, 2004, p. 73). These maps capture and articulate the mental models which describe thoughts, opinions and decision process of respondents. Unstructured interviews were selected since the method is supported by the literature reviewed. Cassell and Symon (2004, p. 75) argue “that an increase in quantification and standardisation in terms of the research instrument will not necessarily equate to a more exact replication of cognition and can

limit research to preconceived ideas of the researcher and hence introduce a different kind of bias whilst sacrificing the richness in the data". Some advantages of cognitive mapping include aiding the researcher to move between raw data and the development of themes and categories, the analysis process is similar to that used in social science and it aids in the preservation of detail and the thought process routings in the map. Having mentioned some advantages, the largest value add of cognitive mapping is its ability to "represent issues and statements that are interlinked, interrelated, independent and even tangled" (Cassell & Symon, 2004, p. 79). This attribute allows for the deduction of similarities, differences and trends obtained from various sources.

Cassell and Symon's are supported by Conrath and Montazemi (1986) who state that cognitive mapping is particularly suited for topics relating to information technology (IT) and systems (IS) as it "involves the recognition of cause and effect relationships by aiding in the identification of irrelevant data, it is used to evaluate factors that affect a given class of decisions and most importantly, enhances the overall understanding of a decision maker's environment particularly when it is ill-structured" (Conrath & Montazemi, 1986, p. 45). The final comment relating to ill-structured environments is particularly relevant to this study due to the problematic EA state which is prevalent in organisations, identified by the literature review. Furthermore, the studies Irani, Kahraman, Love, and Sharif (2002) and Tan and Hunter (2002) found that cognitive mapping, was the most valid approach to realise value in terms of IT/IS investments and reasoning with regards to the selection of appropriate information systems. This method can therefore be easily adapted to achieve the same result to determine value realisation of current EA approaches and in discovering alternate approaches within the EA realm in organisations.

3.3 Population and sample

3.3.1 *Population*

The population includes all organisations or individuals that operate in the financial services sector in South Africa. These organisations include those that operate within banking, insurance, consultancies, service companies etc. Interviews were conducted on

individuals who are employed in IT and skilled or knowledgeable in architecture or enterprise architecture within these organisations. Financial services institutions were selected to be researched due to the significance of these organisations on the Johannesburg Stock Exchange and the role they play in the South African economy.

3.3.2 *Sample and sampling method*

A hybrid technique was used to identify the sample; convenience and snowball sampling were both used as part of the process. Convenience selection was opted for due to access to resources and snowball selection ensued in referrals as a result of interviews with subject specialists. A total of 7 organisations with 2 individuals per organisation were interviewed. The initial objective was to interview one individual that served in the capacity of a practitioner and the other, C level or senior IT management within the organisation. This objective was not achieved due to the architecture and enterprise architecture structure within the organisations. A variety of combinations resulted whereby in some organisations only practitioners were interviewed, some only executives and others a combination as per the original objective. Even though, the envisioned plan was not executed, the final result returned an equal split. Table 1 articulates the split between the profiles of respondents.

Table 1: Profile of respondents

Description of respondent	Number to be sampled
EA Practitioner	7
C level / Senior Manager	7

Table 2 depicts the profile split per organisation interviewed;

Table 2: Profile split per Organisation

Organisation	Profile of respondents
Organisation A	Senior Manager, Senior Manager
Organisation B	Senior Manager, Practitioner
Organisation C	Senior Manager, Practitioner
Organisation D	Practitioner, Practitioner
Organisation E	Senior Manager, Practitioner
Organisation F	Senior Manager, Practitioner
Organisation G	Senior Manager, Practitioner

3.4 The research instrument

As discussed in the research design, the tool that was utilised is an unstructured, open ended interview, which is later transcribed as a cognitive map to allow the deduction of similarities, differences and trends. The interviews conducted were in depth; that continued for the approximate duration of one hour to an hour and a half. Cognitive maps allowed a pictorial representation of data which revolved around the central theme of pragmatic approaches to EA.

3.5 Procedure for data collection

The method prescribed by Cassell and Symon (2004) was adapted and used to collect and assemble the cognitive maps. It is described as;

1. Following each stage of questioning following the trail of thought of the respondent, responses are written on post-it notes and then passed to the participant for accuracy.
2. The participant is then asked to arrange the post-it notes on the table to show how they were or were not causally related to the concepts already elicited. This occurs after each level of questioning.

3. As the participant explained the links, the interviewer sketches a map of the concepts showing the direction of the linkages.
4. The participant is finally shown the map and asked to check that it accurately represented their views after each set of concepts had been added.

In the event of telephonic interviews, whilst the questioning took place, the interviewee's concepts and thoughts were documented as part of a high level map by the interviewer, these constituent elements and distinct concepts are drawn on a page. Once a theme was completed, the interviewer explained what was drawn and requested that the interviewee confirm the map constructed. The interviewee is then requested to explain aspects noted on the map; the path of integration, creation and direction of the relationship vectors and the entities that it joins, the entities' and vectors' relationship to each other and the environment within which they are drawn. Themes within the cognitive maps are drawn and discussed one at a time, as opposed to the entire cognitive map being discussed and explained as a whole. This approach allows the interviewer to follow and better understand the interviewees' though process. The interviewee validates the described themes individually, before the interviewer commences to structure and draw the next theme.

3.6 Data analysis and interpretation

Interviews with respondents were documented and examined via cognitive mapping. The cognitive maps create pictorial presentations of the respondent's thoughts and opinions on the subject matter. The maps therefore explained the thoughts and thought processes of the respondents and their views on pragmatic approaches to enterprise architecture. The maps also illustrated themes and concepts that developed from the interview discussions; these formed the foundation for every cognitive map that represented an interview. Once a high level map was documented, a second layer of detail was added in the form of relationship vectors that attempted to explain the association between the listed concepts and themes to better explain the respondents thought process. The recorded interviews were further utilised to improve the accuracy of the already constructed cognitive maps. Once all the interviews were complete, the cognitive maps

were transposed to form a composite map to assist in the identification of themes, differences, similarities and trends.

The steps that were pursued to generate a composite map are listed below;

1. The maps were first individually analysed; this included the revision and refinement of the original rough diagrams drawn whilst conducting the interviews. Ideas were grouped into themes to assist with further examination.
2. The rough diagrams were transformed into cognitive maps using the software package, Microsoft Visio, which allowed for easier editing, modification and enhancement for both the text and graphical objects.
3. Because no themes were assumed or noted, step 2, was executed as an iterative step to allow for the improvement and fine-tuning of the maps.
4. Identified themes were then studied and revised to best represent the common ideas that originated from all the interviews. A concerted effort was made to maintain both the common themes and unique ideas and views that were extracted as part of the interview process, to ensure that the composite map is an accurate representation of the interviews.

3.7 Limitations of the study

Limitations are a result of delimitations and the impact it places on the study is recognised. The following are a result of the delimitations listed in the introductory chapter;

- Due to individuals being interviewed in Johannesburg only, the results of the study cannot and is not intended to be generalised to a broader population.

3.8 Validity and reliability

3.8.1 *External validity*

Research conducted as part of this study will not be able to be generalised to larger groups of individuals other than those actually forming part of the investigation. It can also not be generalised across different business sectors in SA, nor outside the South

African national context. Although, this is a small sample size, it is possible to assert that it is worth investigating, since not only could it provide some indication of the current status of EA in the South African financial sector, but could also offer greater insight on how viable such a study is in the broader South African context if the scope were to be extended in future research.

3.8.2 *Reliability*

Due to the qualitative, open-ended nature of this research paper, the study is not replicable.

CHAPTER 4. PRESENTATION OF RESULTS

4.1 Introduction

This chapter presents and describes the output of the interviews conducted with respondents that participated in the study. The interviews are presented in the form of cognitive maps.

Cognitive maps describe a person's thinking about a problem or subject, in this case, the focus is pragmatic approaches to EA and issues surrounding the theme. The maps are a network of nodes with arrows (connectors) as links; a particular type of directed graph, where the direction of the arrow implies causality (Harary, Norman, & Cartwright, 1965). In some instances, lines will not maintain an arrow head; this denotes a non-causal link and simply implies an extension or similarity of the connected node. Cognitive maps are not simple mind-maps, but rather a formal modelling technique with instructions for its development. These maps are a result of the personal construct theory which suggests an understanding of how humans make sense of their worlds (Kelly, 1955). Kelly's theory provides the instructions and guidelines for the mapping. In summary, the maps are used for representation purposes, illustrating the thought process of an individual in a visual form, denoted by short pieces of text or key words linked with connectors with or without arrow heads.

All maps presented, illustrates an in depth interview that continued for approximately one hour to one and a half hours. The maps strive to provide a truthful account of the interview without simplifying the respondent's views and perceptions of the focal subject. The maps also endeavour to show the respondents thought path from one element to the next, which somewhat aid the reading and understanding of the respondent's logic. A further step has been applied, whereby the nodes or thoughts within the maps are categorised into themes to further aid the reading and understanding of the maps.

4.2 Cognitive Maps

The 14 cognitive maps are depicted here. Organisations and respondents are not identified, but respondent's profile, organisation focus and service offering are listed to create a perspective of the environment in which the entities operate.

This section presents the maps with *Pragmatic EA* as the epicentre to ensure a common base and starting point for all interviews. Maps are merely presented and not discussed, Chapter 5 deals with the discussion of findings, by discovering similarities, differences and themes.

Figure 1: Cognitive Map for Interview 1; Organisation A

Respondent Profile: C level Manager
Focus: Insurance; long-term, short-term and medical cover

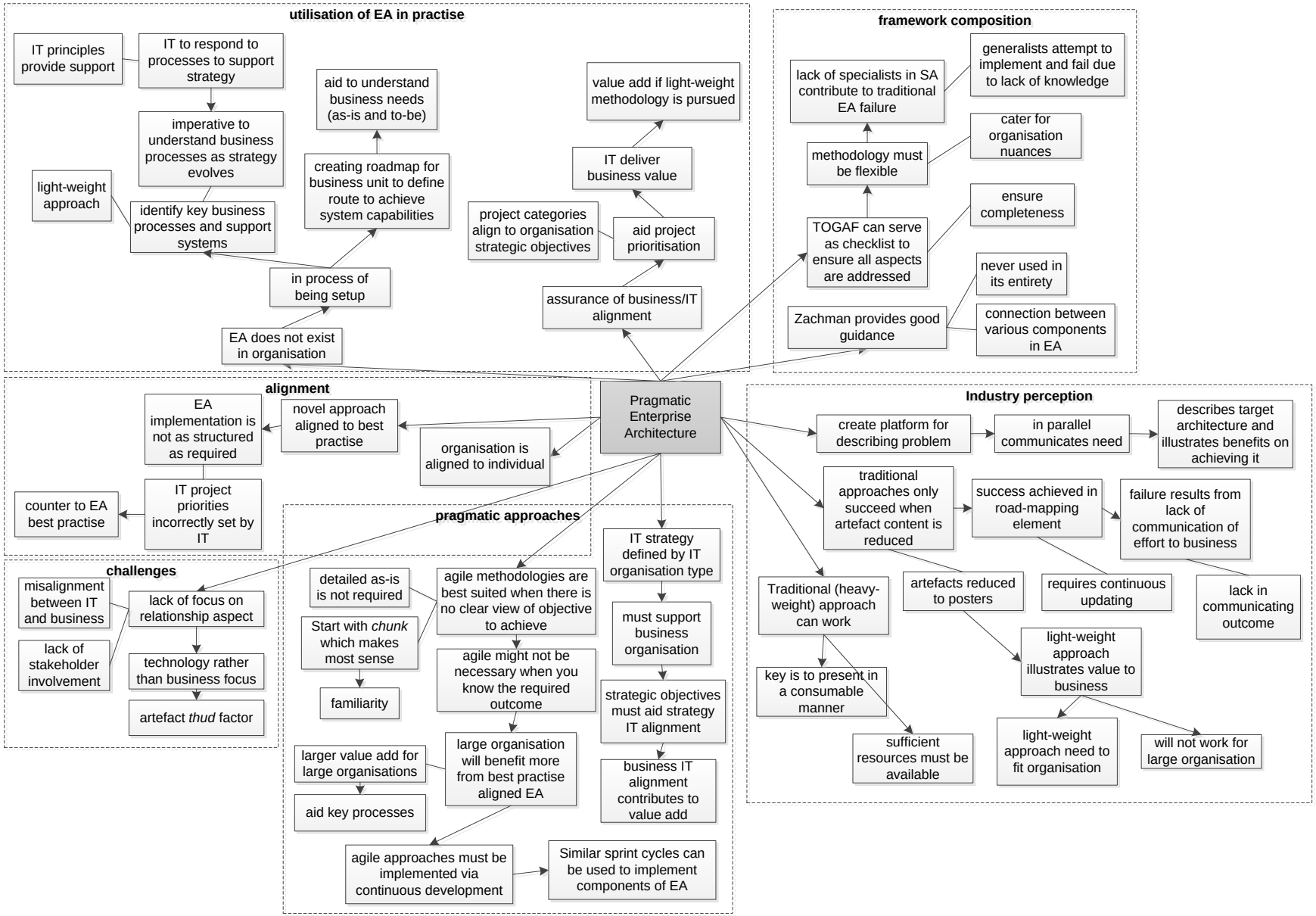


Figure 2: Cognitive Map for Interview 2; Organisation A

Respondent Profile: Executive Manager
Focus: Insurance; long-term, short-term and medical cover

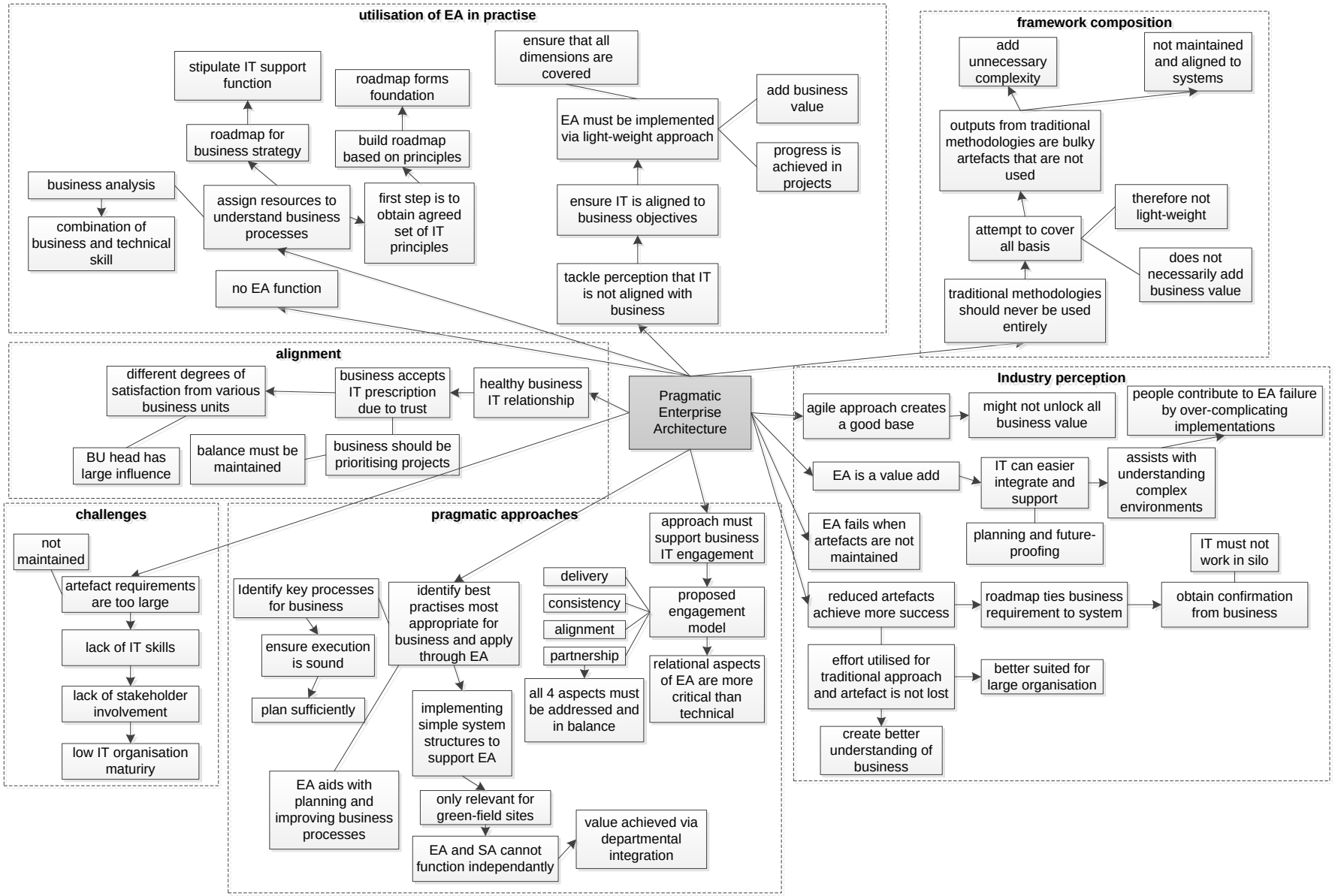


Figure 3: Cognitive Map for Interview 3; Organisation B

Respondent Profile: C level Manager
Focus: Insurance; Corporate and specialist

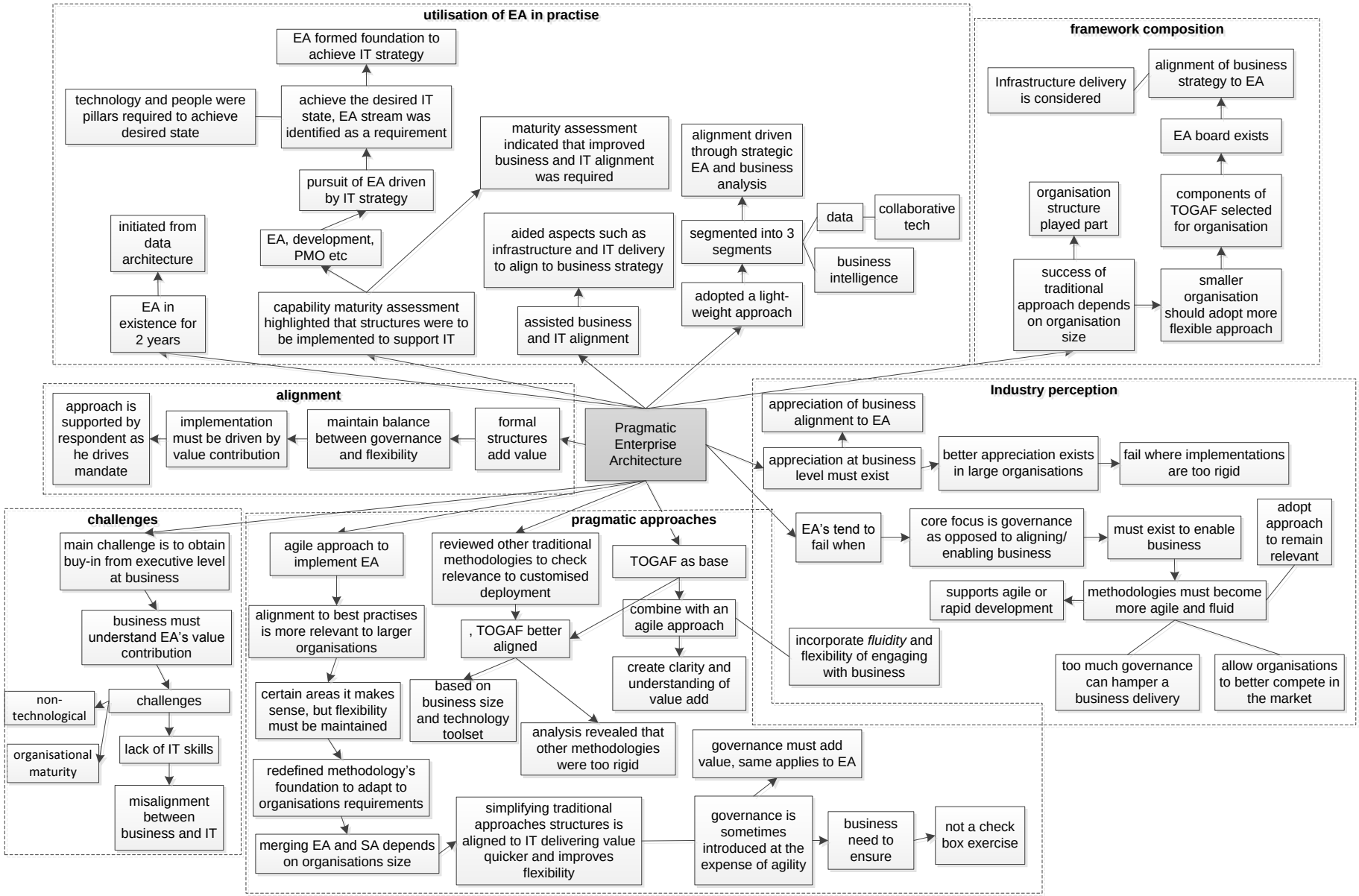


Figure 4: Cognitive Map for Interview 4; Organisation B

Respondent Profile: Practitioner
Focus: Insurance; Corporate and specialist

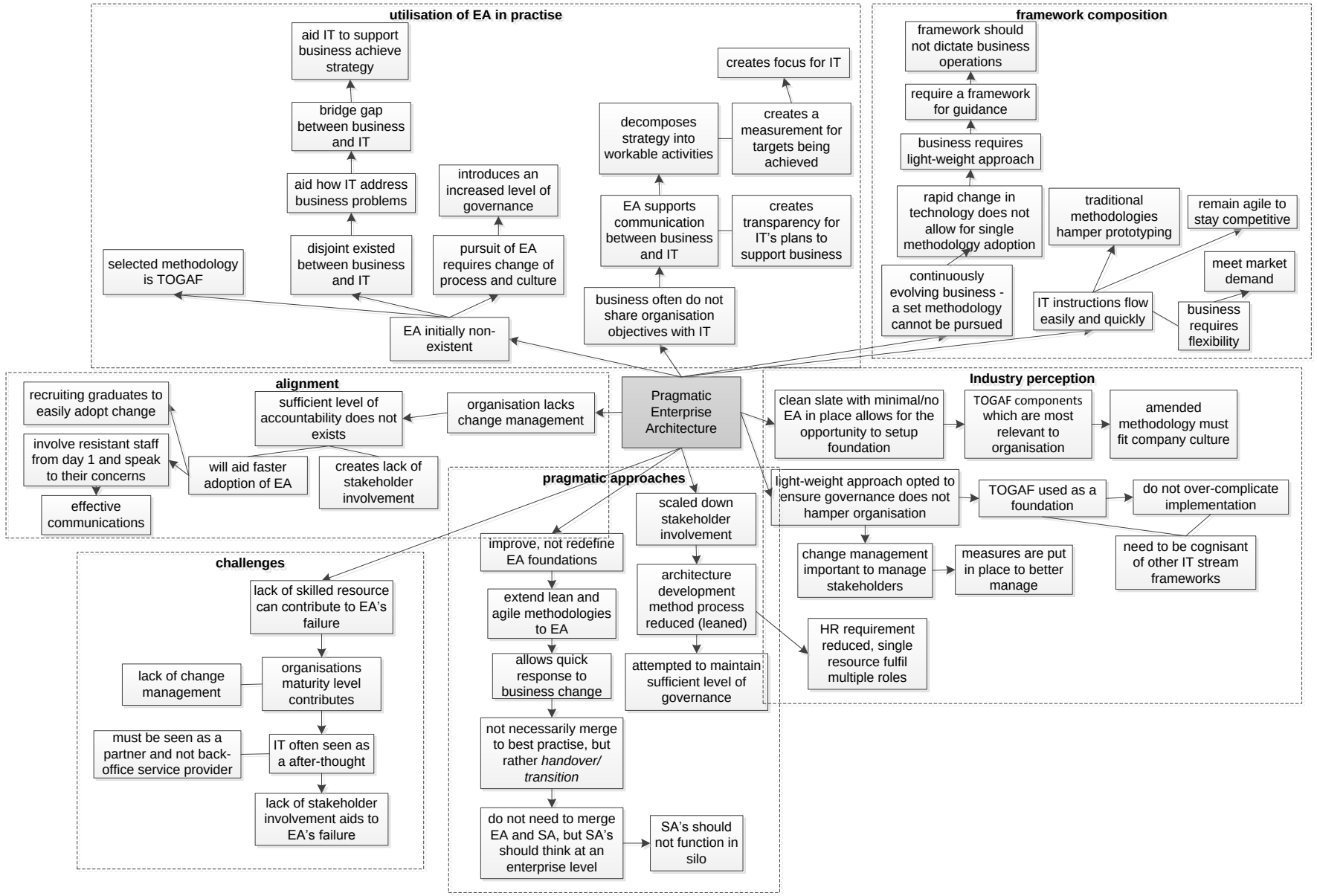


Figure 5: Cognitive Map for Interview 5; Organisation C

Respondent Profile: Senior Manager
Focus: Banking; specialist, corporate and asset management

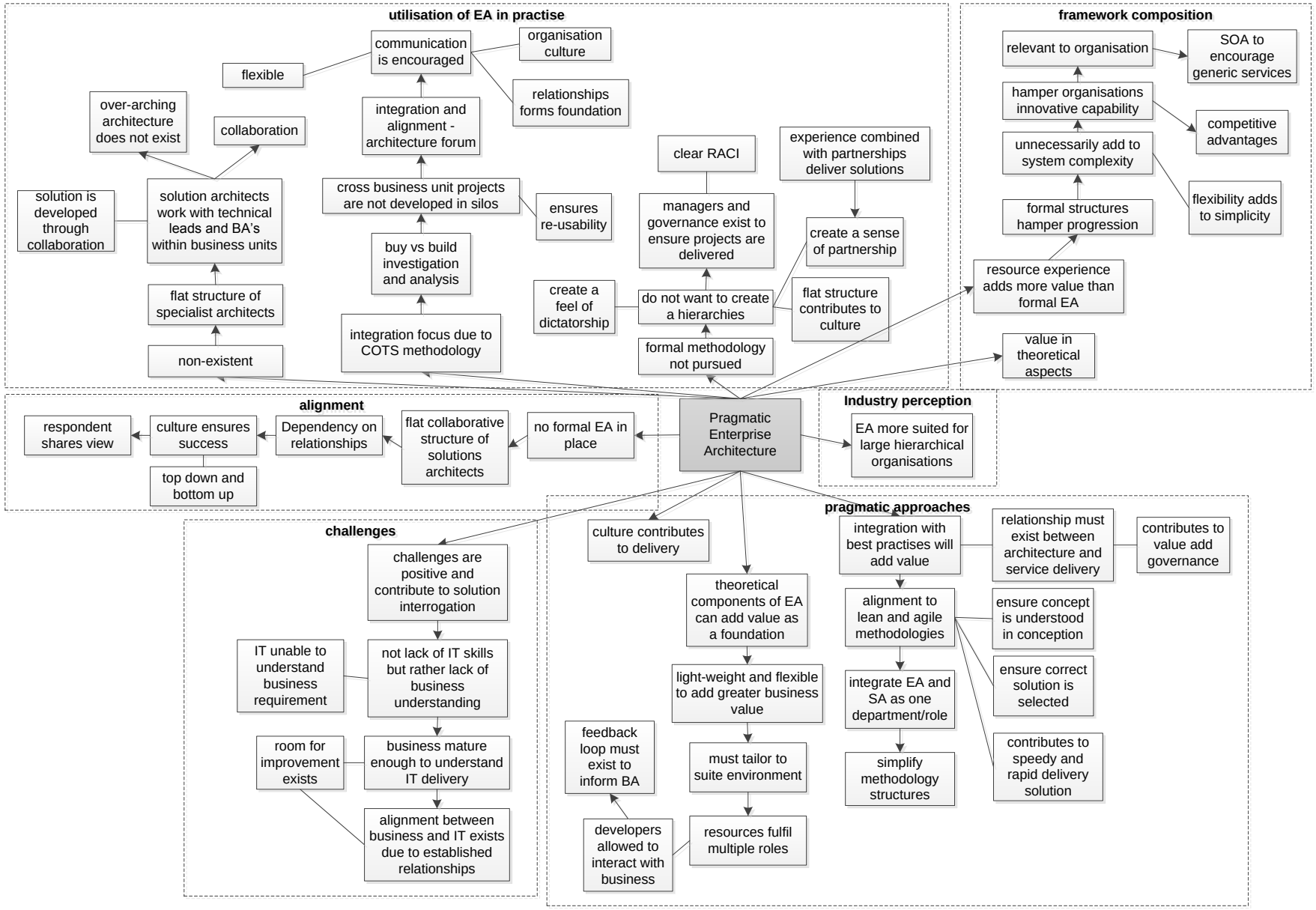


Figure 6: Cognitive Map for Interview 6; Organisation C

Respondent Profile: Practitioner
Focus: Banking; specialist, corporate and asset management

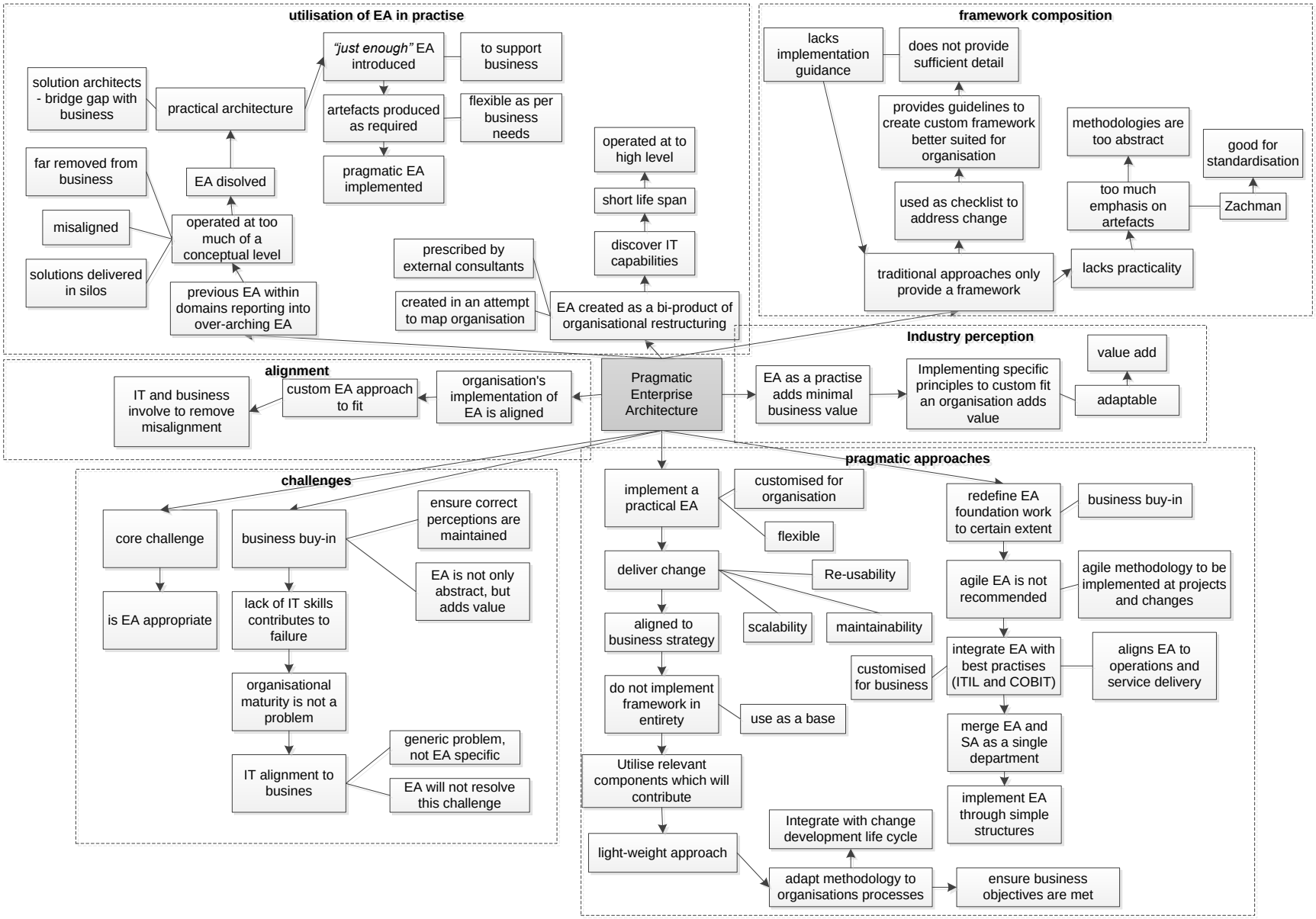


Figure 7: Cognitive Map for Interview 7; Organisation D

Respondent Profile: Practitioner
Focus: Banking; vehicle finance specialist

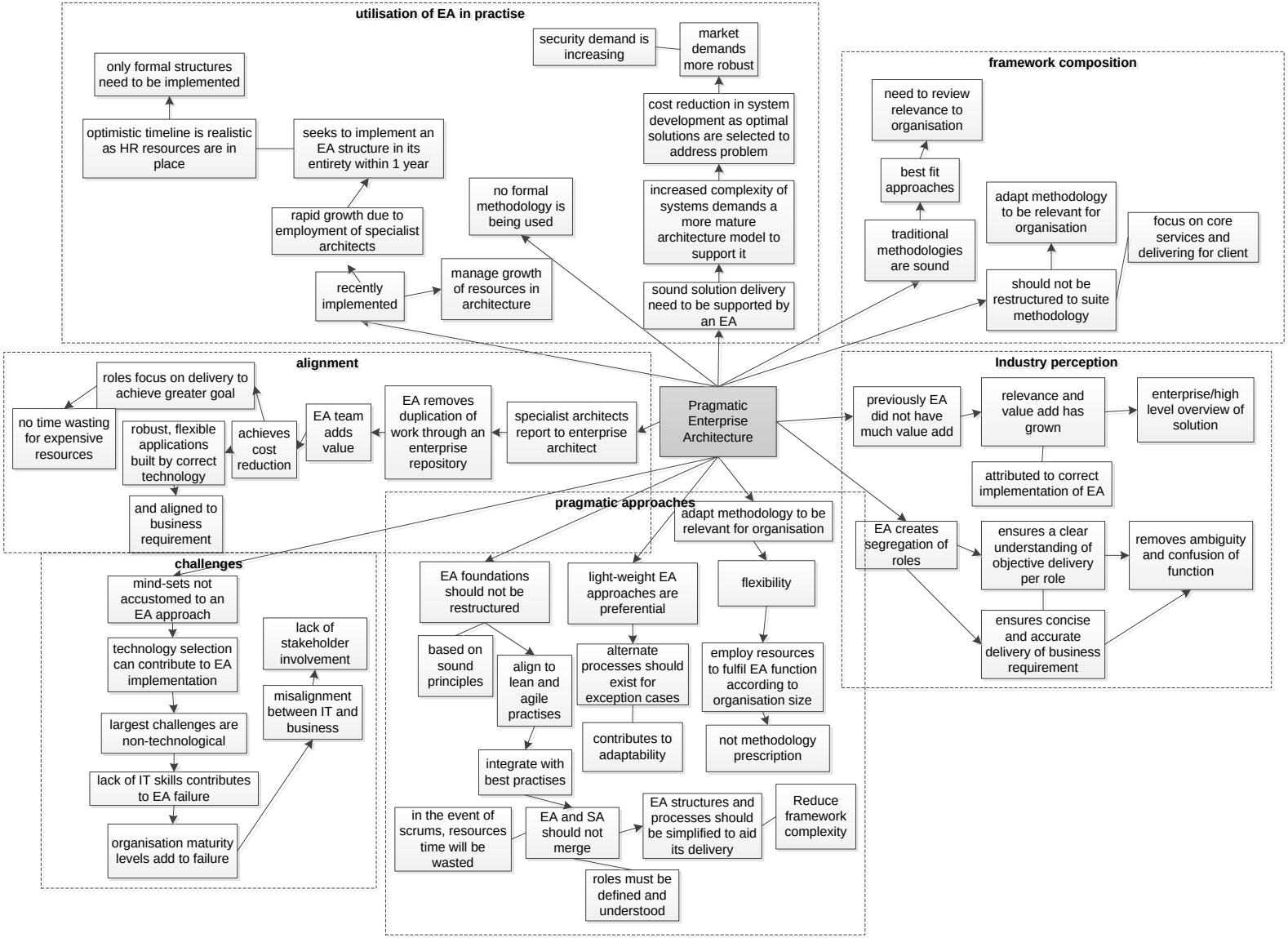


Figure 8: Cognitive Map for Interview 8; Organisation D

Respondent Profile: Practitioner
Focus: Banking; vehicle finance specialist

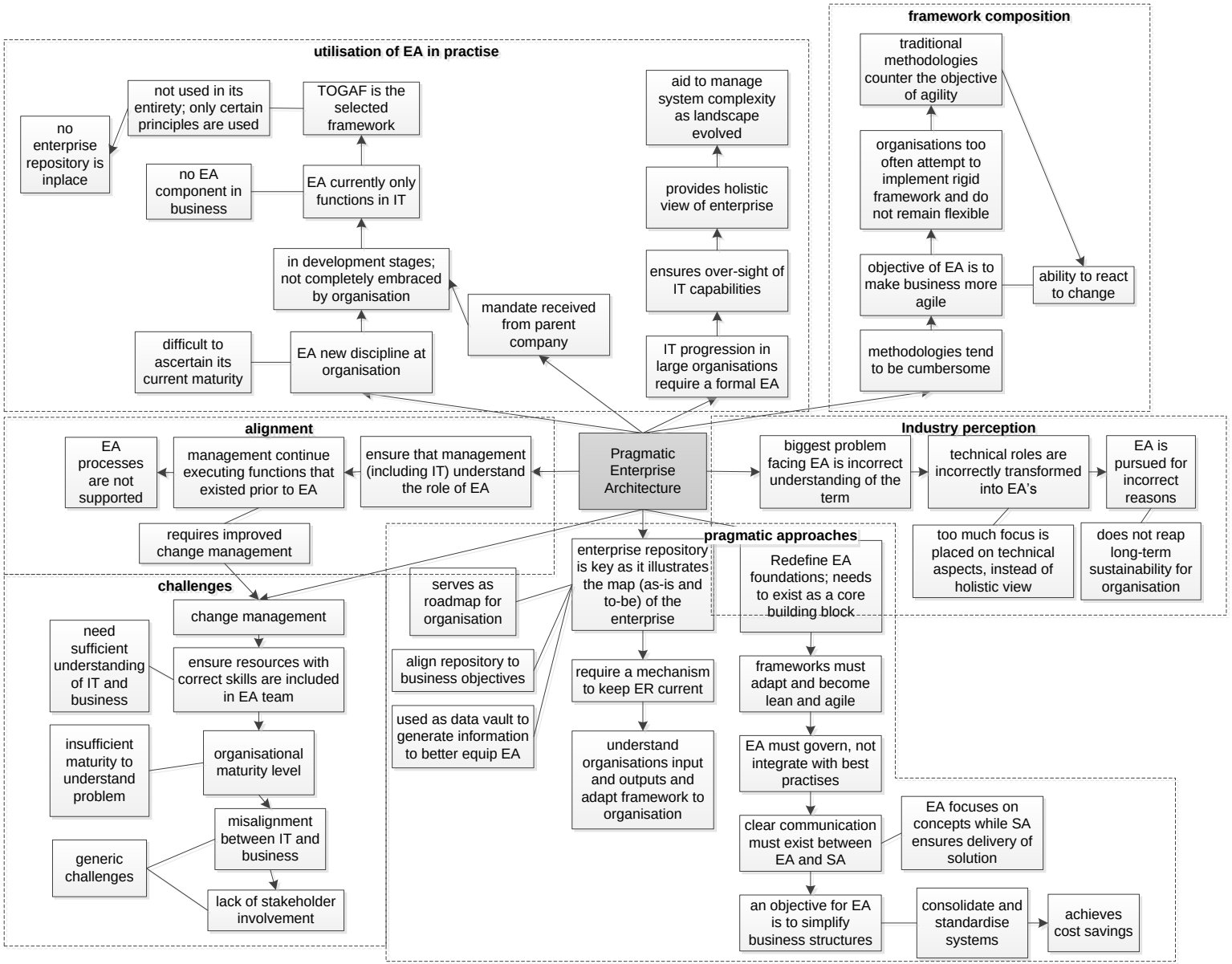


Figure 9: Cognitive Map for Interview 9; Organisation E

Respondent Profile: Executive Manager
Focus: Banking; personal, private, commercial and corporate

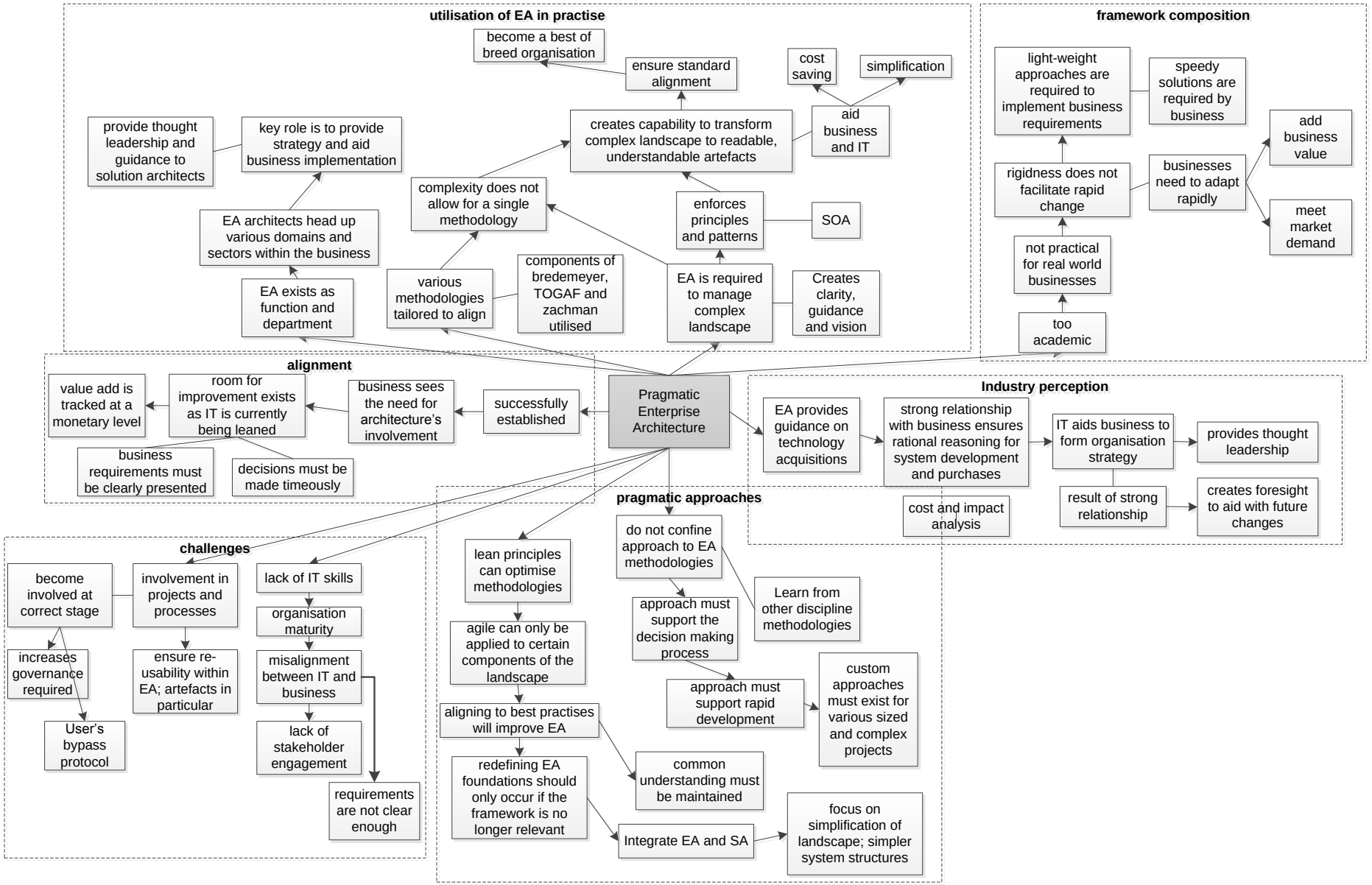


Figure 10: Cognitive Map for Interview 10; Organisation E

Respondent Profile: Practitioner
Focus: Banking; personal, private, commercial and corporate

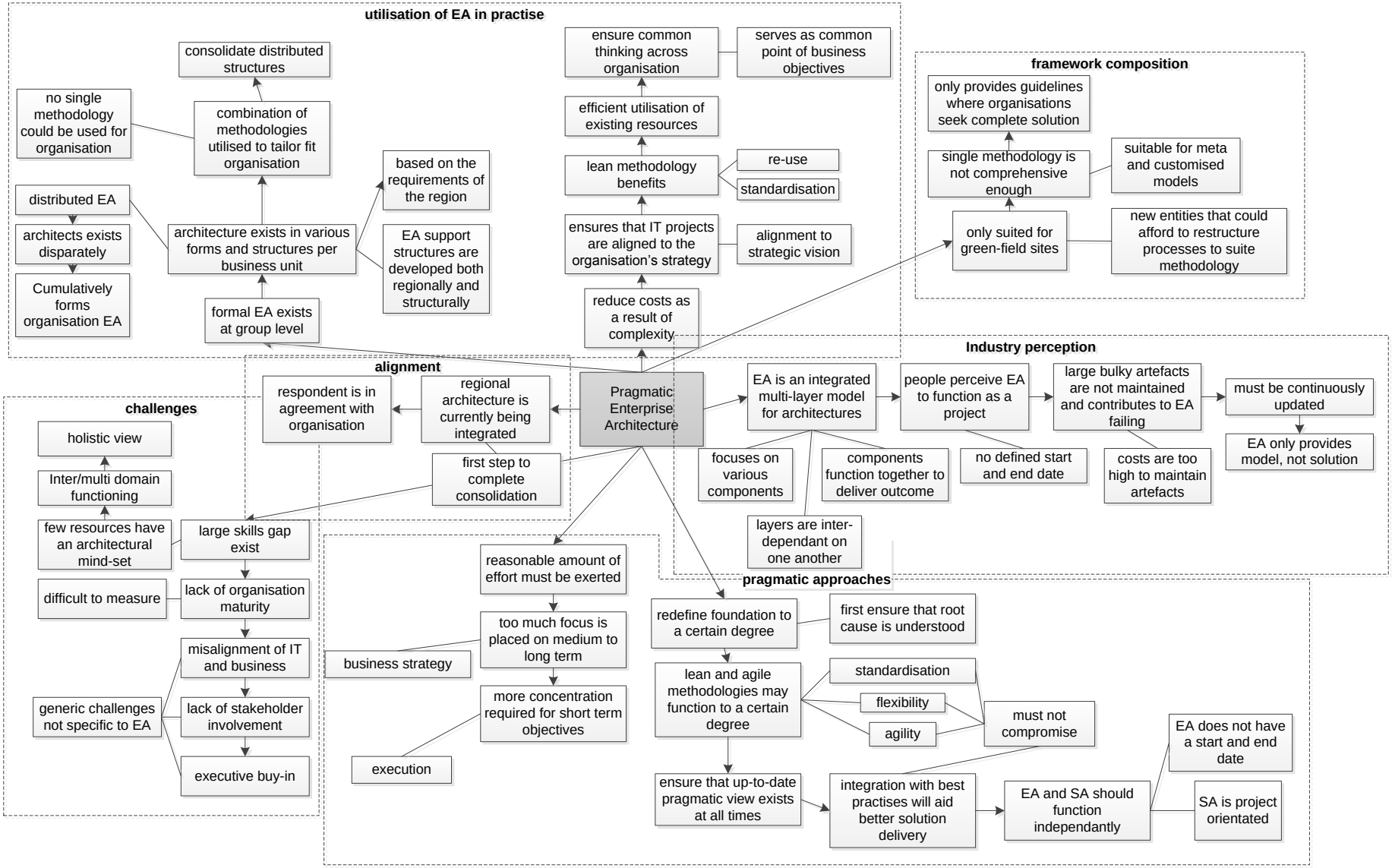


Figure 11: Cognitive Map for Interview 11; Organisation F

Respondent Profile: Executive Manager
Focus: Banking; personal, private, commercial and corporate

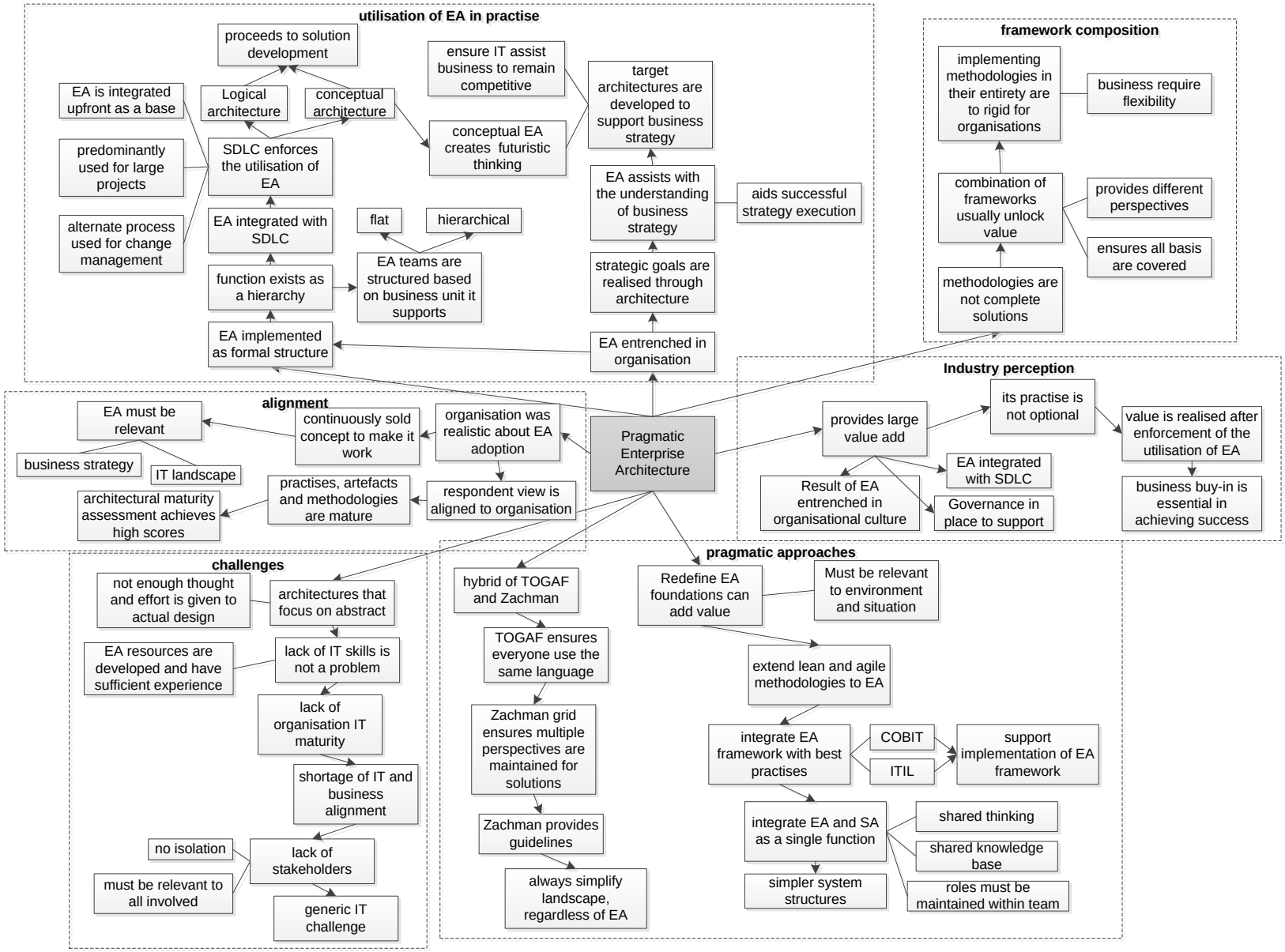


Figure 12: Cognitive Map for Interview 12; Organisation F

Respondent Profile: Practitioner
Focus: Banking; personal, private, commercial and corporate

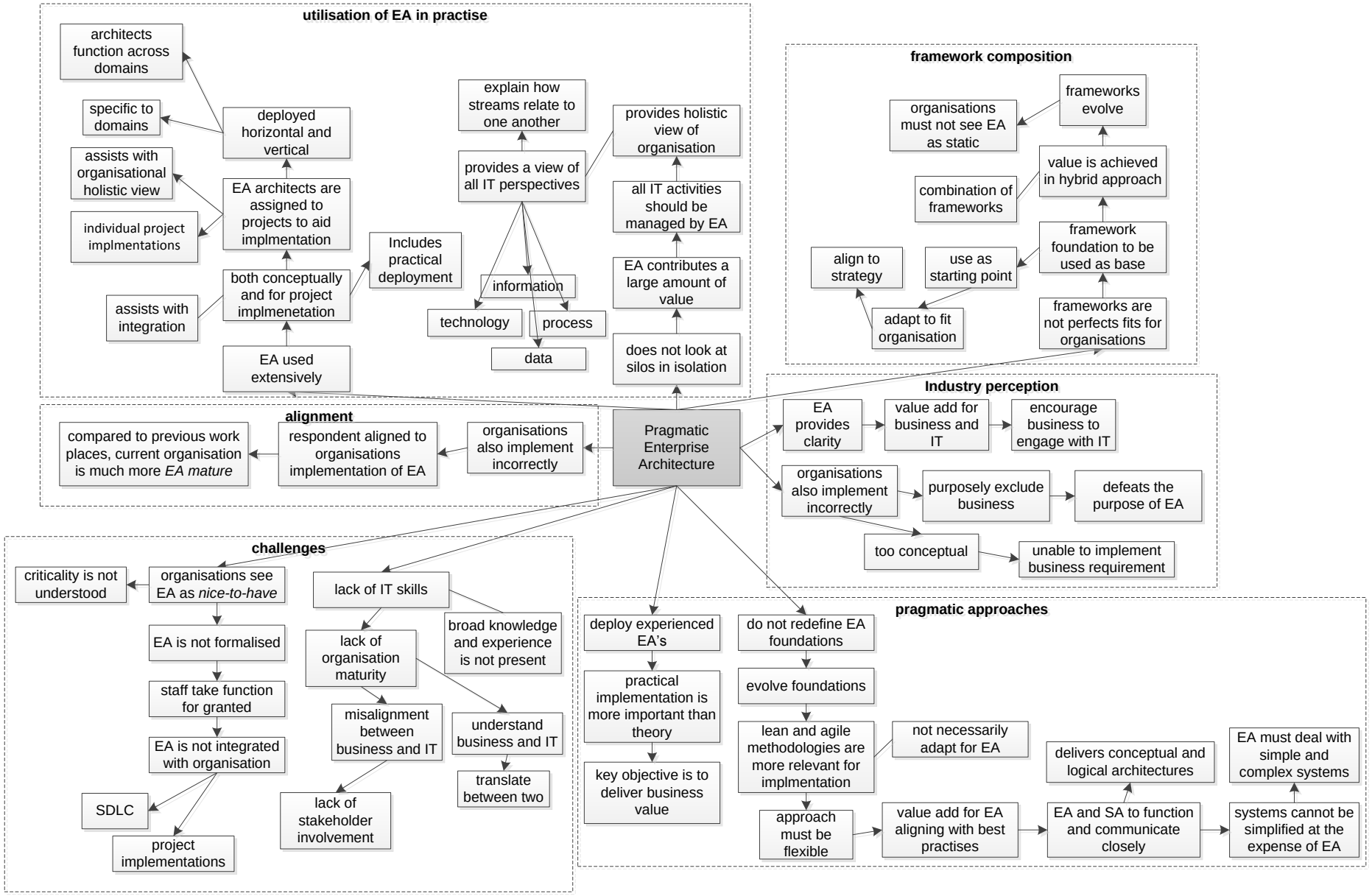


Figure 13: Cognitive Map for Interview 13; Organisation G

Respondent Profile: Executive Manager
Focus: Banking; corporate and specialised

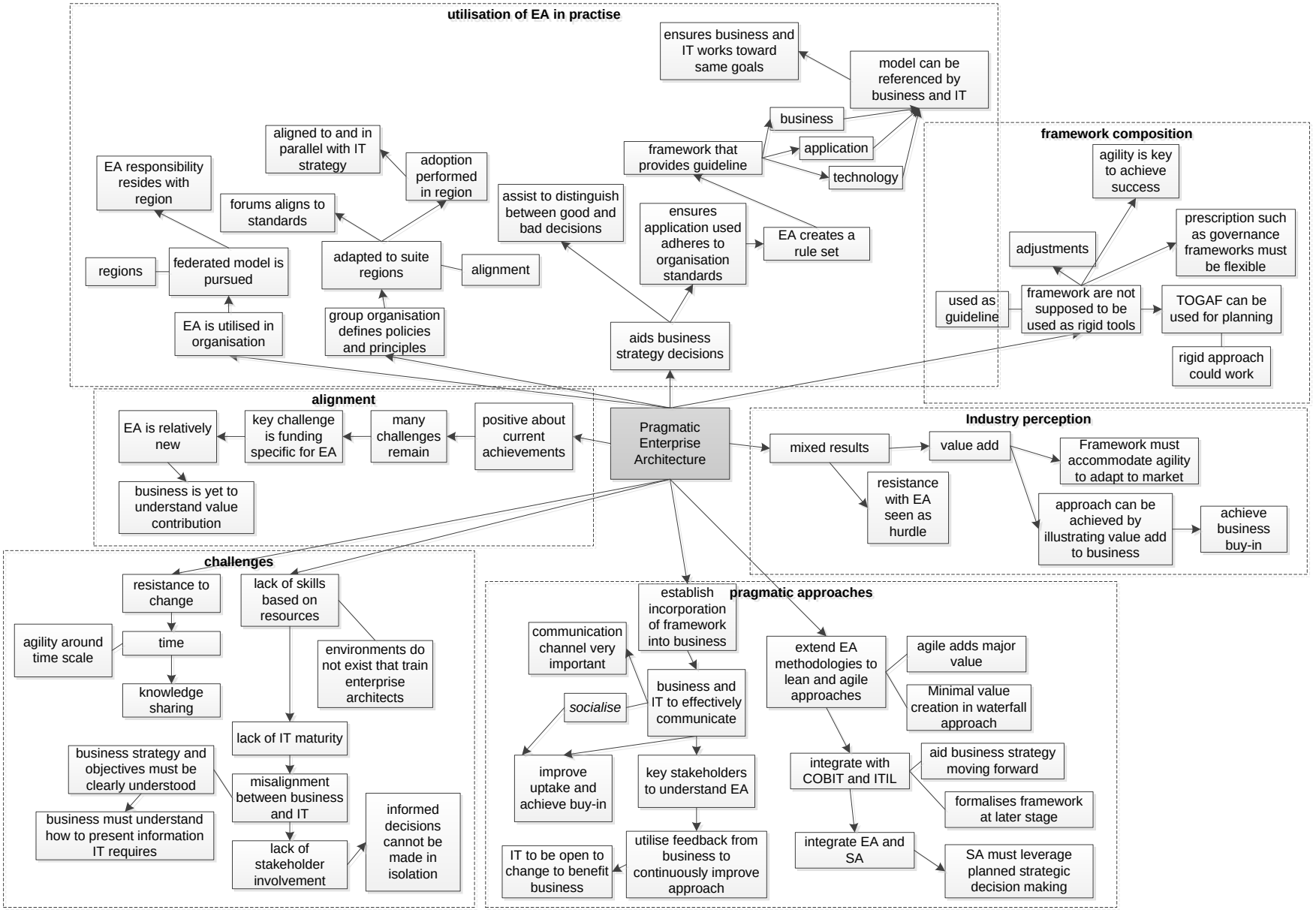
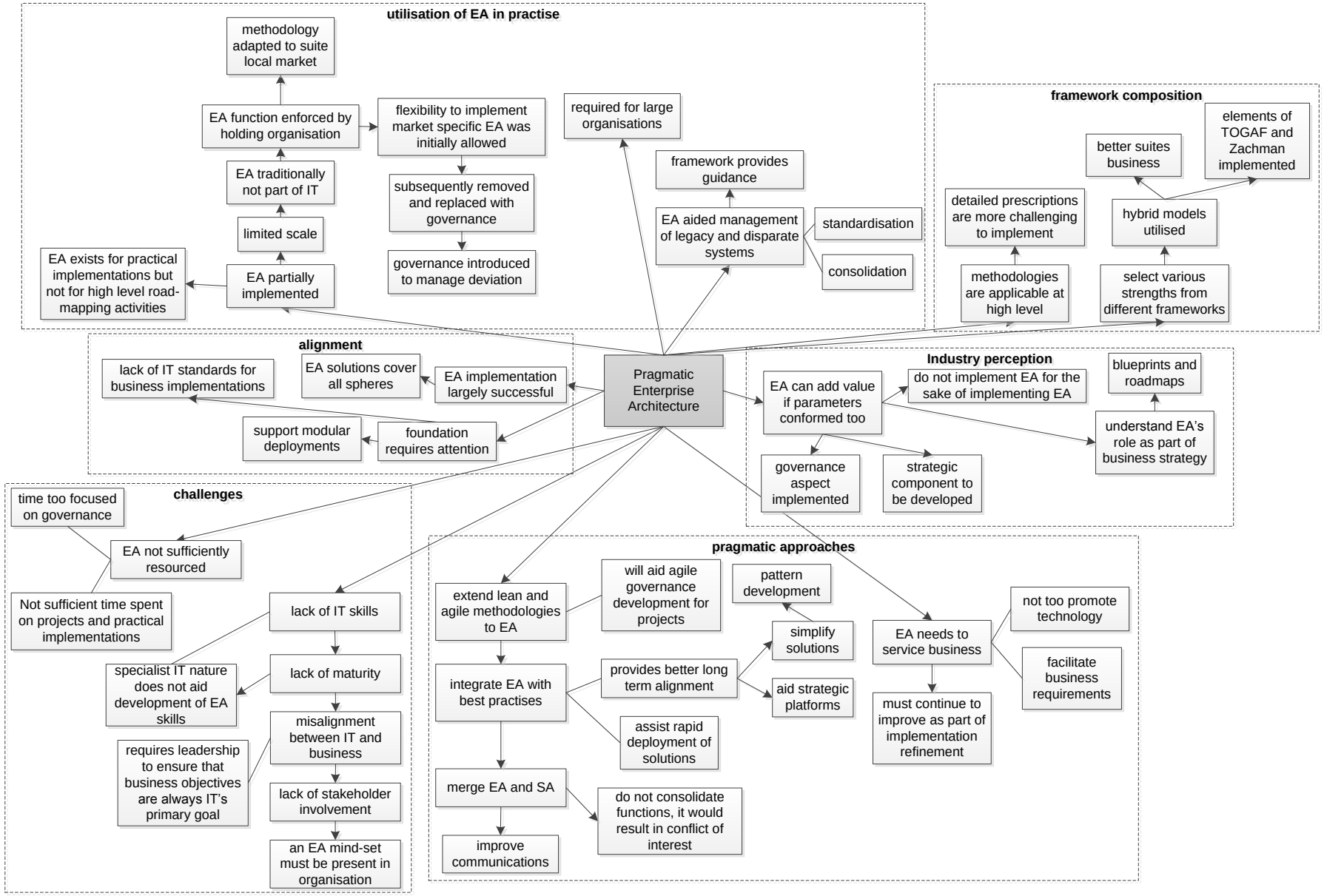


Figure 14: Cognitive Map for Interview 14; Organisation G

Respondent Profile: Practitioner
Focus: Banking; corporate and specialised



CHAPTER 5. DISCUSSION OF THE RESULTS

5.1 Introduction

Chapter 4 dealt with the representation of the interviews held with the selected respondents, this took place in the form of cognitive mapping which illustrated the thought patterns of their understanding of pragmatic approaches to EA. The use of maps assist to depict and explore the cognitive structures of interviewed individuals that operate at organisations of interest who face complex problems related to the topic of study (Eden, 2004). This chapter focuses on the interpretation of the discussions.

A composite map is a map in which several levels are combined to form a single illustration. All 14 maps are imposed on one another to form a composite map with each interview informing a level of the composite map. This exercise is performed to identify common themes throughout the data analysis. After the themes are identified and discussed, the chapter continues to explore their relation to the research propositions.

5.2 Demographic profile of respondents

Two profiles were targeted as part of the research; a senior or C-level manager who operates within IT that oversees architecture or enterprise architecture and a practitioner who functions within the subject matter sector. Chief information officers as well as executive managers that operate in Architecture formed part of the first profile while various architects including enterprise and solution architects were included in the second. Architects other than enterprise architects were interviewed in instances where organisations did not have formal EA structures or chose to implement the structure in a different manner with other architects implementing the activities of enterprise architects. All respondents have completed degrees both in IT and other fields, but all possess many (in excess of 5 years) years' experience within IT. A large portion of the sample has completed formal enterprise architecture certifications and those who did not, illustrated a solid understanding of EA and accompanying principles.

5.3 Composite Cognitive Map

This section depicts the composite cognitive map which stemmed after all cognitive maps were imposed and illustrates the clusters or themes that were recognised as part of the interview process. Cognitive maps can be characterised by a hierarchical structure usually presented in the form of a composite map (Eden, 2004). The high-level map is presented first illustrating the main themes; thereafter, individual lower-level maps are shown, each focusing on a single theme. The sub-elements of the most noteworthy theme, pragmatic approaches, are also illustrated on the high-level composite map due to their significance to the study. The lower-level maps delve into the detail and discussion associated with the represented theme. These are identified and discussed to assist with the review of the research propositions. A conscious decision was made to steer away from the traditional commonly used themes; people, process and technology. A unique approach was selected where appropriate themes according to the interviewer were selected. After all, there is no set approach to constructing themes; these are formed as per the view of the interviewer and the sense which he has gained whilst conducting the interviews.

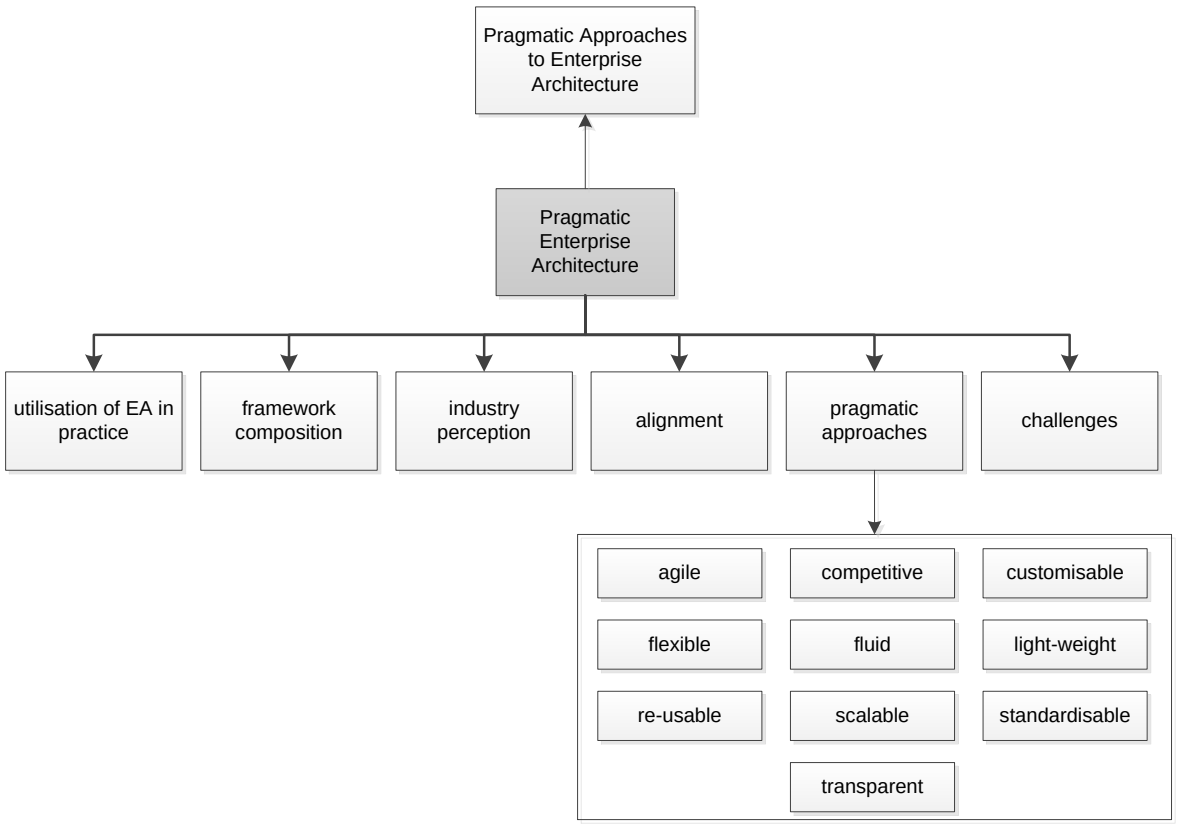


Figure 15: Key Elements of Composite Cognitive Map

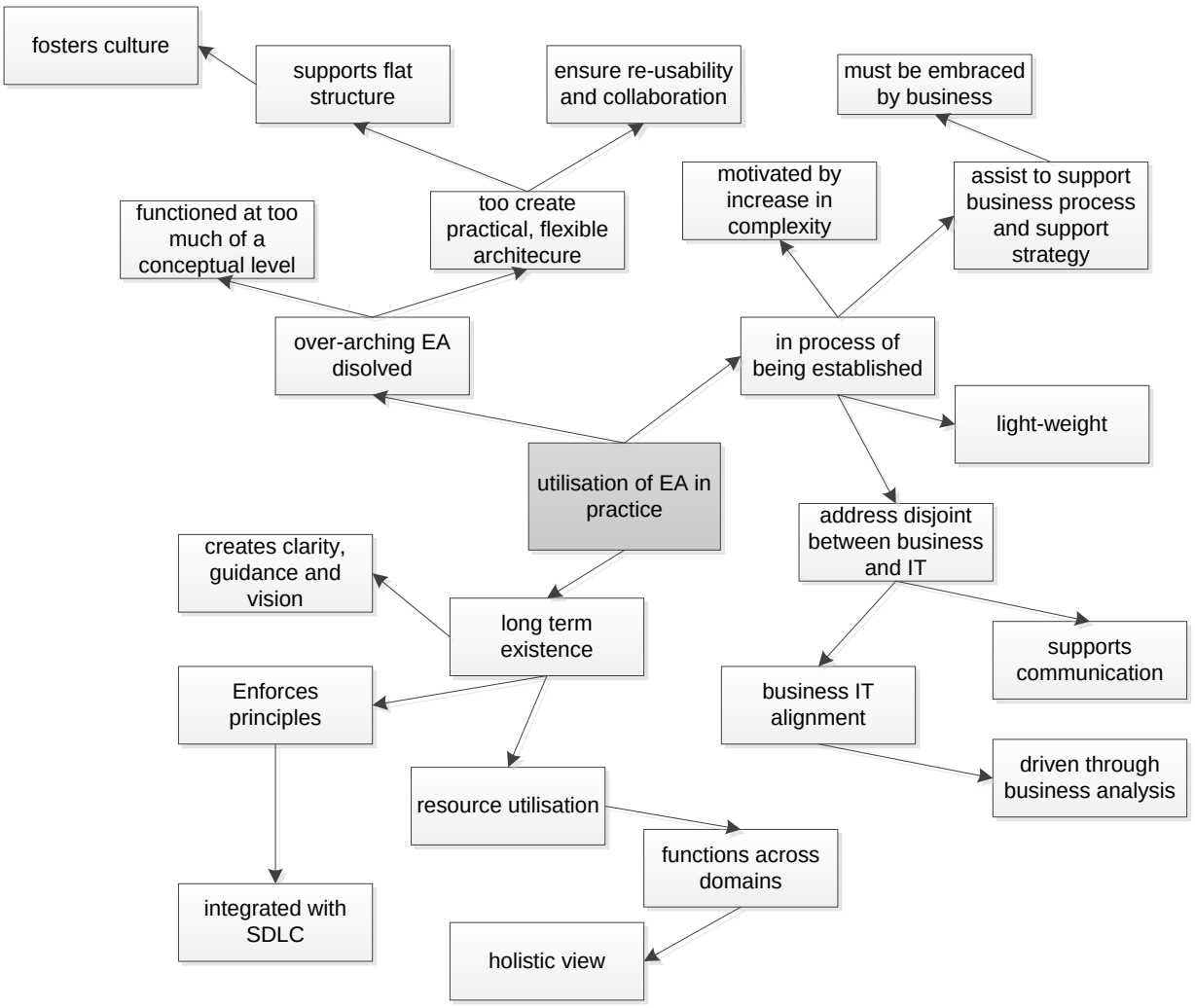


Figure 16: Element of Composite Map: Utilisation of EA in Practise

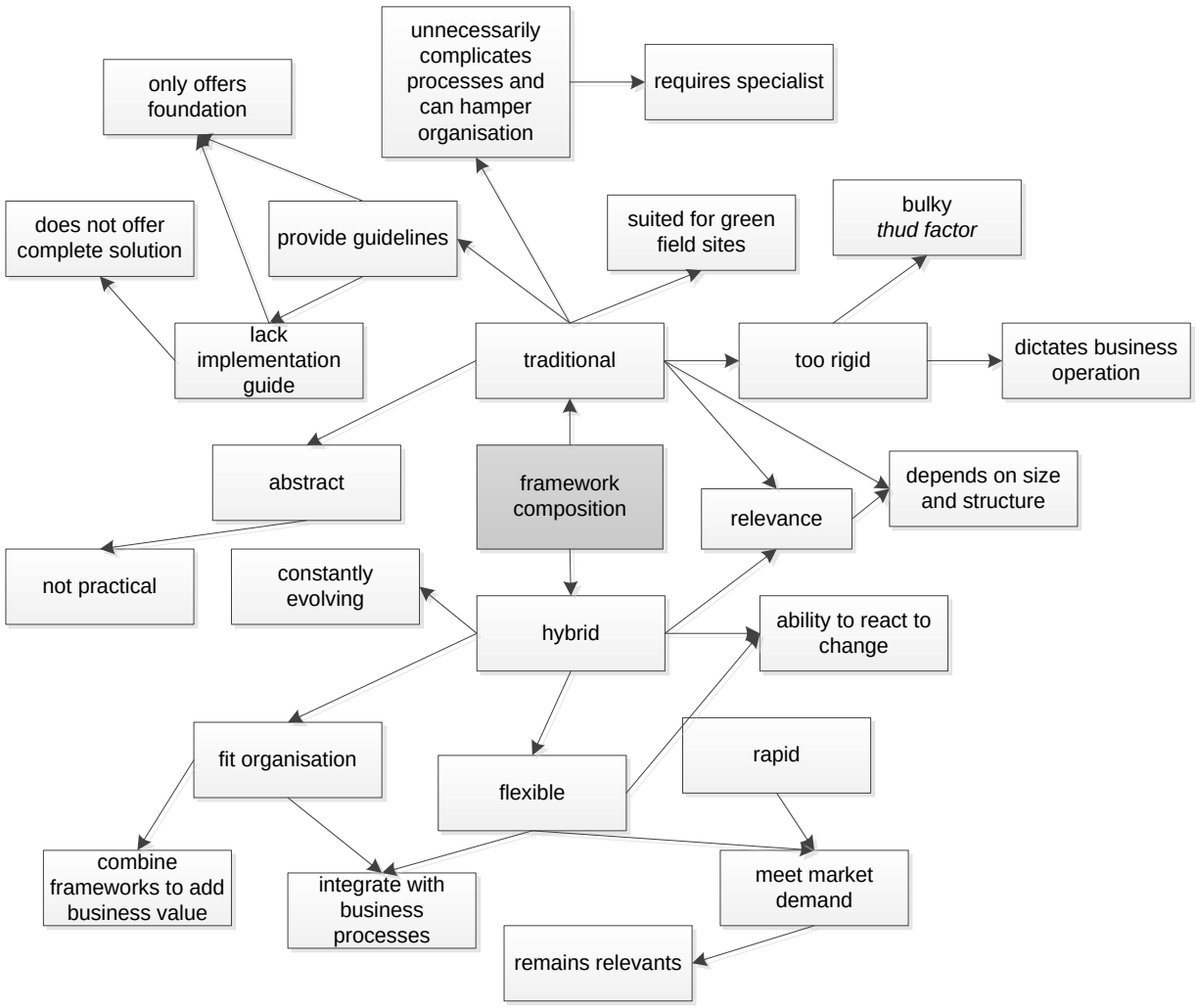


Figure 17: Element of Composite Map: Framework Composition

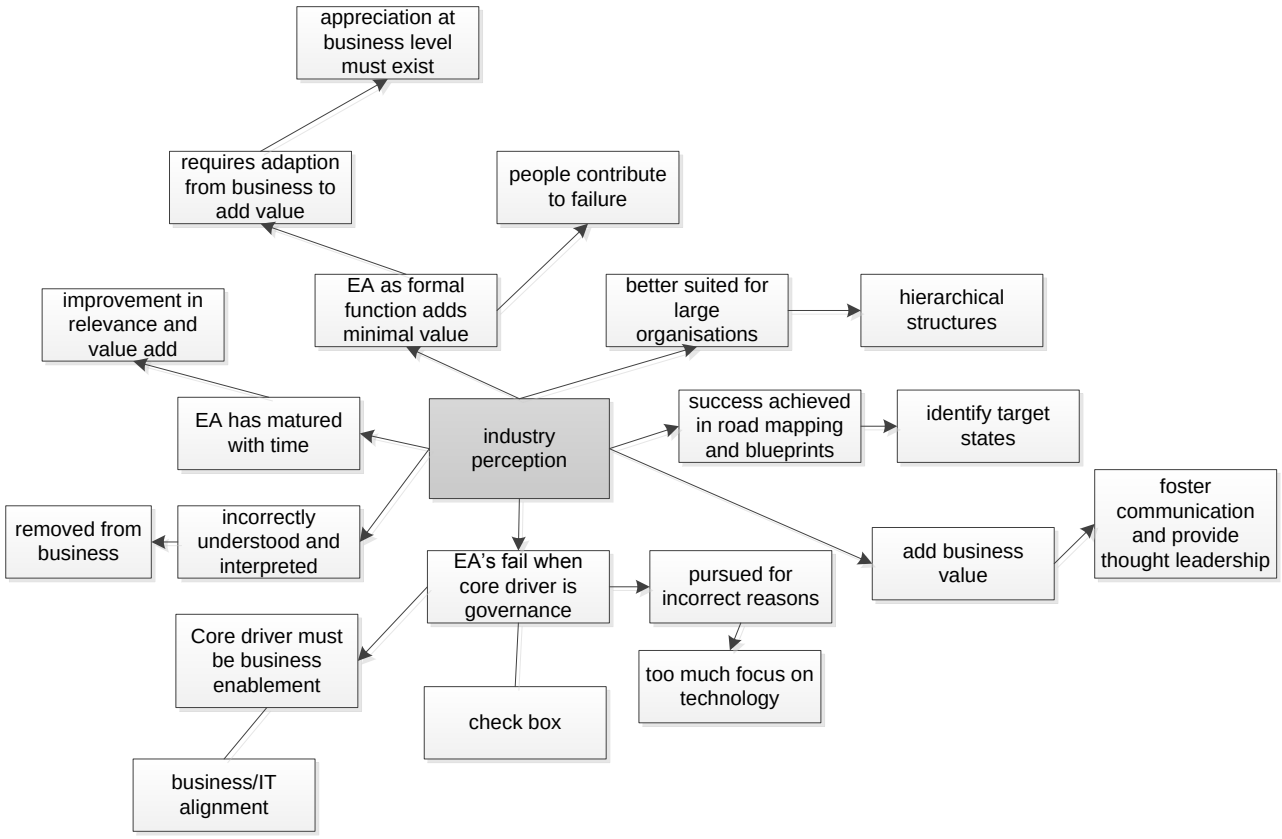


Figure 18: Element of Composite Map: Industry Perception

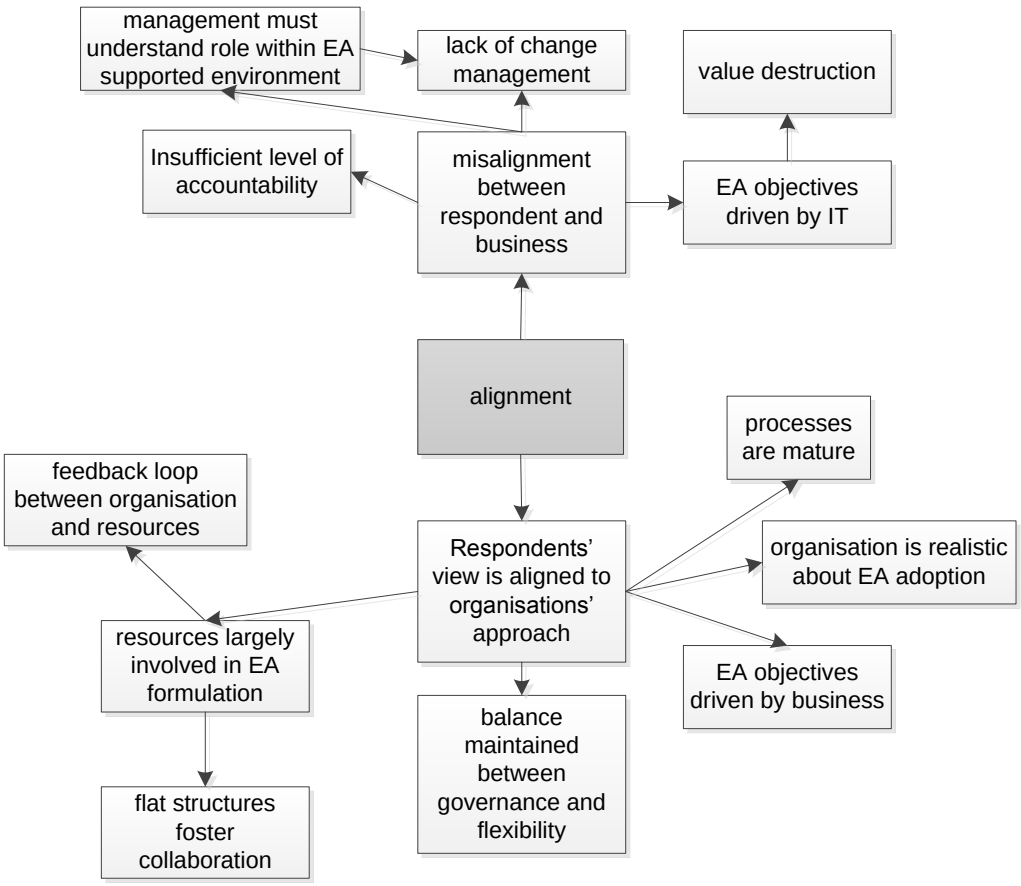


Figure 19: Element of Composite Map: Alignment

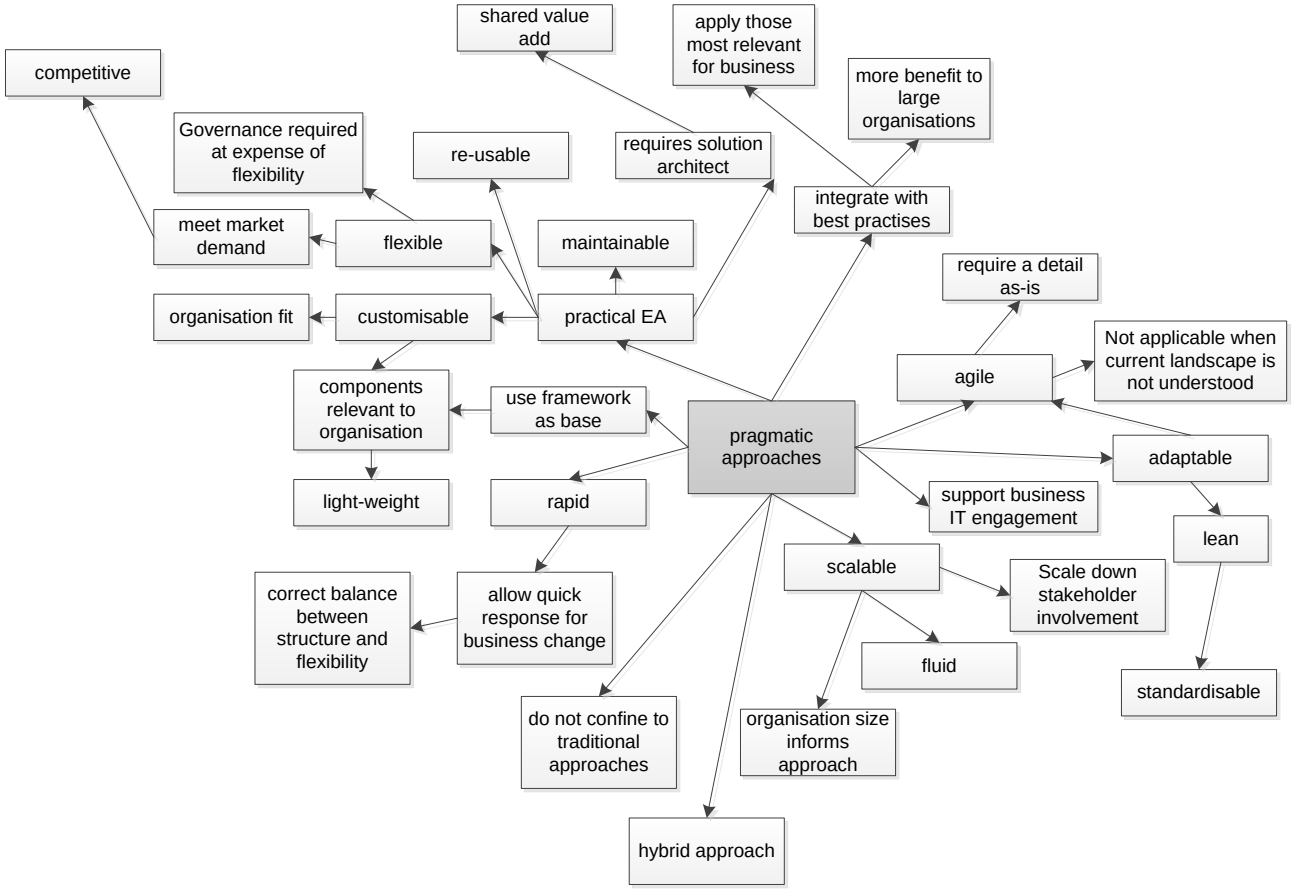


Figure 20: Element of Composite Map: Pragmatic Approaches

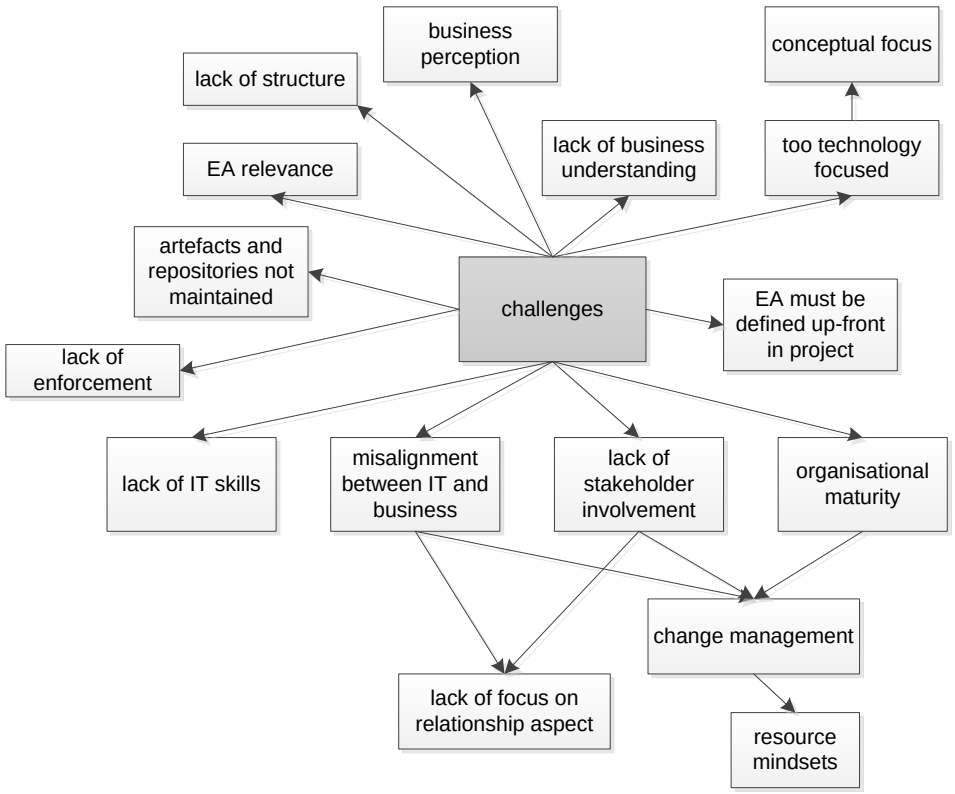


Figure 21: Element of Composite Map: Challenges

5.4 Discussion of Research Findings

5.4.1 *Structure of Discussion*

The themes articulated by the element composite maps will now be discussed. Discussion will be informed by respondents' perceptions as aired in the interviews and illustrated by cognitive maps 1 to 14. They will be reviewed in alignment with the said propositions and findings as per the literature review. Themes do completely correlate to the noted propositions, therefore, after they have been discussed, the evaluation will continue to assess the research propositions. Theme discussion will thus include their relation to the research propositions.

5.4.2 *Utilisation of EA in Practice*

This theme partially addresses the second research proposition; pursuit of enterprise architecture by organisations. It speaks to the base of whether EA is used at all by organisations. It was listed as the first theme, as all respondents started the interview by discussing the current state of affairs at their organisation. This theme could be categorised into three states; EA is not used, an EA is in the process of being initiated and EA has been in existence for an extensive term. The majority of respondents described their organisations' current state as EA being in the process of initiated. This was fascinating as many organisations were in the process of setting up departments, structures and recruiting resources to develop an EA function, this, despite the dismal picture painted in the introduction and reaffirmed by Broer, Roeleven and Gaver.

The main reasons to the three states were as follows; EA's were dissolved due to the department functioning at too much of a conceptual level. The department was unable to implement solutions practically within business. Additionally, respondents found that an EA was not well suited for an organisation with a flat structure, as they were. This response was in contrast to another respondents' view, who advised that EA's are well suited for both flat and hierarchical organisations. The respondent stated that EA functions were setup to custom fit the supporting business units. The business unit that the particular EA team supported could be either flat or hierarchical. The approach merely needs to be adapted to *fit* the organisation. In organisations where EA has been in

existence for a lengthy period, the sentiment was that EA provides a holistic view that functions across domains. The EA was supported by formal structures that were enforced by governance and operated at both a conceptual and practical level. This was achieved by EA being integrated into existing business and IT processes such as the systems development life cycle. It also provided a view of all IT perspectives; information, data, process, technology and business. This idea has been re-affirmed in the literature by Armour, Ekstedt and Simonsson. The majority of organisations were in the initiation phase, commencing on the journey to pursue EA. These decisions were motivated by the premise that EA aids IT to deliver on business strategy (Armour), ensure business IT alignment (Bolles) and overall assist IT to deliver business value (Schekkerman).

Respondents shared that the pursuit of EA is further motivated by the basis that it fostered collaboration, partnership and built relationships between business and IT, a view shared by Handler and Theuerkorn. Respondents voiced the opinion that organisations continue to pursue and utilise EA due to the practical reasons that EA ensures project prioritisation and assist organisations to deal with system and landscape complexity, and at a conceptual view; decomposes strategy into workable activities to ensure its execution, create IT focus, manage IT growth and become a best of breed organisation.

5.4.3 *Framework Composition*

The theme, framework composition, directly connects to proposition one – traditional enterprise architecture approaches; the fact that firstly, traditional approaches are largely used within organisations and secondly, traditional approaches do not add the expectant business value.

The first section of the proposition has not been supported by the literature review as findings on the subject were hard to come by. It has been based on the premise that due to the poor state of EA in industry, the reasoning thereto, is partly or largely attributed to organisations implementing traditional approaches. As stated in the literature review, the term traditional is used in the sense of abiding by EA frameworks in their entirety; without adapting the framework to align with the organisation’s requirements. Respondents suggested the exact opposite; custom fit frameworks were largely used within organisations. No methodologies were being used in their entirety; either selective

components of a framework were applied or a hybrid approach combining multiple frameworks was used to meet business' unique requirements to ensure a complete solution. These sentiments were advocated by Burton and MSDN in the literature review with MSDN noting the suggestion as a "blended methodology".

To address the second aspect; that traditional approaches no longer add business value, this understanding was supported by all respondents. Respondents indicated that traditional approaches merely provide guidance in the form of a framework and lack practicality. They are unable to deliver prototypes and change rapidly, therefore hampering business ability to react timeously to the market and meet its demand, as such, traditional EA approaches are too rigid. All these factors are reaffirmed by Reynolds who performed a study indicating that there is little evidence supporting claims that EA contributes to business value. One respondent went as far as stating that these approaches are only suited for green field sites due to the difficulty of integrating them with an existing enterprise. Having stated the above, many respondents also added that there is value in traditional approaches, in the theoretical aspects in particular. They are well researched and create sound foundations, where, had it not been for their inception, one would not be able to reconstruct its intended functions.. They also create checklists to ensure all aspects are addressed and perspectives considered, particularly the Zachman framework (Du Preez, Koch, Harris-Jones and Pelz-Sharpe) with its visualisation grid. One respondent opposed the final view by advising that due to traditional approaches attempting to cover all bases, this can unnecessarily complicate EA deployments. The majority of respondents differed with his view stating that they will preferably put in the effort and consider all perspectives as opposed to missing a view and introducing unnecessary risk to projects.

5.4.4 *Industry Perception*

This theme can be explained as, the views of practitioners of the success of EA at organisations. Perceptions seldom match reality and this is the principle that led to the creation of the theme. This theme is a litmus test of sorts to check if how respondents perceive EA is aligned to the realities which were noted as part of the introductory chapter−where EA illustrated very little value add in its adoption at organisations. This theme together with the *Utilisation of EA in practise* addresses proposition two – the

pursuit of EA. If industry perceives EA to contribute enormous value, then obviously, practitioners will pursue its implementation.

Respondent's views were very objective. Even though many viewed the glass half full, they were clear to list a number of conditions to fulfil to ensure that EA achieves success whilst identifying the key issues that contributes to EA's demise. The sentiments identified varied substantially. Respondents stated that EA must be pursued for the correct reasons and should not be technology focused. Business must be the main driver to guarantee business IT alignment as found in Schekkerman's study. EA's are sometimes pursued as a checkbox with governance being the key driver; this approach is bound to lead to failure as the end goal would not be clear enough to keep business interested.

A widely shared view; is that EA is better suited for large organisations who could achieve success by using it to create road maps or blueprints to aid the identification of target architecture states, an idea, partially supported by Chandiwana, Oni and Owei. Chandiwana, Oni and Owei do not tie this possibility to large organisations, but support that it can be achieved by any organisation. Respondents aired mixed views for the most suitable organisation structure, with some saying EA is better suited to hierarchical structures and others motivating better suitability for flat structures. Another topic of debate was, what the most appropriate method is to approach the EA implementations; formal versus informal. Pragmatic approaches would aid in this regard satisfying respondents with all views. The flexible, scalable nature of pragmatic approaches would allow the perusal of EA through both light-weight and more elaborate EA deployments. This topic will be further discussed in the *pragmatic approaches* theme. The one topic that respondents shared consensus on was that EA has matured with time and its improved relevance contributes value through fostering communication and providing thought leadership to organisations.

5.4.5 *Alignment*

Alignment in terms of the research paper relates to the alignment of individuals compared to organisations. Are the ideas of individuals aligned to the actions implemented by organisations to rectify failed EA implementations or maintain functioning EA's to continue

to deliver business value? This theme directly informs proposition 3 – misalignment between organisations' and individuals' view on EA.

After reading the introduction, one would think that the two parties are definitely misaligned, adding to the frail state of EA. Surprisingly, this was not the case; the majority of respondents explained that they were very satisfied with the actions that organisations had made as part of their pursuit or continual support of EA. Respondents were not only aligned with organisations' views, but also happy with the current state of affairs. They stated that EA processes were mature, organisations were realistic about EA adoption and EA objectives were largely driven by business. The core factor motivating this alignment was the sentiment that the respondents were largely involved with EA on all levels; strategy formulation, process definitions and practical implementations. The other contributing factor was that many organisations had setup up feedback loops with resources allowing them to continuously provide feedback on the state of EA at an organisation; these feedback loops are very affective as continual improvement has always improved the state of EA and this was transparent to the entire organisation. One respondent voiced discontent and stated that he was not aligned to the approach opted by the organisation. The organisation consciously opted for IT to drive EA objectives, a caution highlighted by Matthee which lead to value destruction. There was also a lack of accountability and change management which resulted in IT management not understanding the role of EA. This caused confusion within the RACI for EA by blurring roles and created duplication of work amongst resources.

5.4.6 *Pragmatic Approaches*

Pragmatic approaches are the principal theme of this report. It serves a dual purpose and connects directly to two propositions – pragmatic approaches deliver business value and the application of pragmatic approaches. This theme assesses if this approach truly supports EA to contribute value to business and measures the most practical means of implementing these approaches to achieve the value.

The review will first focus on the connection of the theme to proposition four – pragmatic approaches delivering business value. All respondents fundamentally agreed with this principal. The views of respondents are that pragmatic approaches ensures practical

implementation of EA and therefore delivers change and ensures that IT remains aligned to business objectives. A respondent advised that pragmatic approaches better deal with understanding complex systems, a view shared by Lam, and consequently delivers more value than the failed traditional approaches. Further views include; the nature of business is that its continuously evolving and pragmatic approaches, due to their flexible nature, allows business to meet market demands and continue to remain competitive and relevant. Another supports pragmatic approaches due to its ability to understand organisations input, processing and outputs, and thus allow IT to develop systems that are aligned to the businesses transformation model. Pragmatic approaches add business value as they assist with decision making that support rapid development of solutions and ensure that too much attention is not vested in the medium to long term application, but required focus granted to the now of actual execution.

To address the second proposition – application of pragmatic approaches, the study will define both conceptual and practical measures to implement these approaches and further illustrate how they are able to contribute value to an organisation. The focal elements or keywords identified as part of pragmatic approach theme are agile, competitive, customisable, flexible, fluid, light-weight, re-usable, scalable, standardisable and transparent. These aspects will all be used to explain how one can apply pragmatic approaches and explain if these approaches can aid business to derive value through EA. Flexible is one of the terms most frequently used in respondent's responses. One respondent related flexible to ensuring that an EA approach be customised to fit the organisation. He further stated that the EA methodology should never be used in its entirety and should be adapted to the organisations processes to ensure that business objectives are met. The same respondent stated that approaches should be reusable, maintainable and scalable. These characteristics will guarantee that an EA delivers change consistently, with minimal effort and can be changed on the fly to correctly match the problem it needs to address. Resources will not be wasted as a result of overkill and IT will not be in a situation where they are inadequately prepared to address a problem. The term light-weight was also often used in responses. Respondents noted that EA frameworks should remain light-weight to aid flexibility. Light-weight was also implied to reduce the artefact size and requirements around traditional approaches as the "thud factor" of artefacts deters business from becoming involved in EA. A view was expressed

that the term scalable, also in many instances refers to the down-scaling of traditional approaches by means of either reducing the amount of stakeholder involvement and reduction in process steps used in traditional frameworks. The particular respondent used TOGAF as an example and stated that the architecture development method used in TOGAF could be reduced or leaned to better add business value. This sentiment once again speaks to the light-weight approach discussed. I particularly found the use of the term fluid interesting and when further enquired, the respondent explained that fluid suggests a substance that can easily change its shape. A pragmatic EA should illustrate the same quality by “easily changing to adapt to the business requirement”. This view is supported by Burton who asserts that frameworks should never dictate the implementation, but that it should be tailored for organisations.

Moreover, to further elaborate on practical implementations, one respondent proposed a pragmatic approach as an engagement model that focused on delivery, consistency, alignment and partnership. All four aspects would need to be kept in balance. The model would firstly identify business processes to ensure sound execution, which would allow IT to plan sufficiently adhering to the four key pillars. Another explains that an enterprise repository is the heart of an EA; it assists the business by providing both an as-is and to-be state and then continues by serving as a roadmap for the organisation by aligning itself to business objectives and being used as a data vault to generate information to better equip EA.

Agievich, Becker, Gimranov, Taratukhin and Peyret’s suggestions were discussed in detail and the overall view of respondents is summarised below.

Integrating EA with best practises allows EA to be customised to fit the organisation and aligns EA to operations and service delivery, this will also strengthen the relationship between EA and service delivery which is appropriate as one of EA’s main objectives is to deliver a high quality service to business. An added advantage of best practise alignment is strengthened governance. Many respondents stated that large organisations will benefit more from integration with best practises and that best practises should not be entirely integrated with EA, but only introduced where it makes business sense. One respondents view was that EA should preferably govern best practise and not integrate with it. The idea of integrating EA with solutions architecture was largely supported, with the view that

value can be obtained from the merging of these architectures. The study revealed that this was a method used by many organisations that participated, where a single structure existed and both EA's and SA's operated within the structure. The sentiment was clear that EA and SA cannot function independently, and if departments are not integrated, clear communication should exist between them as a minimum. Alternate views were that these two functions do not necessarily need to merge, but solution architects need to think at an enterprise level. One respondent stated that the merging of these functions would destroy value as both the enterprise and solutions architect need to fulfil specific functions and the margining thereof will cause unnecessary confusion by blurring roles between the two. Mixed opinions were received on the extension of agile and lean methodologies to EA. Respondents stated that agile EA is not recommended, agile should only be implemented in the execution phase of EA; when projects and changes are implemented, the same applied for lean. Respondents raised caution that should EA be extended to lean and agile methodologies, organisations would need to ensure that the concept is understood at its inception and that it truly contributes speedy and rapid solution delivery within the organisation. A view was held that agile might not necessarily be the answer when the path to achieve the future strategy is clear, agile is more suited towards organisations operating in uncertainty. Half of the respondents agreed to extend agile and lean to EA, commenting that it would add value in the form of speedy, rapid solution development.

5.4.7 *Challenges*

The final theme is noted as challenges. It looks at the nature of the main challenges that prevent EA from deriving value for business. This theme correlates straight to the final proposition of the paper – challenges experienced in EA. The most common challenges raised were lack of IT skills and organisational IT maturity. A large amount of discussion ensued around the challenges; misalignment between IT and business, and lack of stakeholder involvement. The reason thereto will be discussed later in this section.

As before, views on this theme were very diverse. Respondents noted that EA often becomes too focus on abstract models and representations. Architects that function within EA also become too concerned with conceptual views and do not give practical implementation enough thought. Lack of focus on the relationship aspect also contributes

to the problem; this point relates to alignment and stakeholder involvement, a view supported by Broer and Roeleven. Lack of change management was voiced by almost every respondent stating that this factor affects buy-in and individuals' mind-sets play a big part in the adoption of EA. Chuang and van Loggerenberg's study identified this view and reiterates the impact it can have on the implementation of EA. Another challenge stated was businesses perception of their role within EA and the relevance it has to their functions. Respondents explained that business too often have the view that EA is an IT function and should only reside within IT, they are reluctant to assist in its formulation which contributes to EA being ill-equipped to deliver on business objectives, a view observed by Kappelman and Zachman.

The general consensus is that the majority of challenges is a result of non-technical aspects relating to skills, maturity, alignment and buy in. Chuang and van Loggerenberg agree with the sentiment that challenges are largely non-technical. Respondents explain that lack of skills pose a large challenge as an enterprise architect is a unique being. Enterprise architects need to possess a perfect balance of business and IT experience, they need to have an architectural mind-set with inter and multi domain functioning. Resources with these qualities are usually developed over many years and are therefore very scarce, a finding supported by Matthee. The majority of respondents agreed with the view that organisation's maturity level contributed to the level of success that EA achieved. They stated that poor change management was partly to blame for the low maturity levels. Having said that, an interesting finding emerged from an interview with a respondent; he had worked in IT in nine different countries prior to settling in South Africa and state that he has experienced one of the highest maturity levels in SA, which operated at a similar level to that of a first world country. This is a view of a single respondent and is unfortunately not backed by empirical evidence, but the sentiment remains interesting none the less. One respondent noted that he operated in a very mature environment and did not find this to affect the implementation of EA. The views of business IT alignment and lack of stakeholder involvement were very much divided. While most of the respondents agreed that these were valid challenges for EA, half of the respondents stated that they were too generic and are applicable for most if not all IT aspects. They were therefore hesitant to tag these challenges to EA as it would seem as though these challenges are only experienced by EA which was not the case.

5.5 Findings relative to research objectives

This section aligns the findings and themes discussed to the research propositions that were identified.

5.5.1 *Proposition 1: Traditional Enterprise Architecture approaches*

The practise, Enterprise Architecture, is largely used within organisations, but organisations find that implementing EA through traditional methodologies does not aid IT to contribute the expectant business value.

The study identified that respondents largely used EA within their organisations. The majority affirmed that formal structures and governance had been implemented to support EA. Few organisations used EA in an informal manner; at ad hoc and as required by projects. One respondent advised that EA had previously been used, but since dissolved, in the interview he described that although non-existent, informal structures remained, that aided IT to deliver solutions aligned towards that of business objectives and strategy. An interesting finding is that many organisations are currently in the infancy phase and in the process of setting up their EA, this despite the fact that EA has been in existence for the last three decades.

None of the interviewed respondents applied traditional methodologies due to the fact that these do not add expectant value. All respondents explained their personal *flavours* of EA or pragmatic approaches pursued. The reason thereto ascribed to the rigid, inflexible and *bulky* nature of the traditional approaches. Respondents acknowledged that even though traditional approaches did not add value, they did provide guidance in the form of well researched foundations, checklists and multi-dimensional perspectives to aid their pursuit of the pragmatic approaches.

5.5.2 *Proposition 2: Pursuit of Enterprise Architecture*

The primary influence prompting the pursuit of EA is the advantage of business IT alignment; ensuring that IT delivers on business strategy and

objectives. The pursuit is further motivated by the general perception that EA contributes to IT delivering value.

Proposition one identified that many organisations are currently implementing enterprise architectures, which supports the aspect that EA is being pursued. Reasons to the pursuit were noted as collaboration, partnership and relationship building; notions that implied business IT alignment. The majority of respondents noted that EA was pursued to contribute business value and identified the contributions to value add as project prioritisation in alignment with the needs of business, assisting to deal with complex landscapes, the setup of road maps to identify future architectural and target states and finally to assist with the dissection and understanding of business strategy to ensure that IT deliverables deliver on business objectives. One respondent mentioned that EA was pursued due to a mandate issued by the group organisation.

5.5.3 *Proposition 3: Misalignment between organisation and individual's view of EA*

Organisations' plans to rectify EA implementations differ to the views of practitioners who function within the organisation. There is a misalignment between the measures organisations seek to implement to ensure EA contributes to business objectives and the ideas of EA practitioners.

Very little evidence was obtained to support this proposition and it was therefore nullified. Most of the respondents shared the view that the approaches selected by the organisation were in alignment with their views. They not only were satisfied with the approaches, but completely supported them due to the methods being realistic, mature and involved; involved in the sense of incorporating the views of EA practitioners. This sentiment was also supported by successful feedback loops which ensured that views and ideas of practitioners were incorporated to ensure continuous improvements in the field. A single respondent explained that misalignment in views were experienced at his organisation due to the firm opting for an incorrect approach to EA; IT being the driving factor behind the pursuit of EA and not business. Based on the findings that has surfaced as part of this research report, proposition 3, is restated as follows;

Organisations' plans to rectify EA implementations are aligned to the views of the practitioners who function within the organisation. There is therefore, no misalignment between the measures organisations seek to implement to ensure EA contributes to business objectives and the ideas of EA practitioners.

5.5.4 *Proposition 4: Pragmatic Approaches deliver business value*

Traditional EA approaches are no longer valued. Pragmatic approaches are therefore more frequently used. Pragmatic approaches are more successful in aiding IT deliver business value through EA.

All respondents overwhelmingly confirmed that pragmatic approaches were more prevalent in practice. Proposition one noted all the reasons why organisations no longer opt for traditional approaches and subsequently pursue pragmatic approaches. Pragmatic approaches are further supported by sentiments that they are practical and more importantly able to deal with the reality that businesses constantly change to keep up with market demands. Pragmatic approaches are flexible enough to ensure that the enterprise architecture adapts along with business, remains relevant and continues to ensure that IT delivers on business requirements. Additional key points that contribute to the outlook that pragmatic approaches are more effective in contributing value to the business is that it assists IT to understand business to ensure that focus is on the correct aspects and that delivery is executed as required.

5.5.5 *Proposition 5: Application of pragmatic approaches*

Extending Lean and Agile methodologies as a means of a pragmatic EA approach, contributes to the success of EA deployments in an organisation. Integrating enterprise and solutions architecture aid the EA function more effectively. Furthermore, integrating EA with best practises adds to the success of EA and closer aligns IT to business.

Much debate ensued while discussing this proposition. Respondent's opinions differed extensively when discussing the application of pragmatic approaches. The first element in

particular received many mixed reviews. Although half of the respondents agreed with the extension of lean and agile frameworks to EA as a means of a pragmatic approach, attributing it to the point that it would result in speedy, rapid development that will be results driven, the other respondents stated otherwise. The other half's view were that agile and lean methodologies were only relevant to the implementation of EA and no other phases that preceded it. Opposition was further supported that agile only becomes relevant when the current and future states are unknown, a circumstance seldom experienced in EA. Finally, respondents argued that agile is a methodology applicable to a development approach and not enterprise architecture, their view was that the combination of methodologies developed to serve different purposes could further confuse users and create uncertainty around the actual objectives of the frameworks.

Respondents mostly agreed with the second element; integration of enterprise and solution architecture. This approach was a common practise for most of the surveyed organisations. The integration of the two architectures added value by creating the perfect balance of abstract and practical or logical implementation with enterprise architects focusing on abstract while the solution architects focus on the logical. Some respondents cautioned against the integration of these streams, stating that the integration should take place informally with effective communication and not formally by enforcing the two roles to serve under the same structure as this approach could blur responsibilities.

Mixed views were again heard for the final element; integrating EA with best practises. Respondents in support of the approach stated benefits as aligning EA to service delivery, strengthened governance and the delivery of high value services. Protestants disputed that one of the purposes of EA is to govern and not integrate with best practises.

5.5.6 *Proposition 6: Challenges experienced in EA*

Challenges experienced in EA are mostly non-technical in nature. The shortage of IT skills and experience contributes to the failure of EA. A lack of IT maturity is experienced within organisations and further contributes to the failure of EA.

All respondents agreed with the view that challenges are mostly non-technical in nature. While engaging in the interviews and discussing challenges, where a number were mentioned, very few if any respondents listed technical challenges that contributed to the failure of EA, thus easily supporting the premise that challenges are mostly non-technical. Again, all respondents agreed with the proposition that a lack of IT skills and experience contributes to the failure of EA. Respondents shared unique stories explaining how difficult it has become to find skilled and experienced enterprise architects that possess the required business and IT knowledge. They recalled fond memories of how they have been mentored over many years to develop into the seasoned architects that they are today. Discussion also revolved around how unskilled architects aid to the failure of EA due to insufficient multi domain knowledge and viewing solutions with silo *lenses.*

Most of the respondents agreed with the view that organisation's IT maturity levels contributed to the failure of EA. They explained that senior managers with other agendas and false motives could easily detain EA from contributing value to business. Another point was that business needed to illustrate appreciation of EA and understand the relevance thereof which all informed aspects of the organisations' maturity levels.

CHAPTER 6. CONCLUSIONS & RECOMMENDATIONS

6.1 Introduction

This chapter encapsulates the study by means of summarising the findings and conclusion. It carries on by offering recommendations in relation to the significance of the study and closes by suggesting topics of further research.

6.2 Conclusions of the study

While it is evident that despite EA not delivering on its promise over the last few years and many millions being lost to failed implementations throughout the world, organisations are still actively pursuing and implementing enterprise architectures to aid business IT alignment and to assist IT in delivering business objectives. Even after reviewing and discussing a multitude of pragmatic approaches, no single approach emerged as the "Holy Grail" that would instantaneously aid business to implement successful EA's to derive large amounts of value.

Another discovery is that despite Matthee's findings on EA being IT centric, with EA becoming more main stream and understood by more business stakeholders, this contributes to its relevance in today's world; enterprise architecture is more and more being driven by business as it should be. This change is partly reinforced by organisations implementing EA's through pragmatic approaches that ensure framework flexibility to prompt business adoption. It was also made clear that traditional approaches aid value destruction and challenges were identified that hampers the progression of EA. These aspects create a good platform for organisations to work from to ensure the success of their enterprise architectures. This will ensure that organisations step in the right direction and if combined with the pragmatic approaches sentiments, organisations can rapidly move to a value contributing state and ensure that EA's promise is closer aligned to its reality. More importantly, this will allow organisations to close the tap on wasteful expenditure.

A surprising finding was that individuals practising in the field are very much aligned to the views of organisations with regards to the implementation or rectification of EA. Organisations can take solace in the fact that if inclusive approaches are implemented by listening to practitioners, and support mechanisms such as feedback loops are in place, this will further support the plight to get EA back on track.

Many challenges have been identified and discussed and the reality is that they will always pose obstacles to IT. The discussion thereof, however, creates a stronger understanding of how the challenge opposes the implementation of or obstructs EA from attaining business IT alignment. This understanding can assist business to develop controls to put in place to prevent the challenge from affecting EA or mitigate its impact on the implemented architecture.

6.3 Recommendations

The purpose of this paper was to analyse and review pragmatic approaches to enterprise architecture, it then advanced to examine challenges that hamper EA derive the value, such as reduction of cost and complexity, through IT being more effectively aligned to business objectives. The discussion of research resulted in a number of recommendations being realised, which if fulfilled, would result in business deriving value through EA. The recommendations for IT management are listed as follows;

Traditional approaches should not be implemented in their entirety, but rather used as guidelines and checklists to create a custom framework to better fit the organisation. Traditional approaches serve well to be used as a base or foundation for further framework development.

Methodologies should be adapted to organisations processes to ensure business objectives are met. A method to attain this can be summarised as; identify key business processes and support systems, understand the processes as the business strategy continues to evolve and define how IT will respond to processes to support the strategy. IT principles can assist and provide support for this function. Additionally, this can be achieved by formalising EA structures and implementing the necessary governance to support it.

The selected approach to an EA implementation should ideally support the organisation's decision making process, by allowing for rapid development of solutions that are traceable and results driven. Additionally; custom approaches should exist for projects of unique proportion and complexity.

Challenges are mostly non-technical in nature; this sentiment has been proved by proposition six. Regardless of how effective an EA is implemented, progress cannot be made without business's involvement. Management need to understand that the most significant means of addressing the issues experienced in EA is through non-technical approaches. These will be noted as recommendations in the following section;

The most effective means to create business IT alignment is through collaboration, partnership and relationship building. This can be achieved by entrenching EA in the organisations culture via change management. Business should understand EA's relevance and ensure a common understanding across the organisation; this can be accomplished by reducing EA outputs or artefacts to poster-sized documents to allow them to be consumable. IT should steer away from jargon and talk the businesses language to further foster the relationship. The perception that IT is not aligned to business should be tackled and rectified; in some or many instances, this can only be achieved through a large amount of selling of the concept until it sticks.

When project timelines are advised, ensure that they are realistic and that IT will deliver so as to not disappoint business and have them loose confidence in IT and EA. To ensure that this is achieved, a reasonable amount of effort must be exerted and more concentration dedicated for short term objectives; with stronger emphasis placed on execution. Expectations should be continuously managed by maintaining an open channel of communication.

IT should preserve a strong relationship with business to ensure rational reasoning for system development and purchases. If achieved, IT can provide thought leadership and create foresight to aid with future changes that derives actual value.

6.4 Suggestions for further research

Pragmatic approaches informed the central theme of this research. Although discussed practically and respondents making mention of means to practically implement, discussion largely revolved around abstract or conceptual approaches. Based on this premise, the following are suggested ideas that could further aid research in this field;

Development of a framework that incorporates pragmatic approaches, the framework should not only provide guidelines and prescriptions, but be based on a holistic approach; a complete solution that incorporates aspects of process and taxonomy that is flexible enough to be adjusted to fit a multitude of organisation types.

A noteworthy finding revealed that many organisations were unable to measure their EA ability. One organisation raised a concern that the index or tool currently used to measure their EA aptitude repeatedly returned high scores which concerned them as they felt they could do much more to improve their EA implementation. Based on this finding, additional research could be informed by the development of an assessment model or tool that could be used to aid organisations to measure their progress in terms of: policy, processes and maturity, and more importantly, based on the value add provided to the organisation. The tool should be based on a standard for evaluating; the development of the standard can form part of this research, but preferably, should be undertaken as a topic on its own.

Traditional approaches are continuously updated and released as new iterations. Even though they continue to be developed, they do not add business value as identified by the discussion of proposition one – traditional EA approaches. Another topic that could be investigated is identifying the factors that inform the development of traditional approaches, if these elements can be identified and reconstructed, traditional approaches could evolve to no longer destroy, but rather create value. This study would also aid the suggestion of the development of a framework that incorporates pragmatic approaches.

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APPENDIX A

Organisations represented in interviews

Respondents interviewed represented the following organisations. The list does not correspond to the order of the interviews or to the cognitive maps, as the firms are noted alphabetically.

Absa Capital

Clientele

Investec

Lion of Africa

Nedbank

Standard Bank

Wesbank