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Measuring effectiveness and critical success factors for successful enterprise architecture management capabilities in South Africa

Gregory Michael Kingsley

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

Many organisations are currently pursuing the promised benefits of enterprise architecture management (EAM). In order to achieve this they have implemented EAM capabilities, however, many of these organisations do not know if these investments are actually providing any value for them and their shareholders.

In addition, there is limited academic research into the topic of enterprise architecture as a whole and even less is available on critical success factors for effective enterprise architecture management.

This study was conducted in an attempt to determine how organisations should measure the effectiveness or value of their EAM capabilities and to discover what the underlying critical success factors are in ensuring EAM effectiveness.

A review of existing literature was conducted in order to establish a theory base which was then used when conducting a qualitative research exercise comprising of semi-structured one-on-one interviews with 17 EAM practitioners whom all have had experience with enterprise architecture.

Various content analysis techniques were employed including concept coding and thematic abstraction. Ontological cognitive mapping was used to analyse the resulting concept maps of the critical success factors.

The findings of the research are that organisations should measure the effectiveness of their EAM capabilities. The most relevant measures for EAM value are measures which reflect the overall organisation's performance however the exact choice of measures is highly dependent on the context that the EAM capability operates in. Two predominant factors influence this context, maturity and scope. Additional measures are also provided including costs, agility, reliability and internal EAM capability measures.

The critical success factors identified included: focusing EAM primarily on the business, soft skills, support generating outcomes, technical execution of the EAM capability, structure and accountability of EAM, governance, successful delivery of

valuable change and trust. A key message of the critical success factors is the focus on business and business priorities.

DECLARATION

I, Gregory Michael Kingsley, 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.

Gregory Michael Kingsley

Signed at ……

On the …….. day of …… 20…..

DEDICATION

To Tannith, this would not have been possible without your love, support, patience, encouragement and care. To Skyla and Daniel for making so much more worthwhile.

-Greg

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To all those who supported me in this endeavour, especially my research supervisors, Louise Whittaker and Antony Soicher.

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1 INTRODUCTION

Enterprise architecture (EA) is an IT lead discipline which has become a widely adopted means for coping with the ever-increasing complexity of organisations as well as ensuring that such organisations appropriately use and optimize their technical resources (Shah & Kourdi, 2007).

1.1 Purpose of the study

The purpose of this study is to examine how large organisations in South Africa measure the effectiveness of their Enterprise Architecture Management capabilities and what the critical success factors are to maximising the effectiveness of these Enterprise Architecture Management capabilities within the organisation.

Many organisations throughout the world have engaged in programs to implement an Enterprise Architecture Management (EAM) capability as a means of improving the ability of their IT organisations to better support their business operations (Shah & Kourdi, 2007). Many of these programs have met with varying degrees of success (Broer & Roeleven, 2009). Additionally, these programs are generally very costly to implement and given that they are often instrumental in the decision making process for massive enterprise IT investments the direct and indirect costs associated with ineffective and inefficient EAM capabilities could potentially be a highly expensive under taking.

Additional promises of EAM is the delivery of improvements to the business architecture of an organisation, enhanced decision making ability and improved overall business performance. The potential benefits of EAM to an organisation are potentially massive (Günther, 2015; The Open Group, 2009).

1.2 Importance of the research

Given the promises and costs of such programs and their varying degrees of success, the purpose of this research is to identify how organisations should measure the effectiveness of an EAM capability and to find the critical success factors which influence the

effectiveness/ineffectiveness of an EAM capability within large enterprises in South Africa thus enabling such enterprises to maximise effectiveness.

1.3 Context of the study

Since his initial work on Enterprise Architecture John A. Zachman, and many others, have proposed Enterprise Architecture as the means of achieving better alignment between Information Technology (IT) departments and the rest of a business (The Open Group, 2009; Zachman, 1987, 1997). However, there are many examples of failed Enterprise Architecture (EA) capabilities which have not lived up to all their stated objectives and benefits (Broer & Roeleven, 2009).

In a 2008 study on successful EA implementations, Broer and Roeleven claim that only 40% of those surveyed were actually succeeding in their respective EA programs. This was despite 92% of organisations recognising the strategic importance of an EAM capability (Broer & Roeleven, 2009).

Ross, Weill and Robertson. (Ross, Weill, & Robertson, 2006) argue that organisations proceed through four distinct stages of EA maturity beginning at Business Silos and arriving at Business Modularity. Of the companies participating in their research only 6% of organisations had achieved the Business Modularity maturity stage. They further indicate that it was difficult to ascertain how IT investment patterns change as companies move from the third to the fourth stage of maturity.

In South Africa, there has been limited formal academic research on the challenges associated with EA. For example, the questions of what EA framework to use; how best to govern the interaction between business, IT and strategy; what is the best reporting and accountability line for EA; how to position the business domain of EA and this impact on the overall positioning of EA within an organisation, specifically in South Africa, have never been adequately answered. Only minimal work is widely published in this field. (Matthee, Tobin, & Van der Merwe, 2007)

Enterprise Architecture is a long run process and usually takes many years before organisations begin to see the full promised benefits. (The Open Group, 2009)

Additionally, within South Africa, major EA consulting practices have reported that the Enterprise Architecture industry is beginning to experience an increase in the number of organisations embarking on EAM capability implementations. However, many key challenges remain. (Fauber, 2008, 2010; Perry, 2009)

1.4 Problem statement

1.4.1 *Main problem*

Identify how large organisations in South Africa measure the effectiveness of their Enterprise Architecture Management capabilities and identify the critical success factors which have most influenced the eventual effectiveness or ineffectiveness of their Enterprise Architecture Management capability.

1.4.2 *Sub-problem 1*

Determine if and how large enterprises measure the effectiveness of their EA capabilities.

1.4.3 *Sub-problem 2*

Determine the critical success factors which influence the effectiveness of an Enterprise Architecture Management capability within large enterprises.

1.5 Significance of the study

This study fills a gap in academic research on the subject of Enterprise Architecture in South Africa. Enterprise Architecture as a whole has only recently been a topic of extensive academic research (Simon, Fischbach, & Schoder, 2013).

The focus of this study is on measuring the effectiveness of EAM capabilities and understanding the underlying factors which effect both successful and unsuccessful EA capabilities. It attempts to inform key decision made within organisations relating to EAM capabilities and how EAM capabilities can become more effective in addressing strategic objectives within an organisation (Abaas, 2010; Bologa, Faur, & Ghisoiu, 2010).

The study can provide guidance to CIOs and CEOs, as well as EA consulting organisations on key choices which are often made with minimal reference outside of their own experience. And thus attempt to increase the probability of success of EA practices.

Should even a marginal increase in the degree of effectiveness of EAM capabilities be achieved, the cost savings and competitive advantages of large enterprises would represent a significant improvement. For example, ABSA South Africa has indicated that they will be increasing their IT spend to R5 billion annually by 2015 and thus a 5% improvement is potentially worth R250 million to Absa alone (Kamhunga, 2011; Reuters, 2011).

Given that EA is being positioned as the primary driver for IT investments in many South African companies and that, according to some estimates, the total value of IT expenditure in South Africa was estimated to beR81.2 billion in 2013 (Santos, 2009). The importance of ensuring that the EAM capability of large IT organisations is optimally established has a very serious impact to the cost of IT within an organisation. The promise of an effective EAM capability extends beyond marginal cost improvements as the full value proposition of EAM extends into improving the competitive capability of the organisation as a whole.

1.6 Delimitations of the study

The study is based on organisations operating in South Africa and the findings may not necessarily be fully applicable in other countries and businesses due to historical differences.

All respondents are senior level staff members with extensive prior experience either as Enterprise Architects or as senior business leaders who have been heavily dependent on Enterprise Architecture.

The study focuses on the Enterprise Architecture Management capability and not on the Enterprise Architecture design thus the measures and success criteria deal with the EAM capability as a primary subject matter. The EA design is a secondary consideration.

The study is limited to large organisations in the South African context with existing EAM capabilities so the findings may not be fully applicable to small, micro and medium enterprises (SMMEs).

1.7 Definition of terms

Enterprise Architecture (EA) – EA is an IT lead discipline which has become a widely adopted means for coping with organizations' ever-increasing complexity and for ensuring that organizations appropriately use and optimize their technical resources (Shah & Kourdi, 2007). In order words, Enterprise Architecture is a series of management activities which are designed to maximise the value of a company's technical resources (computers, equipment, information, applications) to a business. Additionally EA refers to how an organisation chooses to structure itself as embodied in its elements (people, processes, applications, and so on); their relationships to each other and to the environment; and the principles guiding its design and evolution. I.e. its organisational (enterprise) architecture (Aziz, Obitz, Modi, & Sarkar, 2005; The Open Group, 2009).

Enterprise Architecture Management – EAM is a management practice that establishes, maintains and uses a coherent set of guidelines, architecture principles and governance regimes to provide direction for and practical help with the design and the development of an enterprise's architecture in order to achieve its vision and strategy (Ahlemann 2012).

FFEAM – Focus Framework for Enterprise Architecture Measurements (Günther, 2015).

TOGAF – The open group architecture framework, an open (non-proprietary) industry standard for implementing Enterprise Architecture.

Zachman – The Zachman framework for Enterprise Architecture. A proprietary framework initially developed by John Zachman and widely used by IBM.

Business Domain – The business strategy, business information strategic plan, governance, organization, and key business processes information, as well as the interaction between these concepts. It includes business processes, organization structures and people (The Open Group, 2009).

Information Architecture – The information, information systems and data of the organization. It includes the data stores of both structured and unstructured data. It also includes the data management resources, policies and procedures relating to data (The Open Group, 2009).

Application Architecture – The applications landscape of the organization. Includes patterns and practices for optimal applications development and deployment. It also includes the mapping of business services to application capabilities (The Open Group, 2009).

Security Architecture – The security architecture within the organization (The Open Group, 2009). It comprises all the components involved in ensuring people, places, systems, data, networks and documents are kept secure.

SMMEs – Small, micro and medium enterprises.

Technology Architecture – The logical software and hardware capabilities that are required to support deployment of business, data, and application services. This includes IT infrastructure, middleware, networks, communications, processing, and standards (The Open Group, 2009).

Information and communications (ICT) departments – The organisational entity within enterprises tasked with managing the IT architecture of the organisation.

Technical Architecture Framework for Information Management (TAFIM) – An Enterprise Architecture framework developed in 1994 by the US department of defence for ensuring alignment of IT initiatives within the various departments of the US Department of Defence.

Enterprise Architecture Framework – Many choices and practices exist for establishing an Enterprise Architecture Management capability. These include choices around: governance structures, lifecycle involvement, documentation standards, domain structure etc. All these are collectively referred to as the Enterprise Architecture framework.

1.8 Assumptions

Respondents are willing to provide insight into their EAM capability as well as share experiences gained from potential past failures.

EAM capability exits within the given organisation.

EAM capabilities are not significantly affected by the type of industry of the organisations in large, multi-billion rand industries which are heavily dependent on their IT infrastructure.

2 LITERATURE REVIEW

2.1 Introduction

This section contains a review of the key themes which are of most relevance to the study. The first area reviews a brief history of Enterprise Architecture. The second reviews different means of measuring EA effectiveness. The thirds discusses how the measurement of EA effectiveness will be achieved. The final section seeks to discover literature describing existing critical success factors.

2.2 Introducing Enterprise Architecture

2.2.1 *Enterprise Architecture Defined*

Enterprise Architecture (EA) is a term which can cause much confusion, due to its dual meaning. Firstly, EA is an IT lead discipline which has become a widely adopted means for coping with organizations' ever-increasing complexity and for ensuring that organizations appropriately use and optimize their technical resources (Shah & Kourdi, 2007).

Additionally an organisation's enterprise architecture can also refer to the integrated and holistic vision of a system's fundamental organisation, embodied in its elements (people, processes, applications, and so on), their relationships to each other and to the environment, and the principles guiding its design and evolution (Aziz et al., 2005).

Recently a new term has emerged to assist in clarifying this duel meaning. Enterprise Architecture Management (EAM). EAM is a management practice that establishes, maintains and uses a coherent set of guidelines, architecture principles and governance regimes that provide direction for and practical help with the design and the development of an enterprise's architecture in order to achieve its vision and strategy (Ahlemann 2012).

2.2.2 *History of Enterprise Architecture*

John A. Zachman defined the term Enterprise Architecture in 1987 with the publication of his work entitled "A framework for information systems architecture" (Zachman, 1987). At

the time Zachman was an engineer at IBM and the discipline has since become a major service line of IBM consulting services.

In 1994 the US department of defence introduced the Technical Architecture Framework for Information Management (TAFIM) EA framework as a means for ensuring alignment of IT initiatives within the various departments of the US Department of Defence.

In 1996 the U.S. Congress passed the Clinger/Cohen act, also known as the Information Technology Management Reform Act (ITMRA) (Long, 2009; United States Congress, 1996). This act gave the Office of Management and Budget (OMB) widespread authority to dictate standards for "analysing, tracking, and evaluating the risks and results of all major capital investments made by an executive agency for information systems" (United States Congress, 1996).

Since this initial groundwork, there has been an increase in the amount of attention given to Enterprise Architecture with a steady increase in the number of frameworks used for EA implementation and the number of research activities in this area (Abaas, 2010; Aziz et al., 2005; Zachman, 1997).

The origins of Enterprise Architecture in South Africa are not clearly known however it has spread rapidly. This spread has been further supported by the adoption of various Enterprise Architecture frameworks into the South African government's Government-Wide Enterprise Architecture (GWEA) Framework (Needham, 2010). Enterprise Architecture Management capabilities now exist in most large organisations in South Africa.

2.3 Measuring EA Success

Measures for individuals and organisational units have long been a key focus area of most organisations (Armstrong & Baron, 2000). E.g. Sales functions have sales metrics, finance functions have efficiency ratios and marketing functions have marketing measurement matrix. Although much research has been conducted in these traditional business areas limited formal academic research into how to measure EAM capabilities exists (Matthee et al., 2007; Razavi, Aliee, & Tafreshi, 2009).

Success in financial services institutions however has been defined around two key measures (Schmidt & Buxmann, 2011):

- IT Efficiency – The outcomes of an IT department relative to its costs.
- IT Flexibility – The ability and speed of an IT depart to respond to the changing needs of businesses and business environments.

In addition to the above general measures, many organisations require that their key business activities have quantitative and qualitative Key Performance Indicators (KPIs). Information Technology is regarded as a key business activity in many organisations and as such understanding what these KPIs are and identifying common themes will also greatly enable organisations to manage their EAM capabilities more efficiently.

In the work of Boucharas et al. (Boucharas, van Steenbergen, Jansen, & Brinkkemper, 2010) a framework and meta-model for defining and measuring the benefits of Enterprise Architecture is put forth. Their work is focused on how to define the benefits of EA and what the role of these EA benefits is in the achievement of business goals. The measuring of the effectiveness of the EAM is not directly addressed by this research however. This meta-model has been adapted for the use in defining and measuring the effectiveness of Enterprise Architecture based on the findings of this research.

The first objective of this research is to identify how organisations define and measure the effectiveness of their EAM capabilities and to identify what the critical success factors are which influence the effectiveness of an Enterprise Architecture Management capability within an organisation (Schmidt & Buxmann, 2011). This research will attempt to uncover other non-obvious characteristics of successful EA practices (GOA, 2006; Schmidt & Buxmann, 2011).

A key challenge to this research problem is in defining what effectiveness is within the context of EAM. In terms of the scope of this study, focus will be on the degree to which the EAM capability is seen to be able to successfully respond to strategic direction changes by the organisation and how effectively the IT architecture is able to respond to these changes.

2.3.1 *Differing Framework approach to KPIs*

All of the mainstream EA frameworks have indicated the necessity of measuring EA effectiveness (Morganwalp & Sage, 2004; The Open Group, 2009; Zachman, 1997). However, the specific choices of which KPIs to use are generally left to the specific implementation within the context of specific businesses. For example, one of the most widely used Architecture frameworks, TOGAF, proposes that KPIs be developed during the first initial phase of any EA project but does not provide specific KPIs or examples of KPIs to be used (The Open Group, 2009).

2.3.2 *Prior studies to EA effectiveness*

Razavi, Aliee and Tafreshi have developed a highly complex quantitative research instrument for assessing EA architectures as a whole. Their scope was to assess the EAM capability itself, looking at accuracy of documentation, staff knowledge, tools used etc. rather than the value that EA provides to the organisation. These measures focused mainly on the quality of the EAM capability and not on the value or effectiveness of EA to an organisation (Razavi et al., 2009).

Schmidt and Buxmann's (Schmidt & Buxmann, 2011) study into EA outcomes and success factors of IT architecture management provides a good quantitative questionnaire which is a basis for probing questions asked during the interviews that were conducted. See Appendix A – Schmidt and Buxmann's questionnaire.

The main themes covered in the Schmidt and Buxmann study which were considered during the interviews are (Schmidt & Buxmann, 2011):

- **Documentation (DOC)** – how accurately the EAM capability documents the existing and proposed architectures of the organisation.
- **Architecture planning (PLN)** – how well the EAM capability covers planning activities associated with the different domains of the Enterprise Architecture.
- **Programming (EAP)** - EA programming is defined as the process of setting architecture rules and standards to be obeyed by change projects. These may include high-level architecture principles as well as reference architectures and technical standards.

- **EA Implementation (IMP)** – EA implementation refers to the initiation and/or execution of system changes through the EAM function itself.
- **EA Communication and Support (COS)** – The degree of support and communication the EAM capability undertakes with various stakeholders.
- **EA Governance (GOV)** – The degree to which EA decisions and guidance is binding on the organisation and how formally controlled these interactions are.
- **Stakeholder Participation (PAR)** – The extent to which the different stakeholders of the enterprise participate in EA decisions.
- **Duration of EAM Implementation (DUR)** – A review of the EA journey within the organisation.
- **Firm Size (SIZ)** – The size of the organisation.

The focus of both these studies was on the activities of an EAM capability. These measures do not directly relate to improvements in the organisation as a whole. Additionally, these studies used a quantitative research methodology whereas this research makes use of a qualitative methodology. The main reason for this is that the objective of this research is discovery in nature wherein additional measures will be sought rather than the confirmation of previously identified measures.

2.3.3 *Value as a measure of effectivness*

The focusing of the above research was on measuring the effectivness of EAM in terms of performance characteristics of the IT architecture. Another way to measure the effectivness of an EAM capability is to determine if it actually delivers value to the organisaiton as a whole. The premise of this is that an EAM capability which runs exceptionally well but fails to actually make improvements to the organisation is ultimately of no use and is therefore ineffective.

Günther asserts that “Any organisation practice should be able to show its “value”, including enterprise architecture (EA)” (Günther, 2015). She proposes four areas for measuring EAM namely, decision making process, decision making results, program implementation and actual programme results. This framework she calls “The Focus Framework for Enterprise Architecture Measurements (FFEAM)” – See Appendix C.

A key outcome of this research was to identify how this value can be measured as it serves as a justification for the EAM programme as a whole.

The challenge with using IT architecture flexibility to measure the success of an EAM capability is that it does not directly relate to success within the organisation and can be seen as a lead indicator only. Enterprise architecture by definition is concerned with more than just the IT architecture and includes business architecture as a separate and essential architecture domain (The Open Group, 2009).

A key objective of this study is to try to determine how to demonstrate the value of EAM in business terms and not just in IT terms and so a relationship between critical success factors in EAM to benefits to the organisation as a whole will be sought.

2.3.4 *Research Question 1*

How do large Enterprises measure the effectiveness/value of their EA capabilities?

2.4 Critical Success Factors

As with any management function, there are key activities which can be performed to influence the quality of the final outcome. This section provides a brief overview of some of the existing research that has been conducted around the question of influencing critical success factors.

2.4.1 *Commonly held critical success factors*

There are many different factors which have been identified as being critical for success. The following list of critical success factors was proposed by EAdirections (EA Directions, 2007). Additional literature references have been added in order to strengthen the validity of each factor.

- **Culture** – The culture of an organisation influences every aspect of its functioning and as such the type of culture present at an organisation is expected influence the overall success of an EAM capability (EA Directions, 2007; Long, 2009).

- **Politics** – Given the high profile of EAM capabilities and the degree of influence that they can have on an organisation, it is expected that many organisational EAM capabilities need to be cognisant of the politics of various stakeholders (EA Directions, 2007; The Open Group, 2009).
- **Leadership** – TOGAF identifies leadership as a key capability of EA practitioners (EA Directions, 2007; Ross et al., 2006; The Open Group, 2009).
- **Business Linkage** – Various studies have pointed out how important it is to ensure adequate links between what the EAM capability is undertaking and what the business requires. The primary focus of EA is to ensure this alignment (Broer & Roeleven, 2009; Ross et al., 2006; Schmidt & Buxmann, 2011).
- **Senior Management Involvement** – The involvement of senior management, or the lack thereof, has been identified as a key component in Enterprise Architecture. Senior management involvement is more than just awareness. It includes sponsorship and buy-in as well as open and visible support (Broer & Roeleven, 2009; EA Directions, 2007; Long, 2009; The Open Group, 2009).
- **Business Participation** – In order for EA to be successful it must involve the business at many different stages. It is not enough to only involve the business at the initial stages of requirements gathering and then to only involve business prior to architectural change introduction (Schmidt & Buxmann, 2011).
- **Governance Structure and Compliance Process** – TOGAF highlights governance as one of the most critical factors ensuring EA is effective. The reason for this is the tendency of organisational units to disregard those principals which will ultimately lead to a consistent reusable enterprise architecture (Broer & Roeleven, 2009; The Open Group, 2009).
- **EA Resources** – EA resources include: frameworks, architects, repositories and communications technologies (The Open Group, 2009). In order for any programme of this nature to succeed there must be sufficient resources allocated to it.
- **EA Scope and Objectives** – The effectiveness of an EA programme can be greatly reduced if the scope of the EAM capability is either too broad or too narrow (EA Directions, 2007; Schmidt & Buxmann, 2011; The Open Group, 2009).
- **EA Process Implementation** – How the EA process is implemented (EA Directions, 2007).

- **EA Program Communication** – EA programs by definition require many organisations to drastically change the way they perform many of the decision making functions (The Open Group, 2009).
- **Technology Investment and Procurement** – Decisions regarding what technology to invest in are central to managing the future costs of a selected IT architecture. As such, the question of the extent to which an EAM capability influences investment and procurement decisions is important (EA Directions, 2007; The Open Group, 2009).
- **Costs** – A key consideration and impediment to implementing EA is the perceived costs associated with its adoption. Given that EA is a long term process for many organisations and that the finical benefits of a successful EAM capability may not be immediately visible, the question of how to justify the costs associated with an EAM capability is a fundamental factor.

The above set of critical success factors is by no means exhaustive. In addition to the proposed set of EAM measures Schmidt and Buxmann put forward a “Path model” of EAM effectiveness (Schmidt & Buxmann, 2011) see Appendix D. The model proposed by Schmidt and Buxmann proposes that the factors which are of most importance to EAM success are largely internal to the EAM and success is measured as improvements to the IT architecture’s flexibility and the efficiency of the IT function. They do however note that this model is hypothetical as their study did not track changes over a long enough period of time to confirm this causal relationship.

2.4.2 *Question 2*

What critical success factors influence the effectiveness of an Enterprise Architecture Management capability within Large Enterprise?

2.5 Conclusion of Literature Review

Enterprise architecture has been around for a number of years and the practices associated with it are continuing to mature. Many organisations continue to pursue EA strategies and have met with varying degrees of success.

Enterprise Architecture is difficult to successfully and effectively implement and measuring its effectiveness can be difficult for a number of reasons. The literature surveyed describes a number of important measures for effectiveness.

Given the varying degrees of success associated with EAM capabilities the question of what factors influence its effective implementation is of critical importance.

2.5.1 *Research Question 1:*

How do large Enterprises measure the effectiveness of their EA capabilities?

The table below lists the main themes of measures suggested by each study and will be used when reviewing the responses from each respondent interviewed during the interview stage of this research:

Table 1: Literature review – High-level summary of measures

Source	*(Abaas, 2010)*	*(Boucharas et al., 2010)*	*(Broer & Roeleven, 2009)*	*(Brown, 2004)*	*(Günther, 2015)*	*(Long, 2009)*	*(Schmidt & Buxmann, 2011)*
Measure (theme)							
Agility / IT Flexibility	F	D	F	F	F		F
Alignment	F		F	F	F		S
IT Efficiency	D		F	F		S	F
Attainment of organisational goals		F			F	S	
Business process benefits		F	F	F			
EAM benefits		F					S
Customer outcome		F				S	
Financial outcome		F				S	
Costs			F	F	F	F	S
Risk reduction			F		F		
Readily available EA artefacts				F			
External partnership			F	F	F		
Decision making					F		

Key:
F – Measure is clearly defined and developed
D – Measure is not explicitly stated but can be derived or inferred
S – Measure is suggested at a high level

2.5.2 *Research Question 2:*

What critical success factors have influenced the effectiveness of an Enterprise Architecture Management capability within Large Enterprise?

The table below lists the main themes of success factors suggested by each study and will be used when reviewing the responses from each respondent interviewed during the interview stage of this research:

Table 2: Literature review – High-level summary of success factors

Source	*(EA Directions, 2007)*	*(Schmidt & Buxmann, 2011)*	*(Broer & Roeleven, 2009)*	*(Günther, 2015)*	*(Brown, 2004)*
Success factor (theme)					
Culture	F	S			
Project success	F	S		S	
Politics	F				
Clearly defined objectives		S	F	F	
Leadership	F				
Successful delivery of change		S		D	
Sponsorship involvement	F	F	S	F	F
Business requirements / linkage / alignment	F	S	F	D	F
EAM Models		F	S	D	
Development environment		S		S	
Alignment to strategy		S		F	
Technical skills / EA Resources	F	S		S	
Tools	F	F	S	D	
Governance	F	F	F		F
Communication	F	F	S	D	

Key:
F – Measure is clearly defined and developed
D – Measure is not explicitly stated but can be derived or inferred
S – Measure is suggested at a high level

3 RESEARCH METHODOLOGY

This section describes how this research was conducted. The methodology is discussed and justified, the population and sampling method is discussed, and finally the research instrument is presented.

3.1 Research methodology/paradigm

A review of the volume of literature on Enterprise Architecture in 2013 revealed that prior to 2003 only a few publications on Enterprise Architecture existed (Simon et al., 2013). This can be expected as Enterprise Architecture has only recently begun to enjoy widespread adoption. As such, an appropriate research methodology which allows for the exploration of new concepts needed to be followed. This study, therefore, made use of an inductive exploratory research approach (Hoepfl, 1997).

In addition to being a relatively new area of study, Enterprise Architecture Management and the research topics of measures for effectiveness and critical success factors are inherently complex. Thus an appropriate qualitative research methodology is needed. Qualitative research has also been identified as a means for understanding complex problems (Eto & Kyngäs, 2008; Rubin, 2005; Walker, 1985).

3.2 Research Design

Given that this topic is a relatively new area of academic, study semi-structured interviews are used to conduct the research (Rubin, 2005). Semi-structure interviewing proved favourable for this topic as it allowed enough guidance to be given to keep the respondents from diverging too far from the research questions, afforded the interviewee enough flexibility to ask appropriate follow-up questions and allowed for new factors and measures to be identified and explored (Wilkinson & Birmingham, 2003)

Another key benefit of semi-structured interviews is that a significant amount of data gathered is based on the insights of the respondents on potential factors and measures as opposed to existing factors and measures. Semi-structured interviews was an effective

means in uncovering these insights and enabled the interviewer to further probe into and clarify these insights (Saunders, Lewis, & Thornhill, 2009).

3.3 Population and sample

3.3.1 *Population*

The population focused on EAM practitioners who were experienced in Enterprise Architecture Management. The population also included internal customers of Enterprise Architecture capabilities as well as external Enterprise Architecture subject matter experts and consultants. All respondents obtained the majority of their Enterprise Architecture knowledge and expertise in South Africa and were at the time of the interviews actively engaged in some aspect of Enterprise Architecture.

3.3.2 *Sampling and sample method*

Initial respondents were selected via a convenience sample. Thereafter additional responds were obtained as referrals from the initial set of respondents.

The table below lists each of the respondent's companies, their title and their respective role in Enterprise Architecture Management.

Table 3: Companies

	Company	Role	Enterprise Architecture Focus
1	Avanade	Director - Delivery and enterprise architecture	Consulting on Enterprise Architecture
2	Price-waterhouse-Coopers	Senior Manager - Technology Consulting and Strategy	Consulting on Enterprise Architecture
3	Transnet	Chief Enterprise Architect	Enterprise Architecture Management capability
4	RealiRM	Chief Executive Officer	Consulting on Enterprise Architecture
5	Eskom	Senior Enterprise Architect	Enterprise Architecture Management capability
6	Dawn Ltd.	Chief Information Officer	Executive Sponsor
7	Exxaro	Chief Enterprise Architect	Enterprise Architecture Management capability
8	Mutual and Federal	Senior Specialist: Enterprise & Solution Architect	Enterprise Architecture Management capability
9	Telkom	Chief Enterprise Architect	Enterprise Architecture Management capability
10	Government Agency	Chief Information Officer	Solution Delivery
11	Dimension Data	Business Architect	Enterprise Architecture Management capability
12	inspired!	Principal Consultant	Consulting on Enterprise Architecture
13	Non-profit charitable organisation	Financial Controller	Executive Customer
14	Internet Solutions	Head of planning and solutions	Executive Sponsor
15	ABSA	Head of IT: Home Loans and CoE	Solution Delivery
16	Kusaga Taka Consulting	Chief Information Officer	Solution Delivery
17	Momentum	Six Sigma	Solution Delivery

The companies were selected based on their size and prior knowledge of the existence of a formal Enterprise Architecture Management capability.

The selection of respondents was split on a number of key dimensions.

1. Internal versus external to an organisation
2. Executive versus operational level staff
3. Enterprise Architecture Management capability versus Enterprise Architecture customers

Table 4: Profile of respondents

Description of respondent type	**Number of respondents**
External EA consultants	4
Internal EA practitioners/sponsors	8
Internal direct customers of EA	5

The relationships between these various viewpoints and the number of respondents in each dimension are represented below:

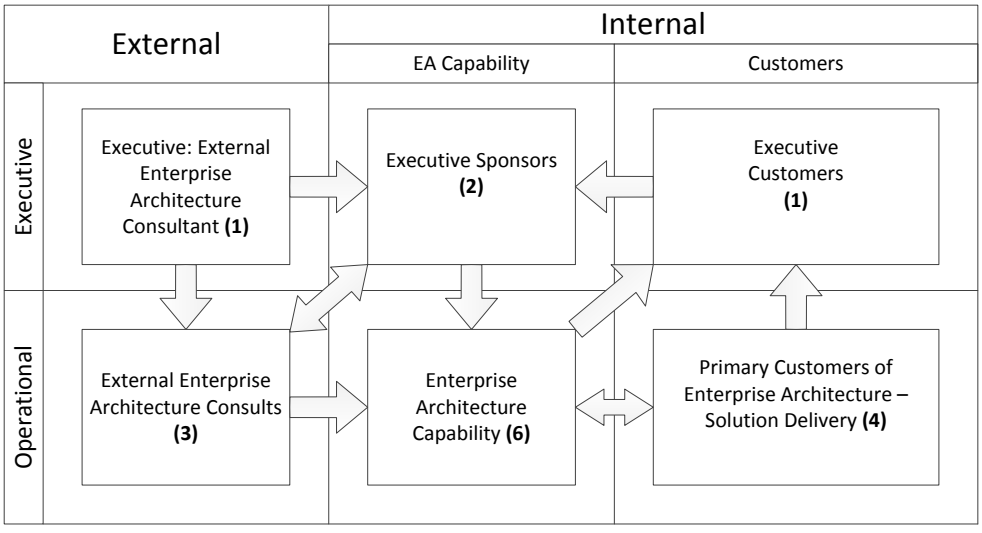


Figure 1: Respondents and their view points

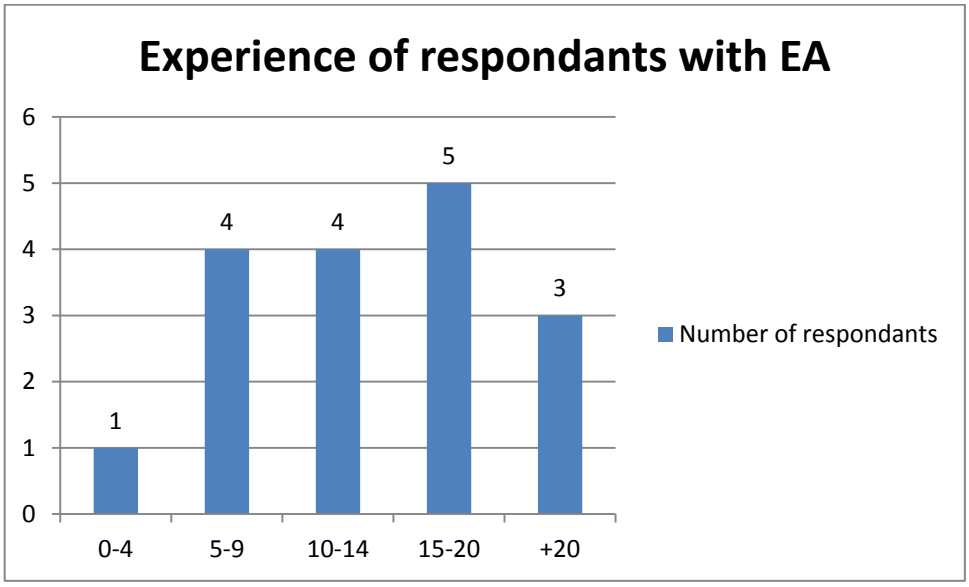
By including a number of different Enterprise Architecture role-players it is possible to compare responses from the various points of view and test perceptions of value both

internal and external role players as well as those performing Enterprise Architecture work and those who are directly affected by Enterprise Architecture outputs.

There is no prescribed number of respondents required when conducting qualitative research, however, what is important is to arrive at a convergence of thought where the addition of another respondent yields little in the way of additional insights and largely provides redundancy (Rao & Perry, 2003).

3.3.3 *Experience of sample with enterprise architecture*

All respondents were asked to give the number of years they have had experience as either an Enterprise Architect or as a key customer of Enterprise Architecture. As depicted below, the respondents were generally experienced with Enterprise Architecture. Most of the respondents had worked as or directly with EA for 10 years or more.



3.4 The research instrument

The two questions were asked of each of the respondents. Their responses were recorded and appropriate clarification questions were asked to probe deeper into their views and perceptions. Interview helps were used to assess areas that were not directly addressed by interviewees in answer to the initial open ended questions. This allowed for adaptation to individuals, their roles and the organisations they represent (Rubin, 2005).

To address the common challenge of concerns around confidentiality, generally associated with this approach, each of the respondents was told upfront that their identities and their respective organisations would not be directly referenced in the research (Hussey & Collis, 1997).

The guarantee of anonymity is often regarded as essential in order to ensure that the responses from respondents are candid and honest. As such at the start of each of the interviews the respondents was informed that their views would be anonymous and anything said which could be directly traceable back to them would not be included in the final report.

3.5 Procedure for data collection

Data was collected from each of the participants through in-depth, one-on-one interviews. Each interview was conducted in person and an audio recording of the interviews was kept. Notes from each interview were further kept to identify specific areas that could be probed further for more detail and clarity.

The interviews were generally conducted in quiet locations to minimise distractions. Each interview typically took between an hour to an hour and a half.

Interviews were conducted between January 2014 and March 2015.

Each interview followed the same overall pattern. After a short introduction and explanation of the purpose of the study was given by the interviewer, the first research question was asked. Follow-up questions were then asked to further probe and clarify the experiences and views of the respondents. After the first question area has been explored the second question was asked with the same approach.

At the conclusion of each interview any areas identified by the literature review not already discussed were then probed. Finally, each respondent was asked what three things they believed should change in order to achieve the ideal outcomes for Enterprise Architecture Management.

3.6 Data analysis and interpretation

Due to the nature and the format of the data gathered, the use of a qualitative research approach requires an appropriate data analysis and interpretation method (Wilkinson & Birmingham, 2003).

The use of content analysis is an appropriate data analysis approach for this type of qualitative research as it effectively draws out the concepts and relationships which are present in the data (Cole, 1988).

In addition to content analysis, ontological cognitive mapping was used as there are clear relationships present in the data which in and of itself represent valuable insights into the research questions. The use of ontological cognitive mapping over more traditional concept mapping was necessary due to the size of the cognitive maps (Chauvin, Genest, & Loiseau, 2009).

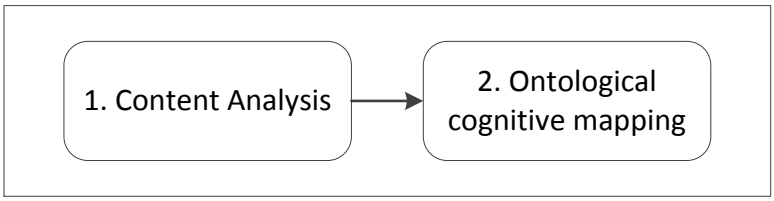


Figure 2: Data analysis process

3.6.1 *Content analysis*

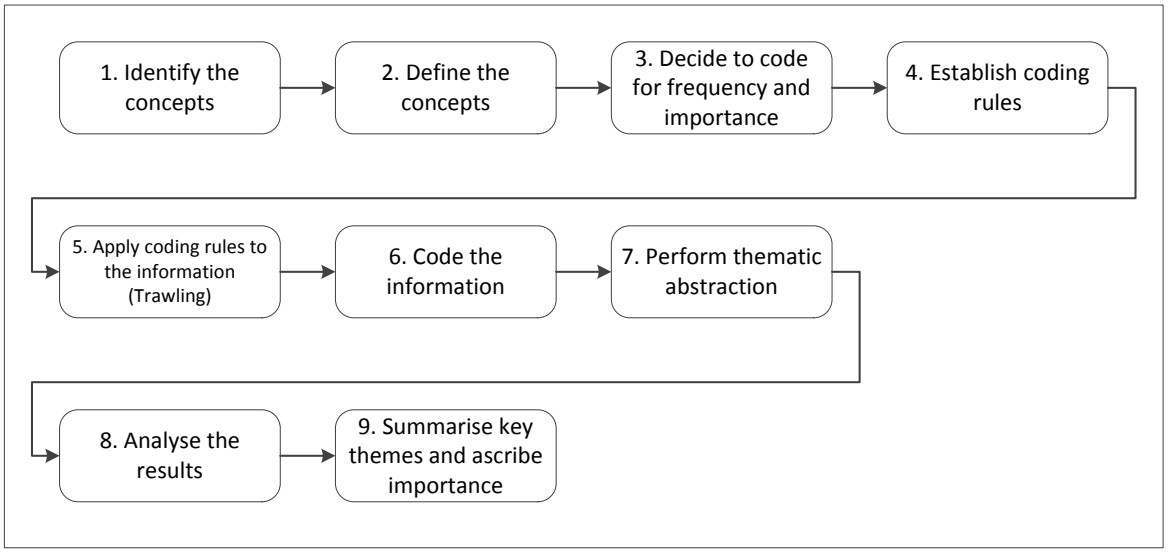


Figure 3: Content analysis process

The use of content analysis is consistent with a qualitative research instrument and is appropriate for this research due to the lack of knowledge about Enterprise Architecture effectiveness measures and critical success factors in South Africa (S. & H., 2008). An inductive approach was used with appropriate derivation of categories (Eto & Kyngäs, 2008) in order to derive the main themes of the text.

Content analysis is not merely a review and numerical counting of specific phrases and topics. It requires more thorough reading and understanding. Given that individual respondent's words and descriptions are communicated in language they are most comfortable with it is always necessary for a researcher to infer common meaning and themes and apply significance and identify patterns from each of the respondents (Wilkinson & Birmingham, 2003).

In the process of gathering the data, additional follow-up and clarification questions were posed to further elicit detail. In some instances the responses were rephrased by the researcher in order to better enable the identification of common themes. This approach proved useful as it enabled the researcher to demonstrate understanding of what is being said and also helped the respondents to determine if their thoughts, ideas and themes where correctly understood (Golafshani, 2003; Winter, 2000).

After the initial processing of the content and the identification of themes and concepts a coding mechanism is needed in order to establish a common vocabulary for use when analysing each interview. The choice of coding is important in that it enables later analysis. In order to ensure consistency in performing the coding across multiple interviews a set of codes and rules was developed based on both the literature and common concepts raised by respondents (Bell, 2014; Wilkinson & Birmingham, 2003).

To further help organise the factors and measures, closely related measures and factors were grouped together using a process of thematic abstraction. These abstracted themes helped categorise the collected data into a more condensed category system in line with inductive content analysis (Eto & Kyngäs, 2008).

The final stage of content analysis is to analyse the coded data with the view of determining meaning and significance. A pure quantitative approach would not be appropriate for this data as it would not capture the true meaning of the information (Wilkinson & Birmingham, 2003). This requires analysis of the coded content in a qualitative manner.

A goal of this research was to identify not only which measures are useful and which factors are critical for success but also which factors and measures are more important than others. Each factor and measure has been graded based on frequency. This is presented in tables 5 and 14 in chapter 4.

3.6.2 *Ontological cognitive mapping*

Content analysis alone is not sufficient to extract all the relevant information provided during each interview. This is due to relationships in the data not being adequately expressed using content coding alone (Bell, 2014; Wilkinson & Birmingham, 2003). A method for reviewing the relationships which exist in the data was needed. Thus in addition to content analysis, ontological cognitive mapping is used. This brings to light clear relationships present in the data which in and of itself represents valuable insights into the research questions. The use of ontological cognitive mapping over more traditional concept mapping is necessary due to the size of the cognitive maps (Chauvin et al., 2009).

The process followed for identifying relationships in the data using ontological conative mapping builds on relational content analysis (Chauvin et al., 2009; Wilkinson &

Birmingham, 2003). Additional steps are added after relationships in the data are coded, analysed and mapped. This involves identifying the elementary ontology concepts, abstracting the relational maps using the elementary ontologies whilst preserving relationships, and then analysing the nature of the relationship and determining the anthological influence of each relationship.

The initial analysis was performed on each question separately, however, some valuable insights were gained when the relationship between measures and success factors was examined. This was achieved by creating concept sets and concept views (Chauvin et al., 2009).

Colour, position and clustering were used to represent the different ontological dimensions of each of the main themes identified during thematic abstraction as follows:

3.6.3 *Colour*

Different colours were used for the each main theme identified during thematic abstraction. This made the creation of composite cognitive maps based on each theme much easier. The colouring of themes has been preserved through all the diagrams depicting critical success factors.

3.6.4 *Position*

The position of different factors was deliberate within each concepts. Moving from generic to specific when moving left to right in the maps. No attempt was made however to establish a clear alignment of abstraction between each concept due to the extremely diverse degrees of abstraction offered by each respondent.

3.6.5 *Clustering*

For large themes an additional level of grouping was introduced around related concepts. This proved useful when developing the final integrated map depicting the high level relationships between each critical success factor.

Clusters were based on the detail provided by each of the individual interview concept maps.

One limitation of this approach was the relationships of critical success factors between different themes could not be preserved fully as it would have resulted in extremely complex themed concept maps. The high level relationships between these themes has however been based on the individual relationships identified in each of the interviews.

3.7 Limitations of the study

The study is limited to large organisations and may not be applicable to SMMEs. The research is also limited to South Africa and may not be applicable to other countries.

The study is concerned with the management of Enterprise Architecture and not technical aspects of designing Enterprise Architectures.

Respondents may present a better picture of the effectiveness of their EAM capability that what may actually be the case.

Finally, the linking of critical success factors to key measures may not yield anything tangibly useful.

3.8 Validity and reliability

Qualitative research deals with understanding a phenomenon in its natural context by considering a number of similar situations (Hoepfl, 1997). It has been claimed that the objective of a qualitative researcher is to be transparent and uninvolved in the data gathering process (Winter, 2000); this is not always possible given the highly interactive nature of interviewing approaches.

For quantitative research the validity of the outcome is a large function of the research instrument. In qualitative research the research instrument is primarily the researcher. The focus of credibility and reliability is therefore greatly influenced by the researcher's trustworthiness and honesty (Golafshani, 2003; Winter, 2000).

3.8.1 *External validity*

External validity refers to research that is based on a sample to be a true representation of a phenomenon and can be “generalised to and across different measures, persons, settings and times” (Calder, Phillips, & Tybout, 1982).

Given the limited number of respondents in this research and the research instrument, broad scope external validity cannot be achieved, however, two key factors assist in establishing some degree of external validity.

Firstly, all respondents are persons closely associated with Enterprise Architecture Management and have extensive practical experience.

Secondly, three distinct groups of respondents were interviewed namely, Enterprise Architects, consultants in the Enterprise Architecture field and customers of the Enterprise Architecture Management process who have worked closely with Enterprise Architects over an extended period of time.

A high degree of alignment of views across these three groups is evident. This was true not only for existing practices but also true of opportunities for improvement.

In short, although this research methodology cannot be taken as a generalised view of the entire population it can be used as a base for further research and can be used to inform further enquiry.

3.8.2 *Internal validity*

In qualitative studies validity is not a single concept but “rather a contingent construct, inescapably grounded in the processes and intentions of particular research methodologies and projects”(Winter, 2000). In other words, internal validity is a product of a number of factors. The goal of internal validity is to present a piece of research as being credible based on the processes involved in sourcing and analysing the available data in such a way as for the research to be considered “proper research” (Stenbacka, 2001).

All interviews were conducted under similar conditions. The respondents were given the same brief overview of the research topic and were all asked the same open-ended

questions in order to elicit free feedback. The aim of this approach was to enable all respondents an equal opportunity to state their broad views without any interference from the researcher. Follow-up and clarification questions were asked based on the individual answers and views and not through following a specific set of questions which could have led the respondents into giving a narrow set of answers. It was only after respondents felt they had exhausted their own views that the interview helps were used as a means of assessing areas not already covered by respondent led feedback. This helped ensure that the views expressed were truly reflective of the views of those interviewed and not as a result of the researcher's bias or the existing academic theory base.

Being able to form unbiased conclusions regarding the relationships which exist within the data is a key element in attaining internal validity (Brewer, Reis, & Judd, 2000). For a qualitative interpretive study of this nature great care must be taken on the part of the researcher to ensure that the relationships proposed are truly reflective of the respondent's insights and researcher own bias (Brewer et al., 2000; Golafshani, 2003; Leedy & Ormrod, 2001). A fundamental discipline which was followed during the data gathering process was restating of key concepts and the confirmation of inferences on the part of the researcher. Whenever an inference was identified during the interviews the researcher would test this inference with the respondent. The objective of this was to enable the respondent to confirm or refute the inference. When the inference was refuted additional follow-up questions were asked to better understand the inference.

3.8.3 *Reliability*

Research reliability is to a large degree a function of the research instrument used (Winter, 2000). In this research, the instrument is primarily the researcher and so the question of reliability needs to be carefully considered, specifically researcher bias and values (Leedy & Ormrod, 2001).

To address the first challenge of reliability the researcher would state any inferences gained during the interviews to the respondent with the view to enable the respondent an opportunity to correct or approve of the inference. When the respondent disagreed with the inference additional clarification questions were asked in order to ensure that any inference was a true reflection of the views of the respondents.

Great care was exercised to ensure that there was a common understanding of technical terms not only between the researcher and respondent but consistency of terminology and meaning was applied across all the interviews.

All interviews were recorded both in note form and as audio recordings. These recordings were reviewed multiple times to ensure consistent analysis.

Key to the reliability of this research is the number of respondents covered in the sample. Although convergence emerged after only twelve interviews, an additional five interviews were conducted to further ensure reliability in the analysis of each interview.

3.9 Confidentiality and ethics

It is a general expectation of many respondents to a research interview process of this nature that their responses will be kept confidential (Pope, 1993). This is driven due to the sensitive nature of the information which is shared. The information shared could pose a potential competitive advantage should it be disclosed to a third party.

In addition to this expectation the researcher committed to each of the respondents that their responses would be kept confidential allowing the respondent margin for a greater degree of openness (Wilkinson & Birmingham, 2003).

Consequently, during many of the interviews respondents shared experiences, of both success and failure, which have proved extremely valuable to the understanding of this topic (specifically with regard to question 2).

In three instances the respondents requested that the organisation not be named. In such cases assent was given to the nature of the organisation and its industry being named.

All information gathered from respondents has been treated with the strictest confidence. Any sensitive information which could be traced back to a particular respondents or organisation has been obfuscated to ensure that there is no breach in confidentiality.

All original recordings and notes of all meetings have been appropriately disposed of.

4 PRESENTATION OF RESULTS

The key findings of the research are presented below in summary form. For a more detailed view of the responses from each respondent see Appendix E. The implications of the findings are discussed in the subsequent chapter.

4.1 Introduction

In this section the results of the two analysis techniques is presented for each question.

The results of question 1 are presented below in tabular form. The frequency of occurrence of each measure is used to order each measure from most common to least common. In order assist in interpreting, the measures are grouped by major theme and main topic. A separate list of the individual measures from each major theme and topic is then presented.

The results of question 2 are presented below as relationship maps. Each map is a composite map of each of the individual maps of each interview and represents a main line of thought/causation. Appendix E contains the individual maps for further reference. Appendix E also contains a key to each map where the particular measures summaries in question 1 are sourced. The relationship between measure and critical success factor is explored in the subsequent chapter.

4.2 Response to research question 1

Research question 1 sought to determine the exact measures which organisations were using to measure the effectiveness of their Enterprise Architecture Management capabilities. During the interviews a total 101 measures for effectiveness were given by the respondents. Many of these measures overlapped or were given multiple times.

Major themes

In order to derive meaning these 101 measures were reviewed and grouped according to major themes and sub-themes. The table and graph below lists the main themes and the number of times a measure was given.

Table 5: Major themes

Major themes	Frequency
EA KPI's defined directly in business terms	30
Costs	25
Delivery time	18
Internal measures	16
Reliability	7
Satisfaction	5
Total	**101**

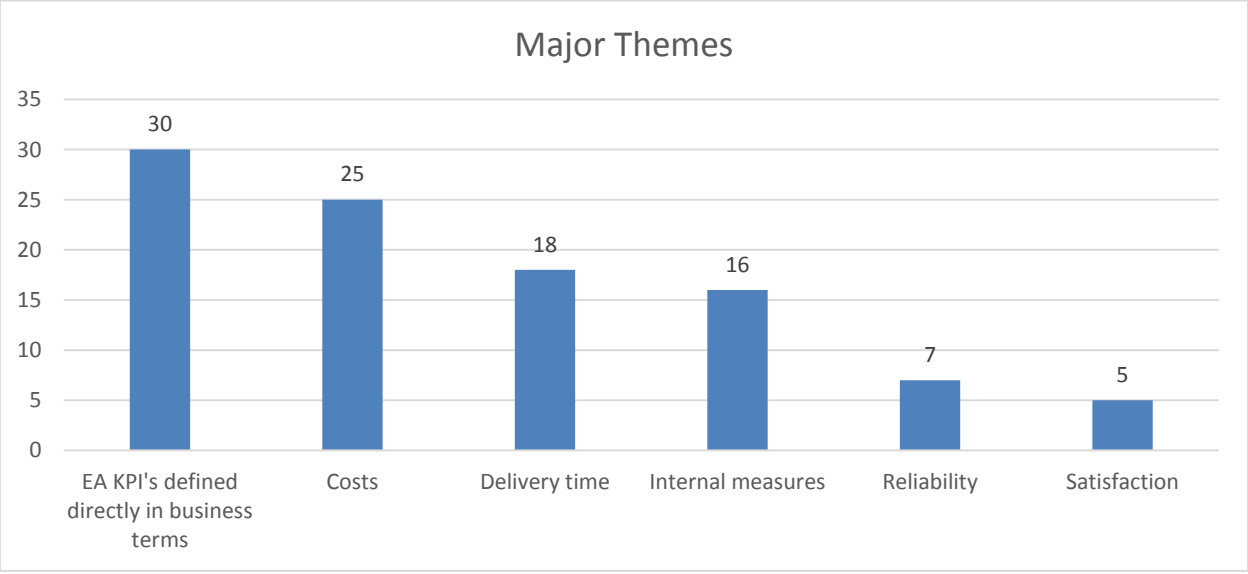


Figure 4: Graph – Major themes

4.2.1 *Measure type*

In addition to the major themes listed above, themes were qualitative or quantitative. When generic high-level measures were suggested without giving specific examples they were classified as themes. The table below details this breakdown.

Table 6: Measure types

Measure type	Frequency
Quantitative	70
Qualitative	22
Theme	9
Total	**101**

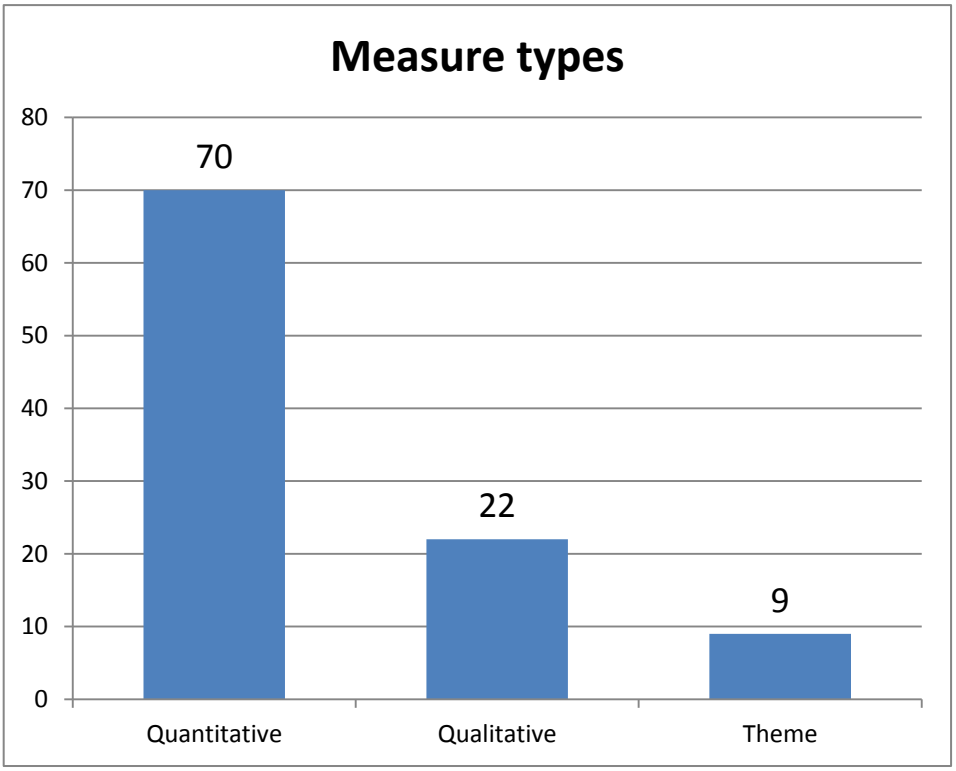


Figure 5: Graph – Measure types

4.2.2 *Major theme – EA KPIs defined directly in business terms*

The definition of EA KPIs directly in business terms was the most frequently mentioned theme (30 times). After reviewing the individual measures some commonality existed

amongst the respondents. The table below lists all the unique measures. The number of measures given for each sub-theme is given in brackets after each sub-theme.

Table 7: Major theme – EA KPIs defined directly in business terms

Sub-theme	Measure
Business outcomes (11)	• How well aligned is the Architecture to the business' strategy? Can we achieve our objectives? • Are we actually achieving the strategic plans? • Is the business meeting its objectives? (Daily, monthly, quarterly, annually etc.) • Compare the business priorities to the IT priorities. • What have we actually enabled the business to achieve? • What business KPIs are we improving? • What does business actually get from this? • What business capabilities have we missed? • What are the critical stakeholder measures?
Business case metrics (7)	• Are we delivering on the business case? • Was the functionality of the business case delivered? • Was the business value of the business case realised? • All architecture initiatives need a business case. The benefits defined in the business case become the KPIs for measuring EAM and EAM's return on investment.
Profitability (6)	• Measure the entities profit/loss. (Department, division, product line, organisation as a whole) • What is the future business profitability outlook?
Business architecture metrics (4)	• Establish key business architecture measures (e.g. cost to serve, time to market, issue turnaround time). • Define the value of EAM as improvements to key business architecture metrics or KPIs
Customer services (2)	• Customer satisfaction. • Customer service performance.

4.2.3 *Major theme – Costs*

The next most given measure was costs. Costs can be ascribed to almost all activities within an organisation and are generally well understood and measured easily. This is advantageous to the EAM capabilities because the cost savings achieved from EAM interventions can be quickly quantified and can thus form the basis to justify further funding for EAM.

Table 8: Major theme – Costs

Sub-theme	Measure
Business operational costs (11)	• Cost per widget • Reduction in costs • Process efficiency/improvement (process waste) • Reduce the cost to serve, increase the bottom line • Error rates of people/amount of rework • Processing times/effort • Error rates and input costs • Headcount • Productivity per head • Core customer service metrics/costs
Costs of keeping the lights on (7)	• Cost of the architecture • Cost of running the architecture • What does it cost to run core business processes? • What does it cost to run IT? • What cost savings can be achieved?
Change costs (6)	• What does it cost to make changes to the architecture? • What is spent on rouge projects? • What is the opportunity cost of changes? • The cost of projects • Cost to market
Project count (1)	• Number of projects/focused effort

4.2.4 *Major theme – Delivery time*

The measuring of delivery time was cited by all respondents, involved in solution delivery and by all but one EAM consultant, as important. This is due to the fact that improvement in delivery time is regarded as one of the key promises of EAM (Brown, 2004).

Table 9: Major theme – Delivery time

Sub-theme	Measure
Agility (13)	• Time to market • How quickly can our architecture change? • Are we delivering quickly enough (defined by business)? • Time to implement • Turnaround times • How quickly can we adapt to new products? • Time reduction for change
Flexibility (5)	• How adaptable is our architecture to change? • Ability to launch new products/channels (frequency of additional) • Success of new offering launch • Rate of change to new products • Business model agility in addition to traditional architecture agility • How quickly can we change our business processes? • What degree of reuse do we attain?

4.2.5 *Major theme – Internal measures*

Table 10: Major theme – Internal measures

Sub-theme	Measure
Degree of standardisation (6)	• Homogenous versus heterogeneous environment • Degree of deviation from best practices • Are our standards being met? • COTS versus Bespoke • Degree of standardisation versus customisation
Influence: Enhanced decision making (4)	• More detail when considering investment choices • Number of insights/position papers developed • Number of insights/position papers adopted • Number of decisions influenced and the degree of influence
Gaps in architecture (2)	• Differences between current and to-be architecture • Quantification of the gap between current and target
Documentation usage / quality (2)	• Quality of documentation • Relevance of documentation (usage)
Meetings attended (1)	• Number (percentage) of key meetings attended
Reference measures (1)	• How much of the EA is informed by frameworks (including business process frameworks)?

4.2.6 *Major theme – Reliability*

Table 11: Major theme – Reliability

Sub-theme	Measure
Outages (4)	• Number of outages/failures • Actual architecture stability/availability • Time to return to service • Down time
Cost of outages (1)	• Impact analysis
Support calls (1)	• Help desk support calls
Performance (1)	• Performance of architecture

4.2.7 *Major theme – Satisfaction*

Table 12: Major theme – Satisfaction

Sub-theme	Measure
Organisation internal customers (4)	• Quality of interaction with key stake holders • Surveys and feedback sessions – Are we doing a good job? • Perceptions of customers (360 degree feedback) • Perceptions of the value added by the EAM team to projects, decision making, and organisation.
Customers of the business (1)	• How well are we servicing the customers?

4.2.8 *Measure types – Quantitative*

It was universally agreed that quantitative measures were the easiest to define and track. The majority of all measures supplied were quantitative.

4.2.9 *Measure types – Qualitative*

Qualitative measures focused on the attributes of the architecture as a whole and of the perceptions of EAM. The sub-themes most frequently identified as qualitative are listed below:

- **Business outcomes** – The types of measures most commonly mentioned here are focused on attainment measures. E.g. “Are where meeting objectives?” and “Are we meeting strategic plans?” Although many measurements for these two themes can be quantified, the key theme of these two measures is referred to if the architecture possesses the attributes required to meet business outcomes.
- **Internal organisation customers –** These measures deal mainly with perceptions of value-add and perceptions of internal customers. A key challenge identified with this measure was how to measure the perceptions of the internal organisation customer. A common view amongst respondents was that this measure will be the main lag measure of all other measures of value. To quote one respondent, “The proof is in the pudding and in the eating”.
- **Degree of standardisation** – Although it is possible to numerate instances of deviation from standards, the measure of the impact of these deviations is more likely to be qualitative than quantitative. Many of the respondents provided expels of quantitative measures for standardisation. Additionally, measuring the degree of standardisation in itself is not a direct reflection on value as the universal adoption of standards can lead to poor solution fits and low levels of innovation.
- **Influence**: **Enhance decision making** – This measure is similar to internal organisation customers. Although an important measure the quantification of influence is difficult. Furthermore, there are a number of other factors which can contribute to good or bad decision making. Thus it becomes necessary to measure the ability of an EAM to influence decision making qualitatively.

4.2.10 *Measure types – Theme*

Some of the respondents could only suggest a general theme as opposed to individual measures. There were only two major themes mentioned namely:

- EA KPIs defined directly in business terms
- Internal measures

Both these themes have already been covered above and will be explored in more detail in the next section. Fundamental however, is that there was a high degree of agreement amongst those respondents on the importance of the theme "EA KPIs defined directly in business terms". This will be discussed in the next chapter.

4.2.11 *Comparison to literature review*

The table below builds on

Table 1 by including the results of the research as an additional column.

Table 13: Literature review – high-level comparison to research findings

Source	*(Abaas, 2010)*	*(Boucharas et al., 2010)*	*(Broer & Roeleven, 2009)*	*(Brown, 2004)*	*(Günther, 2015)*	*(Long, 2009)*	*(Schmidt & Buxmann, 2011)*	***Research***
Measure (theme)								
Agility / IT Flexibility	F	D	F	F	F		F	F
Alignment	F		F	F	F		S	F
IT Efficiency	D		F	F		S	F	F
Attainment of organisational goals		F			F	S		F
Business process benefits		F	F	F				F
EAM benefits		F					S	F
Customer outcome		F				S		F
Financial outcome		F				S		F
Costs			F	F	F	F	S	F
Risk reduction			F		F			F
Readily available EA artefacts				F				D
External partnership			F	F	F			
Decision making					F			S

Key:
F – Measure is clearly defined and developed
D – Measure is not explicitly stated but can be derived or inferred
S – Measure is suggested at a high level

4.2.12 *Conclusion*

Measuring the effectiveness of Enterprise Architecture Management is regarded as important and worth the necessary effort. There are many different ways of measuring the effectiveness of EAM. The choice of measure is highly contextual and requires careful analysis before measures are chosen. What is clear is the chosen measures must be easy for the rest of the business to understand as internal measures for EAM are of little use outside of the EAM practice.

4.3 Response to research question 2

Question 2 sought to identify the critical success factors which contribute to successful Enterprise Architecture Management. Question 2 builds on the foundation of question 1 in that the objective of question 2 is to identify what contributes to success as defined in question 1.

During the interviews a total of 518 success factors were identified by the respondents, with an average of 30 factors each. Many of the factors given overlap or were given multiple times. Content analysis was applied to each interview and a set of coded interview summaries was created.

4.3.1 *Major themes – critical success factors*

The coded interview summaries were analysed to identify relationships between factors and then colour coded around eight major themes to enhance their readability. These colour coded maps were then used to create eight major theme maps. The major theme maps are presented below.

For each major theme map critical success factors have been ordered from left to right in line with ontological relationship maps moving from high-level concepts to detailed activities or principles. In addition they have been grouped into major clusters in line with an ontological relationship mapping approach.

There were eight major themes identified as being critical to the success of EAM. Each is presented in subsections below as anthological relationship maps and will be discussed in more detail in the next chapter.

The frequency that each theme was mentioned suggests a degree of importance or precedence. The table below lists the eight themes in order of frequency.

Table 14: Major themes – critical success factors

Major theme	Frequency
It's all about the business	159
Soft skills	115
Support generating outcomes	75
Technical execution / abilities of EAM and EAs	65
Structure / accountability of EAM	44
Governance	30
Successful delivery of valuable change	17
Business trust in EAM	13
Total	**518**

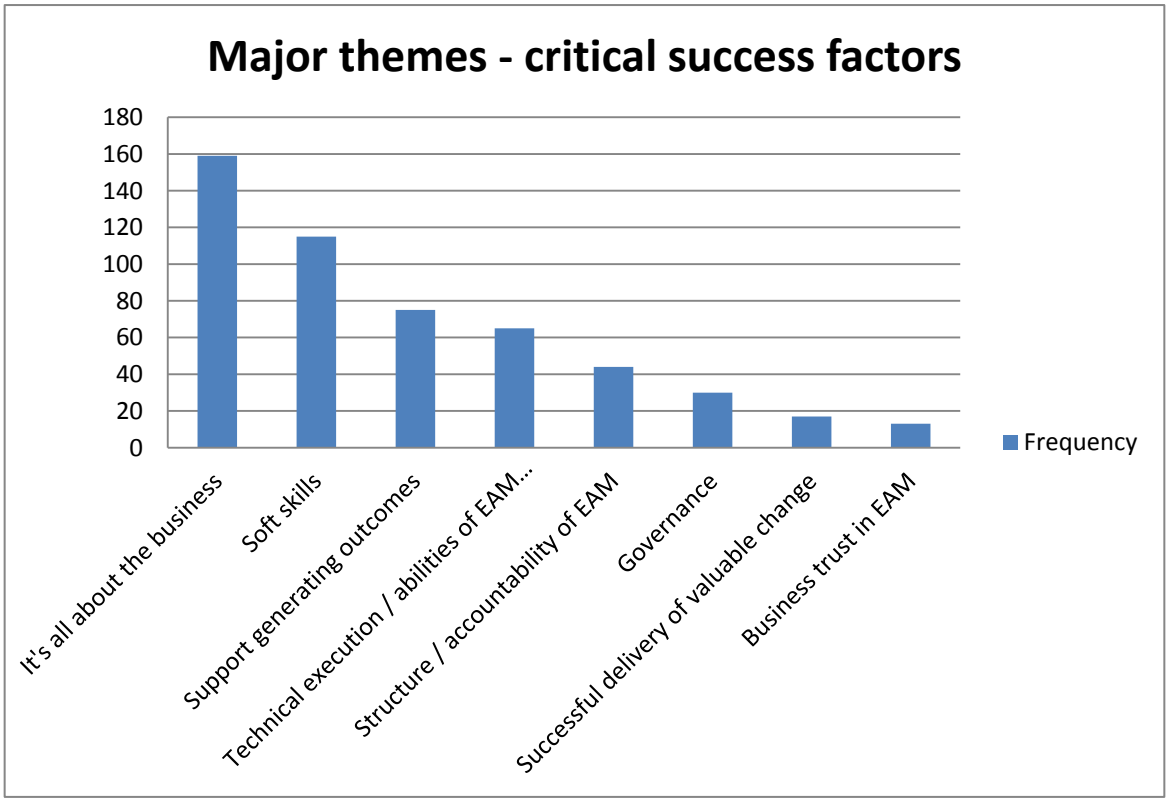


Figure 6: Graph – Critical success factors

4.3.2 *Respondent / Critical success factor response matrix*

The table below gives a breakdown of the frequency of each major theme given by each respondent. It is worth noting that the items mentioned most frequently are also factors universally mentioned by each respondent. Three if these factors are universally mentioned.

Table 15: Respondent / Critical success factor response matrix

Themes	Interview 1	Interview 2	Interview 3	Interview 4	Interview 5	Interview 6	Interview 7	Interview 8	Interview 9	Interview 10	Interview 11	Interview 12	Interview 13	Interview 14	Interview 15	Interview 16	Interview 17	Total	Weight	Cumulative weight	Mention %
It's all about the business	5	8	10	5	11	11	10	12	14	5	12	5	9	10	10	11	11	159	30.7%	30.7%	17
Soft skills	9	2	10	13	7	5	5	6	3	17	8	4	4	3	5	10	4	115	22.2%	52.9%	17
Support generating outcomes	3	6	5	6	5	9	1	1	6	2	6	2	5	1	6	6	5	75	14.5%	67.4%	17
Technical execution / abilities of EAM and EAs	6	3	1	2	6	0	11	8	5	2	7	2	5	1	1	5	0	65	12.5%	79.9%	15
Structure / accountability of EAM	3	1	3	4	2	1	3	3	1	0	1	2	2	6	11	0	1	44	8.5%	88.4%	15
Governance	1	1	3	2	3	1	2	3	3	3	0	0	0	0	3	1	4	30	5.8%	94.2%	13
Successful delivery of valuable change	2	4	0	2	1	1	1	0	0	0	0	1	0	1	3	0	1	17	3.3%	97.5%	10
Business trust in EAM	3	0	0	1	0	0	0	0	0	0	1	2	0	0	0	2	4	13	2.5%	100.0%	6
																		518			

Figure 7: Table – Critical success factors

4.3.3 *Major theme – "It's all about the business"*

There are 159 factors (30.7% of all success factors given) that suggested focusing on the improvement of business and business architecture, making this the most strongly stated critical success factor.

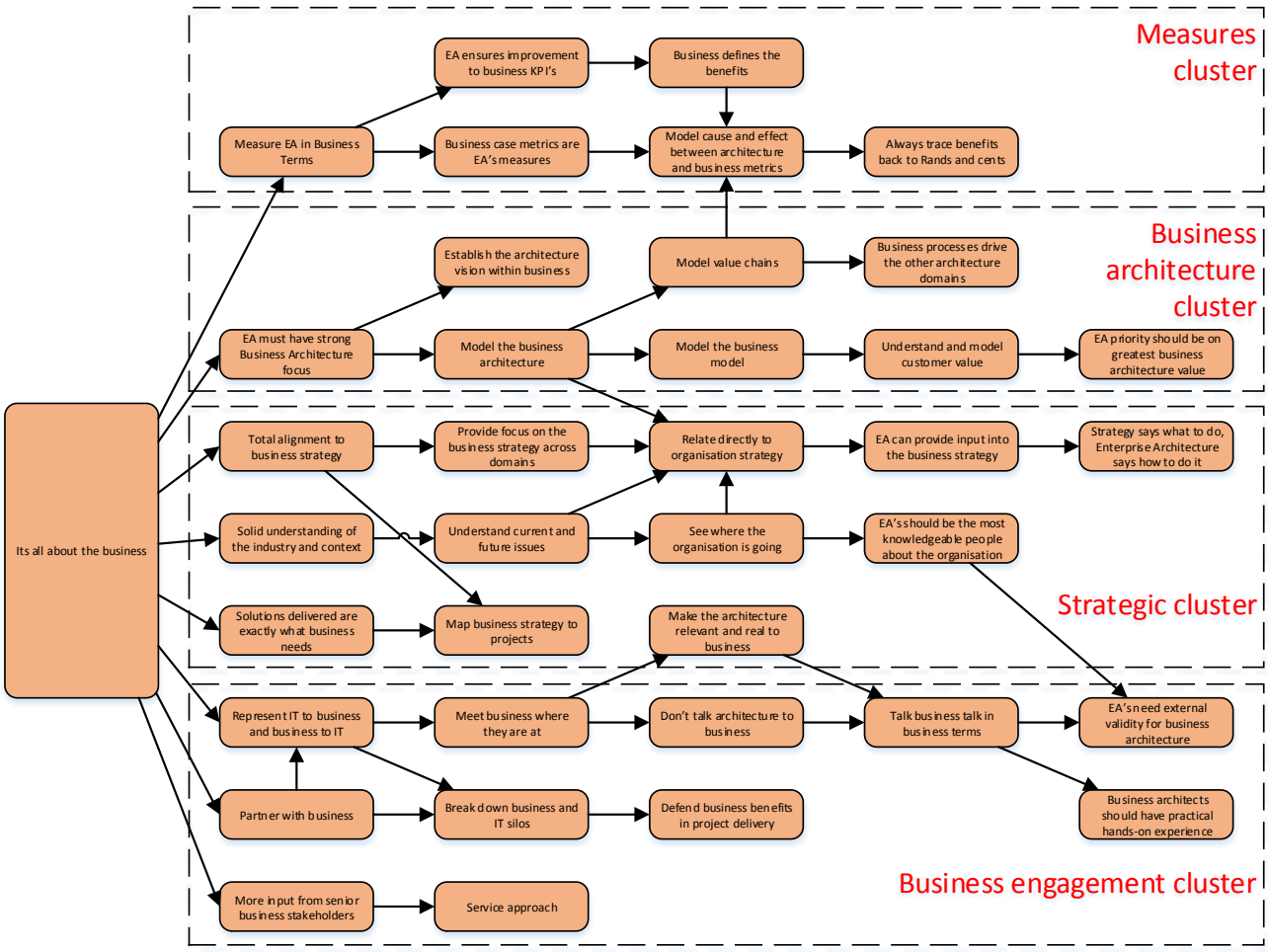


Figure 8: Relationship map – "It's all about the business"

The factors have been grouped into four clusters namely:

- **Measures cluster** – The importance of implementing measures which focus on business outcomes was established in question 1. This cluster represents some detail around how this should be achieved. The common message in this cluster is that EAM should identify those business measures most relevant to the business' performance, map the relationship between these measures and the enterprise architecture, and then adopt changes to these measures as a reflection on EAM.

- **Business architecture cluster** – One of the most overlooked architectures covered by EAM is the business architecture. Views from respondents were emphatic on the importance of focusing on the business architecture. Many respondents expressed the view that EAM without business architecture is just solution architecture and not true enterprise architecture. Respondents further suggest that effective business architecture modelling is more than organisational structure and processes but also includes understanding the business model and customer value proposition.
- **Strategy cluster** – The strategy cluster highlights the importance of EAM working with the strategy functions of organisations in order to, both, take direction from as well as provide input into the business strategy. One strongly expressed view was that EAM should belong to business strategy and not to ICT (Information and Communications) departments.
- **Business engagement cluster** – Business engagement refers to the approach that EAM takes to working with business stakeholders. The key message is that EAM should engage with business in a manner familiar to business. EAM should "speak business speak" and not "architecture speak". As one respondent put it, "When you speak architecture, business switches off". Another key message of this cluster is the importance of EAM representing business to IT and ensuring business' interests are being protected during change initiatives.

The implications of these clusters will be discussed in the next chapter.

4.3.4 *Major theme – Soft skills*

Perhaps the most surprising result from this research is how technical abilities are not nearly as important as the soft skills of the EAM staff, specifically those of the chief architect. This theme was the second most mentioned theme in the research with 115 (22.2%) of all factors.

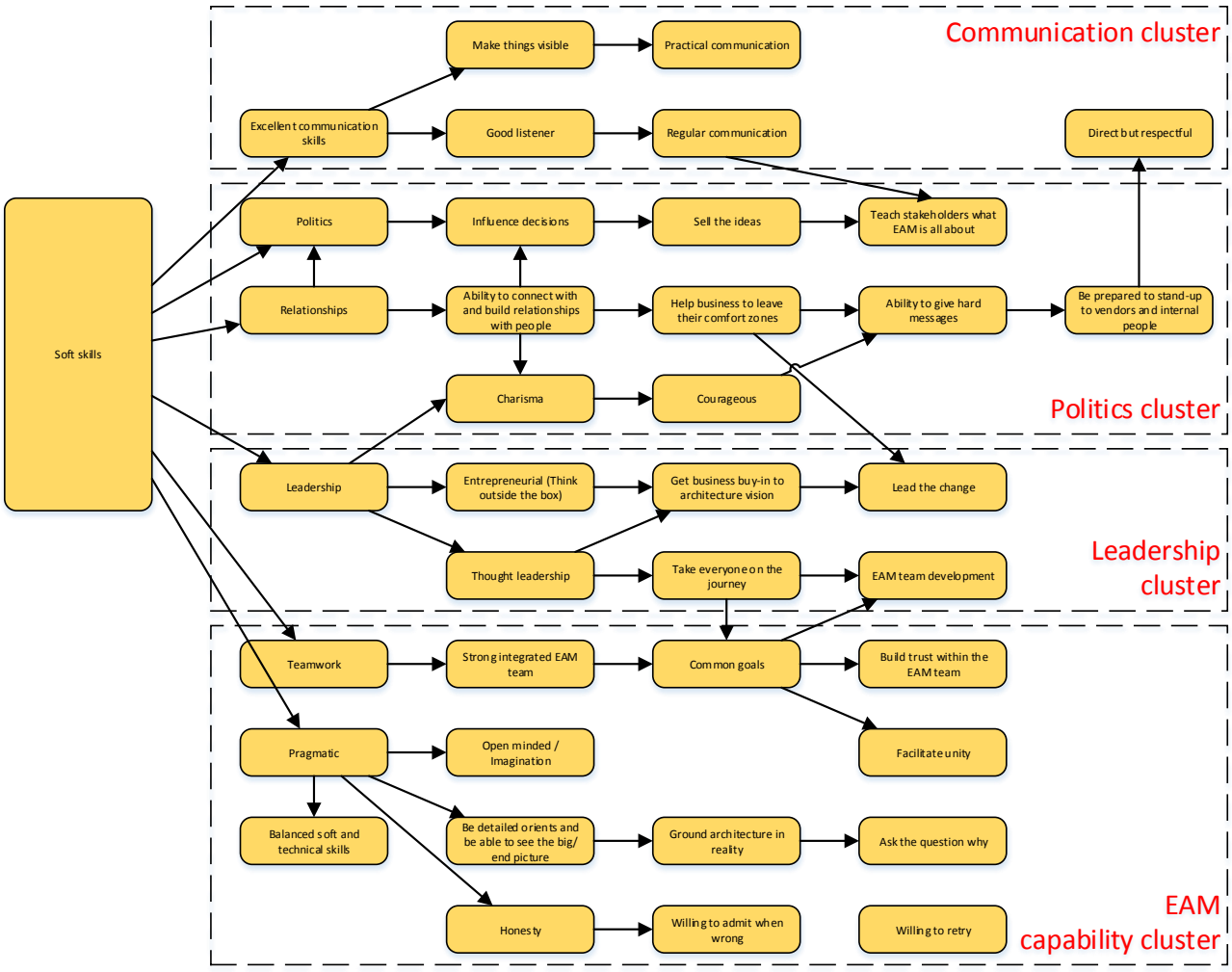


Figure 9: Relationship map – Soft skills

The factors have been grouped into four clusters:

- **Communication cluster** – Communication skills on the part of EAM staff is essential in effectively engaging with business. EAs with poor communication skills are unable to effectively engage with business and as such are unable to achieve

the success factors identified in the preceding major theme “It’s all about the business”.

- **Politics cluster** – Being able to achieve any significant influence within the organisation can only be achieved if EAs are able to understand the underlying politics within an organisation. The ability of EAs to influence and lobby is suggested as an essential skill. An EAMs ability to deliver any change, specifically to the business architecture, is severely limited if these skills are lacking.
- **Leadership cluster** – Effective EA’s are leaders and change agents. They are able to lead organisations in change.
- **EAM capability cluster** – This cluster refers to the soft issues which should be present within an EAM practice. Teamwork and internal trust were some of the key factors of this cluster.

The implications of these clusters will be discussed in the next chapter.

4.3.5 *Major theme – Technical execution/abilities of EAM*

This theme deals with the technical abilities of the EAM practice and EAs. Where the previous theme deals with the importance of soft skills this theme deals with the importance of technical skills to the success of EAM. Based on the responses of respondents, when paired with soft skills, a complete picture of the skills that EAs should possess is provided.

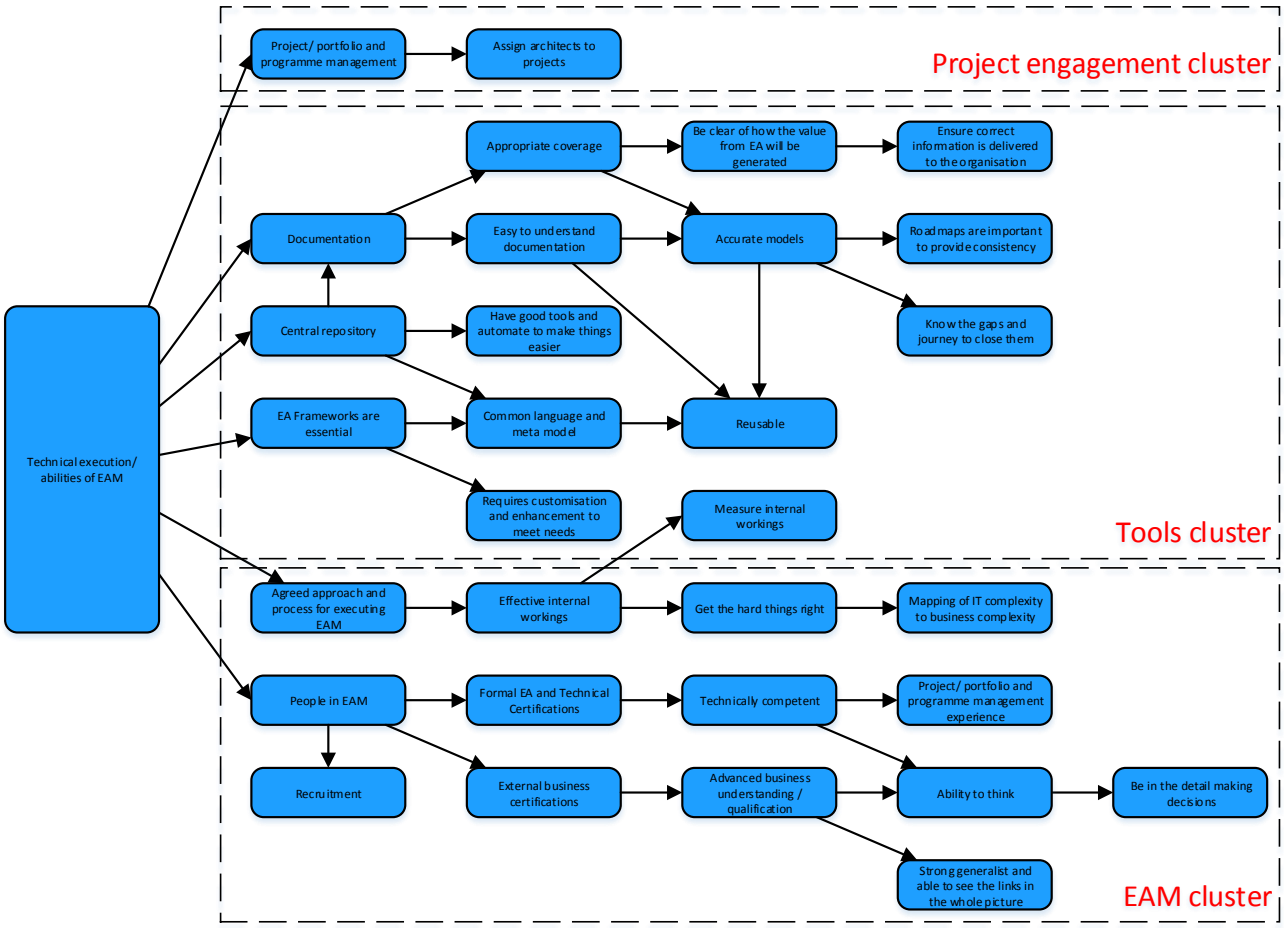


Figure 10: Relationship map – Technical execution / abilities of EAM

The factors have been grouped into three clusters namely:

- **Project engagement cluster** – EAs need to engage proactively with programs and projects.
- **Tools cluster** – Although the specific choice of tools was not deemed important the need for a set of tools is essential. Tools are more than just applications but also

include: the framework, documentation methodology, documentation and documentation methodology.

- **EAM cluster** – Like EAM cluster in soft skills, the technical abilities of the EAM and EAs cannot be overlooked. One respondent summed this cluster by saying, “There is no substitute for good architecture thinking”. The importance of recruitment and skills is explored together with formal training, hands-on experience and focus of EAM.

The implications of these clusters will be discussed in the next chapter.

4.3.6 *Major theme – Structure / accountability*

This theme deals with the placing of EAM within the greater business organisation. Almost all respondents agree that EAM should not sit within ICT but should have a business reporting line.

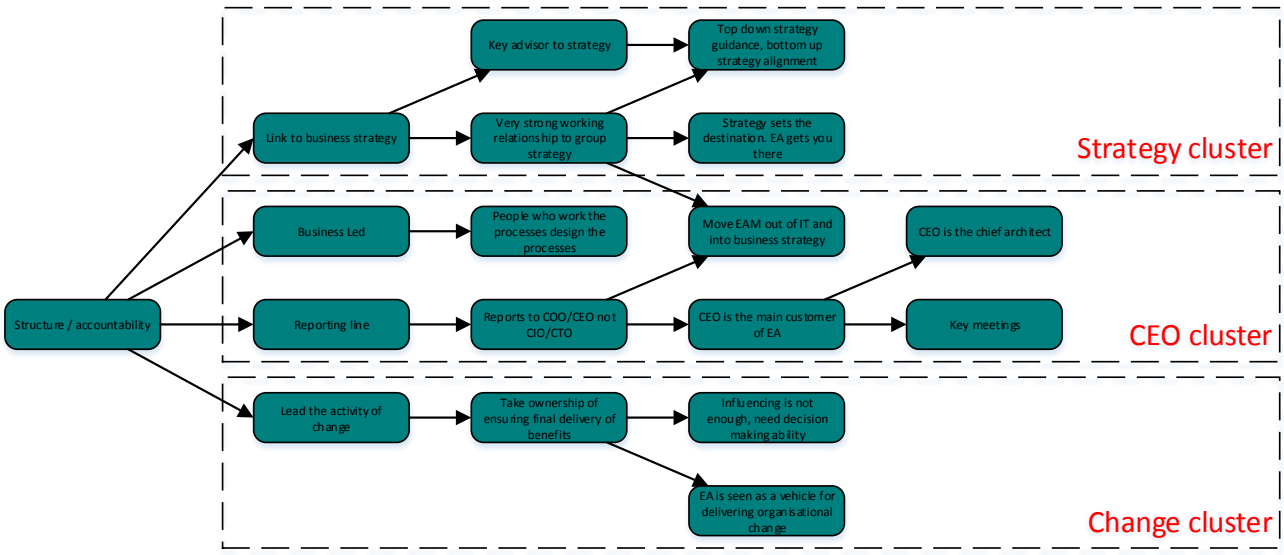


Figure 11: Relationship map – Structure / accountability

The factors have been grouped into three clusters:

- **Strategy cluster** – The importance of bringing EAM closer to the strategy capability within an organisation was stated strongly. One respondent summed up the un-tapped potential of this relationship as follows: “Strategy tells a business what to do, Enterprise Architecture tells an organisation how to do it”. Despite the potential of this alignment being a strong theme none of the organisations involved in the study actually had this arrangement.
- **CEO cluster** – The importance of the business architecture in EAM is further emphasised by the view that EAM should be a business led capability with direct reporting to senior organisation stakeholders. One respondent summed this up by stating: “When you think about it, the CEO is actually the chief business architect.”
- **Change cluster** – The final main idea expressed in this cluster is that EAM should be held directly responsible for change within the organisation. One key distinction here is that EAM is not actually making the changes but rather managing and

coordinating change within the organisation, as well as using existing delivery vehicles to ensure that change is managed and aligned to business priorities and needs.

The implications of these clusters will be discussed in the next chapter.

4.3.7 *Major theme – Support generating outcomes*

This theme deals with outcomes which enhance the ability of EAM to operate within the organisation. Although each of these is the result of other factors they are identified as success factors in growing the scope of EAM within an organisation and have been presented separately.

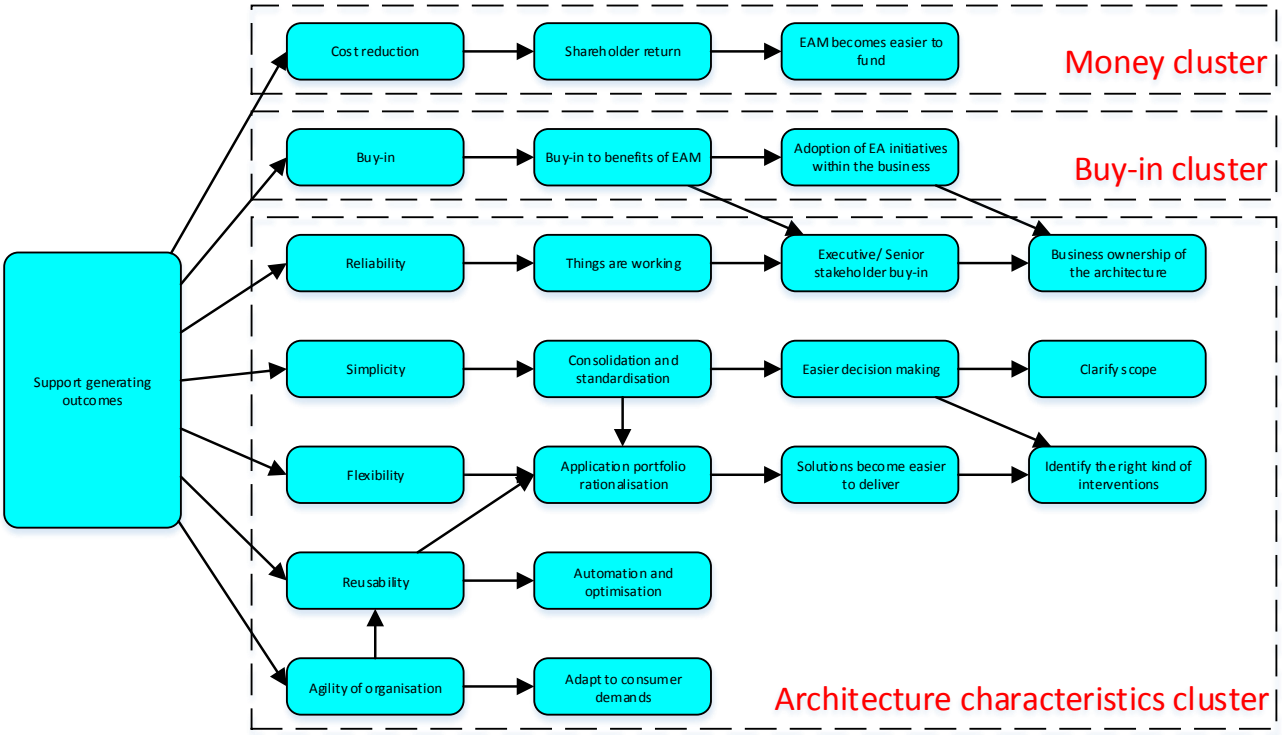


Figure 12: Relationship map – Support generating outcomes

The factors have been grouped into three clusters namely:

- **Money cluster** – This cluster deals with how EAM is able to improve the financial prospects of the organisation which in turn can justify expense on EAM.

- **Buy-in cluster –** This cluster deals with the types of buy-in that enable greater EAM success and scope.
- **Architecture characteristics cluster** – This cluster groups those characteristics of the architecture as a whole which should improve as EAM activities are effectively executed within the organisation. This includes, flexibility, reliability, agility reusability and simplicity.

The themes presented thus far represent almost 90% of the total factors presented by the respondents. The remaining are important but less mentioned factors.

4.3.8 *Major theme – Governance*

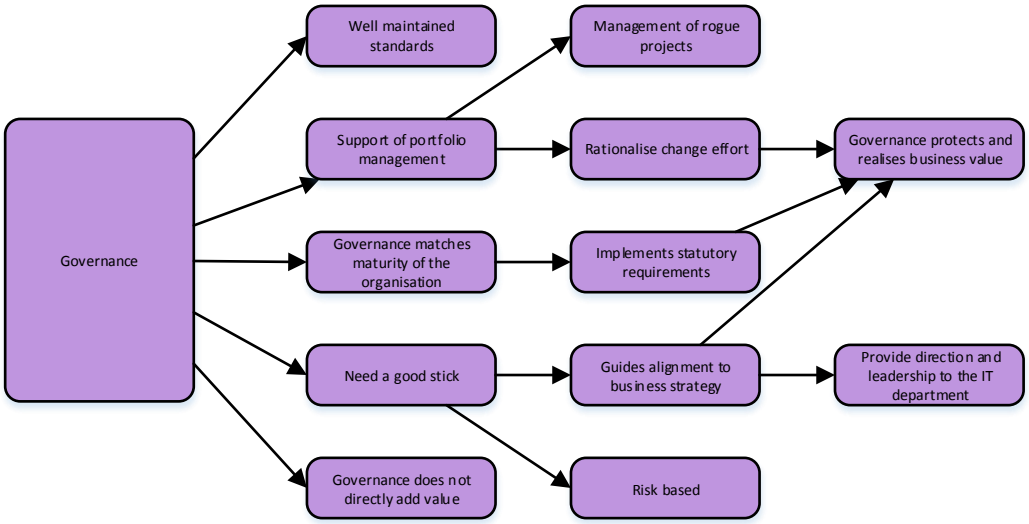


Figure 13: Relationship map – Governance

This theme deals with the importance of governance. Although governance has been identified as important it, as one respondents said, “adds no direct value”. Governance is viewed as being highly context specific with many different factors that must be considered when implemented. It is, at best, the gatekeeper for many EAM activities and as such is only a check and balance to those activities which drive value.

4.3.9 *Major theme – Successful delivery of valuable change*

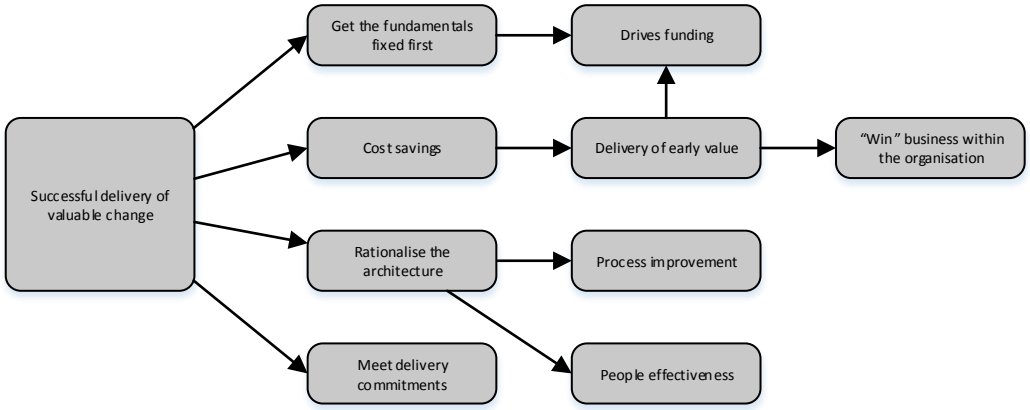


Figure 14: Relationship map – Successful delivery of valuable change

This theme deals with the importance of delivering valuable change as a product of EAM. Although this is an outcome in and of itself the importance of this outcome warranted specific mention and exploration. The key message of this is early, measurable, business improvement is fundamental to "win" business within the organisation.

4.3.10 *Major theme – Trust*

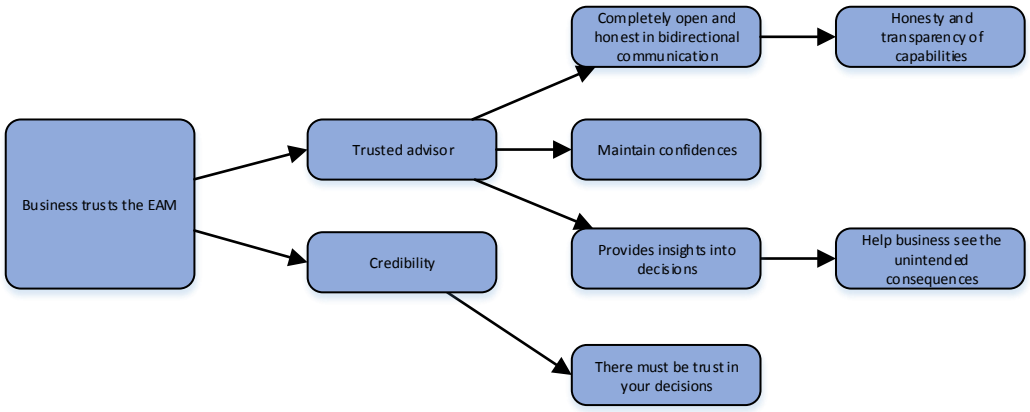


Figure 15: Relationship map – Trust

This theme deals with the importance of trust in successful EAM. Like the early value delivery above, this is an outcome that enhances the support for EAM. Given its prominence it has been classified as its own theme. The key here is that without credibility

and maintaining the role of being a trusted advisor, EAM will not be able to influence the organisation or be close enough to the key issues to be able to provide valuable insights.

4.3.11 *Comparison to literature review*

The table below builds on

Table 2 by including the results of the research as an additional column.

Table 16: Literature review – high-level comparison to research findings

Source	*(EA Directions, 2007)*	*(Schmidt & Buxmann, 2011)*	*(Broer & Roelev en, 2009)*	*(Günther, 2015)*	*(Brown, 2004)*	***Research***
Success factor (theme)						
Culture	F	S				F
Project success	F	S		S		F
Politics	F					F
Clearly defined objectives		S	F	F		F
Leadership	F					F
Successful delivery of change		S		D		F
Sponsorship involvement	F	F	S	F	F	F
Business requirements / linkage / alignment	F	S	F	D	F	F
EAM Models		F	S	D		F
Development environment		S		S		
Alignment to strategy		S		F		F
Technical skills / EA Resources	F	S		S		F
Tools	F	F	S	D		F
Governance	F	F	F		F	F
Communication	F	F	S	D		F

Key:
F – Measure is clearly defined and developed
D – Measure is not explicitly stated but can be derived or inferred
S – Measure is suggested at a high level

4.3.12 *Conclusion*

What drives effective EAM capabilities is broad and complex and as with measures, highly context specific.

When assessing the effectiveness of an EAM capability it is important to consider:

- **It's all about the business** – Whether the focus of the EAM is on business or IT concerns.
- **Soft skills** – Communication, leadership and political abilities as well as soft EAM capability aspects.
- **Support generating outcomes** – Success is important as it leads to greater buy-in and future success. Failure to deliver success will quickly erode buy-in and support.
- **Technical execution/abilities of EAM and EAs** – Important as “there is no substitute for good architecture thinking”.
- **Structure/accountability of EAM** – EAM generally is own by ICT departments and therefore struggle to deliver any real tangible business value.
- **Governance** – Governance is essential but “adds no direct value” to the organisation and must be carefully implemented and adjusted to the context of the organisation.
- **Successful delivery of valuable change** – Successful delivery needs to be early, regular and if cost savings are achieved can be a great source of motivation for EAM funding and program expansion.
- **Business trust in EAM** – Business needs to trust EAM in order for EAM to achieve any real changes within the organisation and thus be able to partner with business in delivering business architecture change and developing future strategy.

The factors presented here are by no means presented as an exhaustive list, however, given the number of factors, their breadth and the high degree of convergence amongst the respondents; these factors provide a solid foundation for further discussion.

4.4 Summary of the results

4.4.1 *Measures*

How to measure success and what makes an EAM successful is an incredibly complex question with a broad set of factors to consider.

Measures can be both quantitative and qualitative in nature. Qualitative measures tend to be more subjective and as such are harder to measure.

Measuring EAM effectiveness in business terms offers significant value to organisations as it provides business stakeholders with measures that they are able to relate to directly. Measures include: business outcomes, business case metrics, profitability, business architecture metrics and customer service measures.

Costs also provide a valuable means for measuring EAM effectiveness. Costs include: business operational costs, costs of keeping the lights on and change costs.

Delivery time, (agility and flexibility of the EA) is an important lead indicator for EAM effectiveness but are not as useful to business stakeholders as the previous two measures.

Internal measures of the effective running of the EAM capability are useful for identifying issues with the EAM capability, but are not as valuable to business stakeholders. At most these measures can be considered as lead indicators for success and not indicators of success alone.

The reliability of the architecture is useful when considering lost productivity, however, it is not a direct measure of effectiveness from a business stakeholder’s perspective as it does not generate value directly.

4.4.2 *Critical success factors*

There are a number of critical success factors which influence the overall success of an EAM capability.

Like measures, making business the central theme to everything that an EAM capability does is most important. This done by beginning with adopting business measures.

The need to focus on business architecture is essential if any significant benefits or value is likely to be delivered by the EAM capability. EAM capabilities should engage with business stakeholders in a proactive way, reflecting a service mentality. EAs need to speak to business in language which is natural to the business stake holders and not use “architecture speak”.

The next most significant set of success factors is soft skills. These include communication, political awareness and ability, leadership skills and soft skills of the EAM capability as a whole. There is general agreement as to the importance of these factors however there is little supportive existing literature. Additionally, EA frameworks provide little guidance on how to improve the soft skills of an EAM capability.

The effective running of the technical side of an EAM capability is almost assumed. It provides little value on its own and serves only as a foundation for subsequent value generating activities.

There is general agreement that the predominant structural arrangement of EAM capabilities needs to be changed. EAM capabilities should not be IT functions but rather business functions with business accountability. This assumes that the EAM capability has an existing business architecture domain focus area or is tightly integrated with another function within the organisation performing this function.

Additionally recognition of the CEO as the chief business architect should be made with board level representation of EAM.

Finally EAM should be made more accountable for the realisation of business benefits brought about by business change. In order to facilitate this accountability, EAM capabilities need to be empowered with decision making authority on behalf of business.

During the execution of EAM there are several outcomes which are seen as success factors in and of themselves. These include, cost savings, business buy-in due to success and improvements to the overall architecture.

Governance plays an important role in aligning business benefits realisation but does not deliver value in and of itself. Governance processes the need to be organisation context specific and be focused towards ensuring business benefits realisation.

This theme deals with the importance of delivering valuable change as a product of EAM. Although this is an outcome in and of itself the importance of this outcome warranted specific mention and exploration. The key message of this is that early, measurable, business improvement is the key to “win” business within the organisation.

Trust is a final critical success factor for EAM success. This theme deals with the importance of trust in successful EAM. Like the early value delivery above, this is an outcome that enhances the support for EAM however given it’s prominence it has been classified as its own theme. The key here is that without credibility and maintaining the role of being a trusted advisor EAM will not be able to influence the organisation or be close enough to the key issues to be able to provide valuable insights.

5 DISCUSSION OF THE RESULTS

5.1 Introduction

The purpose of this section is to discuss the results and explain them. The discussion will follow on from the descriptions of results provided in the previous section. The main objectives of this section are to explain the results, as well as derive further meaning and significance.

As question 1 lays the foundation for question 2, it will be discussed first. After question 2 has been discussed a final discussion on the relationships between question 1 and 2 will be presented.

A key aspect of this section will be the presentation of various analysis tools which can assist in the application of this research in the real world.

5.2 Demographic profile of respondents

A review of the responses of each respondent within the context of their role within EAM in most instances reveals little in the way of strong groupings/ clustering. However there are two exceptions worth noting:

1. EAM consultants seemed to consider the importance of “It’s all about the business” significantly lower than all other categories, with very few mentions occurring. Their main focus area was “Soft skills”. This was not too surprising as this group tended to favour the measurement of EAM in terms of costs of maintaining the architecture as opposed to all other roles, mentioning “EAM KPIs defined directly in business terms” most frequently. This suggests a possible disconnect between the where EAM consultants view their focus of delivery and value versus other EAM role players.
2. Executive sponsors mentioned “It’s all about the business” more frequently than soft skills, technical skills or accountability. This suggests that executive sponsors, prioritise the need to see EAM focusing on the business. This could suggest a general willingness on their part to engage proactively with EAM in improving EAMs

focus on business issues. This makes sense as it suggests that executive sponsors are focused more on business results than any other consideration.

Apart from the two groupings above, the relative frequency of mention for measures and success factors was fairly consistent across the different EAM participant groupings. Given the relative low number of respondents per grouping additional research is required in order to confirm this.

5.3 Discussion pertaining to Research Question 1

5.3.1 *Introduction*

Measuring the effectiveness of Enterprise Architecture is a complex problem. There are many different measures to choose from and the final approach is highly dependent on the context of the organisation and the scope of the EAM capability. In addition organisations are not static but highly dynamic and generally undergoing constant change due to deliberate internal forces as well as unintended or unpredictable external forces.

Given this complexity it is important for any approach designed to measure the effectiveness of EAM to be fluid and constantly evaluated. This will help to ensure it is appropriate to the current organisational context.

5.3.2 *Internal versus External measures*

When reviewing these measures there is a clear difference between measures which reflect the business and measures which reflect the EAM practice. A strong view from most respondents was that measuring the internal processes of the EAM practice was of little use outside of the EAM practice as these measures are difficult to translate to improvements in an organisation’s KPIs and are at best seen as leading indicators.

External measures to the EAM practice were viewed as far more useful in demonstrating the value of EAM as this value can be directly linked to business metrics.

5.3.3 *Business measures (external EAM measures)*

The literature highlighted a number of different approaches to measuring the effectiveness of enterprise architecture which tended to focus on the internal execution of EAM and on the effects of EAM on the IT architecture. In addition to this, respondents stressed the importance of using business outcomes as the true measure of EAM effectiveness.

This is indeed the strongest message from respondents. It is stressed that these business outcomes should be express and measured in business terms and should be adopted as the primary measurements for EAM effectiveness.

The relationship between what was presented in the literature review and the responses from the respondents can be summarised in the following high-level map.

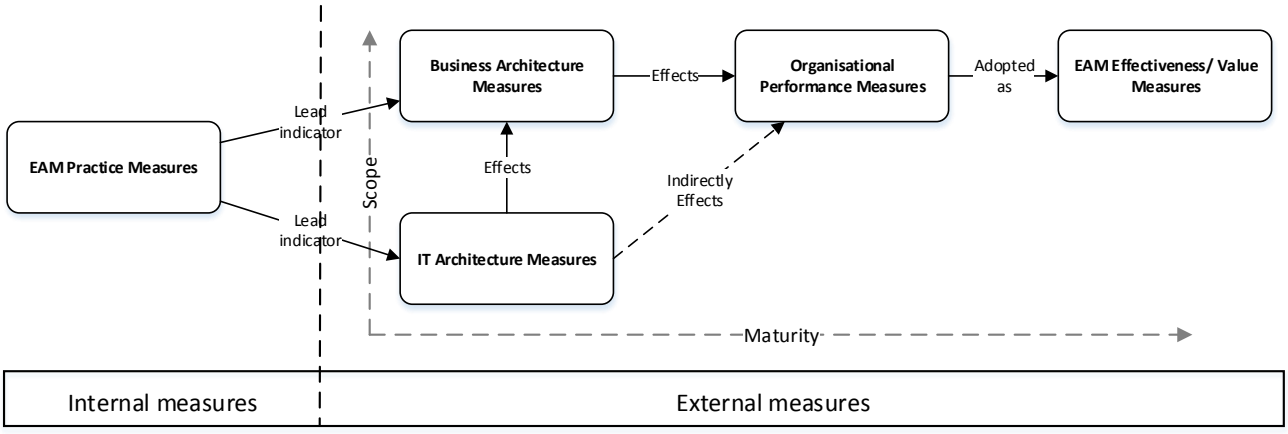


Figure 16: Relationship map – Internal / External measures for EAM

5.3.4 *Existing adoption of external measures amongst respondents*

One surprise finding in the research was that when asked how the EAM capabilities of each respondent was measured in business terms all but two respondents indicated that they are not currently measuring the effectiveness of their EAM in business terms. More than half reported that they are not measuring the effectiveness of their EAM capabilities at all.

This is surprising given the high degree of importance that respondents placed on measuring EAM in this way and suggests that a lot of work in this area is needed.

5.3.5 *Challenge of linking business measures to the EAM capability*

A number of reasons were highlighted as causes preventing the adoption of defining EAM measures directly in business terms and outcomes given are as follows:

1. **Difficulty in demonstrating causality** – Figure 18 (above) illustrates the difficulty that exists in establishing a clear link between what EAM is doing and the outcomes of the final organisation as a whole. The key challenge here was summed up by one respondent who stated, “When there is success, everyone tries to claim it. When there is failure, no one is around to take the blame”. A suggested approach to addressing this is for the EAM to clearly define upfront what they changes will be attempted and the expected benefit of these changes.
2. **EAM is not the only player** – EAM is not the only force of change or influence within an organisation. There are typically a number of other stakeholders who have an influence over the outcome of the business. These stakeholders can either enhance or destroy the final value realised through EAM led change. A good initiative implemented poorly by ICT programs or poorly adopted by business can seriously lessen the value of EAM led change. A key success factor identified during the research was that EAMs have business buy-in and are able to, through the governance processes, ensure changes are fully and correctly implemented.
3. **Time required to establish and maintain benefits measurement frameworks** – Establishing benefits measurement frameworks is time consuming and requires substantial buy-in from many different stakeholders. Many respondents simply indicated that they “… just don’t have enough hours in a day to even think about it”.
4. **Time to realise benefits** – Some EAM led change can take many years before all promised benefits are fully realised. The time delay of these benefits can result in impatience on the part of stakeholders who either change direction or lose sight of the original contribution that EAM made.
5. **Lack of maturity within the organisation in measuring business outcomes** – Some organisations do not poses the capability of measuring more than just the bottom line and perhaps some basic customer satisfaction measures. The challenge presented here is that using business outcomes as a means for reflecting EAM effectiveness may not be possible until the organisation first begins to measure their own performance and outcomes.

6. **Limitations in the scope of the EAM capability** – In some organisations the EAM capability is only involved in certain projects and thus does not have a mandate to view the organisation as a whole. Additionally, some EAMs are primarily concerned with IT architecture and have limited scope over business architecture. Both these limit the ability of the EAM to influence the organisation as a whole.

Given the above set of challenges it is not surprising that despite the importance given to measuring EAM effectiveness in business terms, only two of the organisations covered by this study are currently performing these measures.

5.3.6 *Other measures*

In addition to defining EAM effectiveness in business terms there were a number of other measures proposed. All of these were previously identified in the literature review and did not offer significant additional insights.

5.3.7 *Context matters*

The majority of respondents highlighted that the choice of measures is highly contextual and there is no one set of measures universal to all organisations.

One of the contextual aspects given most frequently is organisational maturity. The general theme of organisational maturity is that the more mature an EAM practice is and the more mature the organisation is in dealing with EAM; the more the measures of the EAM effectiveness would be able to align to the overall business measures. The key idea behind this aspect is that a mature EAM practice has a greater ability to guide the organisation and inform the decisions that affect the organisation as a whole. The more mature an organisation is the greater its ability to measure its own performance metrics.

Another contextual aspect given frequently is EAM scope. The general thought expressed is that EAMs with limited scope would have limited ability to influence the organisation whilst EAMs with broad scope can influence more of the business. Closely related to the concept of organisational scope is domain scope. Like organisational scope, domain scope also affects the types of measures that can be used to measure the effectiveness of an EAM capability.

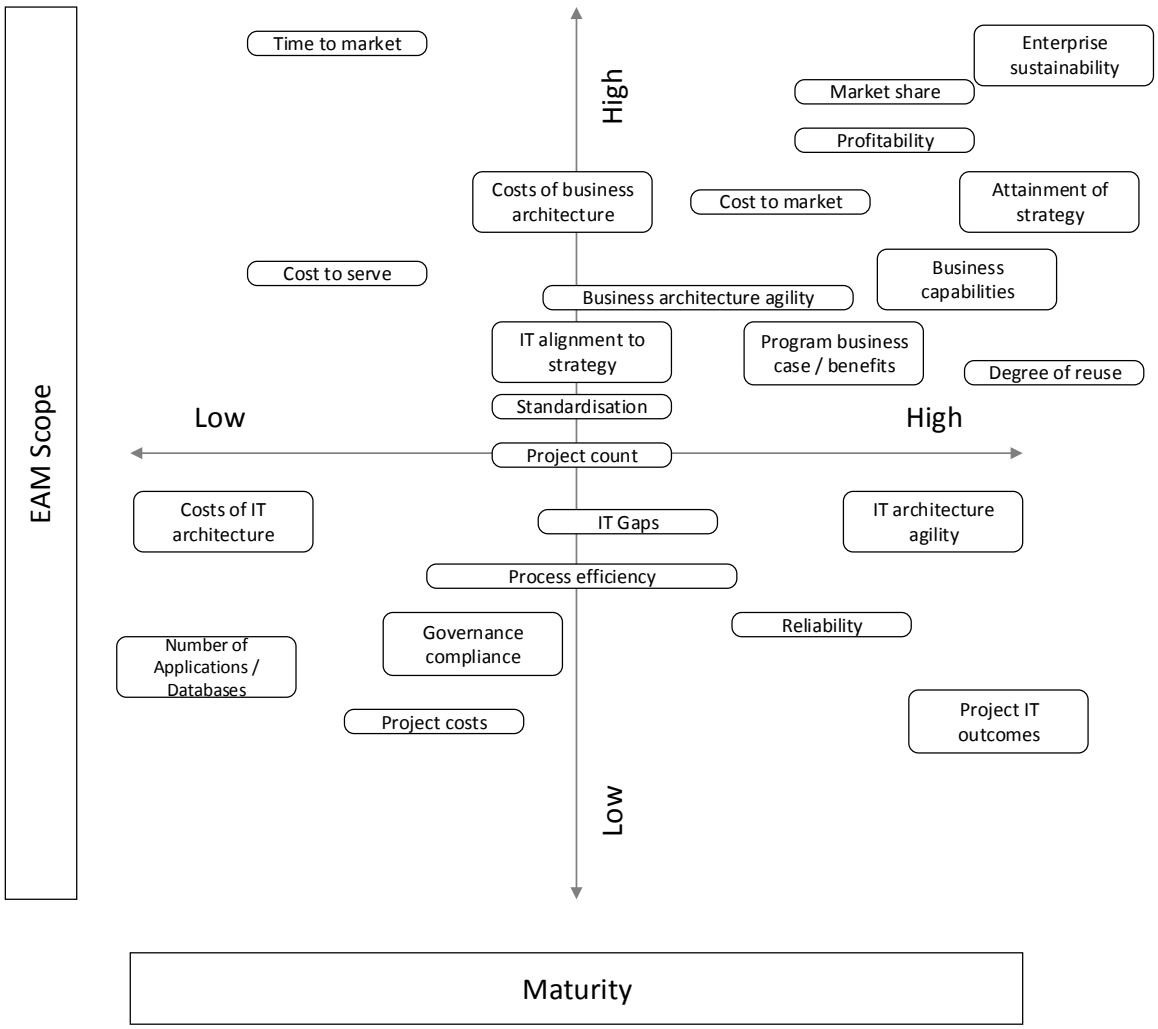


Figure 17: Graph – EAM context

The relationship between the choice of measures and context is given above. The measures above are not an exhaustive list but are provided to illustrate the types of measures which would be appropriate for a given maturity and EAM scope.

5.3.8 *What measures are right for your organisation*

This research does not attempt to provide detailed guidance on what measures should be chosen for every context. What this research does show is that it is important and ongoing monitoring of the choses measures should occur.

Additionally, once measures have been defined the their appropriateness should be regularly re-evaluated as the context of the EAM changes to ensure that the measures

remain relevant and meaningful representations of the effectiveness and value that EAM brings to an organisation. What is important however is for chosen measurements to occur before changes are made so as to establish a base-line which can be used comparatively when determining the degree of improvement.

5.3.9 *How to perform ongoing monitoring of measures*

As indicated previously it is important for ongoing monitoring of measures to occur. After measures have been defined it is important to determine the mechanism and frequency of obtaining these measures.

In some instances organisations may have well established means of measuring performance. The frequency of monitoring should reflect the additional effort required and the rate at which measures change. It may only be useful to focus on certain measures for a short period of time after EAM changes have been implemented as the effort required for ongoing monitoring may be very high.

5.3.10 *Conclusion*

Despite the stated importance of measuring the effectiveness of EAM, very few of the organisations covered by this research were actually doing it. This suggests that it is not being given the level of priority that it should be.

As the adoption of EAM increases in organisations and as the costs associated with EAM capabilities increase; questions regarding the value of EAM will also begin to increase. The need to demonstrate quantifiable value will become an essential requirement for an EAM capability. Performing formal EAM value measurement will become essential in ensuring long-term commitment to EAM.

5.4 Discussion pertaining to Research Question 2

Question 2 proved to be far more complex and detailed that initially expected. As question 1 defines effective EAMs as EAMs which delivery valuable business change which can be

expressed in business terms and is meaningful to business stakeholders it is not surprising that the most significant theme is “It’s all about the business”.

5.4.1 *Why EAM is not always about the business*

Making “the business” the sole focus of Enterprise Architecture seems obvious given that it is a support function however there are a number of challenges which prevent EAM from achieving this:

- **Lack of business architecture** – In nine, just over half, of the organisations participating in this study the formal EAMs lacked business architecture disciplines. The functions which normally form part of business architecture in EAM are performed by other departments with varying degrees of collaboration and interaction between EAM and these business architects. The result of this EAM is usually one step behind the business. Another common result is EAMs are more solution architects and not Enterprise Architects.
- **EAM is a sub-function of IT** – Another common impediment to making EAM “all about the business” is that in all by five of the organisations covered by this research (70%), EAMs were divisions within the IT department. The consequence of this is that EAMs tend to be more focused on IT architecture improvement and struggle to make meaningful contributions to the business architecture.
- **Lack of credibility** – One main drawback of the above two factors is that business stakeholders tend not to view the contributions of EAM as being significantly valuable and so the EAMs would typically not have a lot of input into business architecture decisions.
- **“Propeller heads”** – One final drawback was that many of the EAs in the EAMs were “techies” with technical IT backgrounds and tended to have a poor understanding of the organisations business architecture or of broader commercial concerns. They were often viewed by the business as “propeller heads” that “should be keep in a back room far away from the business”. It is this historical context and background that has, in my view, led to the predominance of the definition of EAMs effectiveness in terms of IT flexibility and agility and not in business terms. As one

respondent said “The business does not care how elegant the architecture is. It just has to work”.

5.4.2 *Business success is EAM success*

The use of business measures as measures of EAM effectiveness has been discussed extensively in question 1. It should be no surprise that this is a critical success factor. There are a number of reasons for this but the most important reason is that business stakeholders can see and understand the benefits of EAM without EAM having to first educate business on the inner workings of EAM. As one respondent put it, “They don’t care about TOGAF and ZACHMAN, that’s all internal to the architecture function, all they care about is ‘what difference have you made in my life’, not how did you get there”.

5.4.3 *Business architecture drives all the other architectures*

When EAMs take time getting the business architecture right the other architectures follow. This was a commonly held view despite the low levels of business architecture domain focus in many of the EAMs.

Getting the business architecture right is more than just organisation structure and business process. It deals with ensuring there is clear understanding between the business strategy, architecture and business model. Understanding how the business works end-to-end and generates value is a prerequisite to effective EAM.

5.4.4 *Strategy, strategy, strategy*

There was general agreement that due to many EAMs being housed within the IT function their ability to be effective in the business context was low. This leads to the question of where EAM should sit within the organisation. Without exception the response was “strategy”.

Many organisations have formally defined strategy capabilities. These capabilities typically are small with highly skilled resources. They are generally tasked with understanding the business context of the organisation, understanding competitors, market trends, identify

risks and opportunities, strengths and weaknesses. They ultimately play a pivotal role in key organisation decisions. The rationale behind restructuring EAM out of IT and into, or very close to, strategy is that, by so doing, the EAM would be able to share in these advantages as well as provide valuable insights into the formulation of business strategy.

5.4.5 *Business engagement*

As described above under “Why EAM is not always about the business”, the lack of business engagement is a major cause for a lack of effectiveness. A commonly held view is that EAM represents IT to the business. What has emerged from the research was that in addition to EAM representing IT to the business, EAM should represent business to IT. The benefits of this lie in EAMs ability to direct IT on how best to deliver on business benefits.

A common experience of large transformational IT programmes is that they fail to deliver on promised business benefits. Many reasons for this have been proposed but one common reason is that due to delivery pressures, business benefits are sacrificed or deferred in order to keep delivery dates of major components. EAM capabilities can play a valuable role in ensuring that the impact of IT decisions on the IT architecture do not have a significant negative impact on the benefits to business that the program is intended to deliver.

EAs who deal with the business architecture also need to have a deep understanding of the business areas they support. A good business architect is someone who “has been there, done that”. Someone who has had “hands on experience” within a business area. For some highly specialised business areas there exists the need for EAs to hold business related qualifications and certifications in addition to EA certifications as, in the words of one respondent, “these give you external validity” or “permission to play”. By achieving this, EAs are better able to speak to the business in their language.

The importance of the above factors needs to be reflected in the recruitment and training practices of EAM capabilities. Additionally, there exists many resourcing gaps in the market. These will take time and effort to fill.

5.4.6 *Soft skills*

The most surprising critical success factor to emerge and the second most talked about was “soft skills”. The need for excellent soft skills was universally considered “more important than technical skills”. There were a number of soft skills mentioned. Each is discussed below.

5.4.7 *Communication*

Effective EAs have to be effective communicators. EAM is all about understanding and sharing knowledge. No amount of background architecture work can substitute for poor communication skills. This aspect of soft skills was identified in the literature.

5.4.8 *Politics*

The ability to manage and deal with politics was a surprise as it is not mentioned in any of the literature with any real degree of significant yet it was considered by many to be the most important soft skill that effective EAs need to possess.

An important aspect of politics is the ability to have good and meaningful relationships with stakeholders.

5.4.9 *Leadership*

Effective leadership is essential to effective EAMs. By definition EAM is about leading the organisation in change. EAM leadership can be both formal and informal and requires a keen awareness of the underlying politics of the organisation.

Part of being an effective leader is the ability to sell ideas and generate buy-in.

5.4.10 *Soft EAM capabilities*

The EAM team as a whole need good soft skills in order to operate effectively as a unit. Teamwork and pragmatism are essential. In order to work effectively as a team, architects need to be able to “check their attitudes and egos at the door”. A common failing within

EAMs is caused when EAs are concerned more with “being right” than “what is right”. Dogmatic adherence to technologies and practices can cause a lot of internal strife and severely hamper the effectiveness of EAMs.

Things like team building and socialising were suggested as ways of building team work within the EAM.

5.4.11 *Training for soft skills*

Despite soft skills being crucial to EAM success none of the mainstream frameworks offer much guidance on them. In fact, the skill of organisational politics is not something which is generally taught in formal academic settings. There exists a gap in the developmental space for EAs around soft skills. EAMs should carefully consider the training needs of their EAs and include the development of soft skills as part of their ongoing professional development.

5.4.12 *Technical execution / abilities of EAM*

This theme held little in the way of surprises. It is extensively covered in the literature. It is agreed that without the effective execution of EAM tasks no value can be delivered, however, effective execution of EAM activities alone provides minimal value to the business and can quickly devolve into “architecture for architecture’s sake”.

The general opinion is that tools, frameworks and repositories are needed. The choice of tools, frameworks and repositories is immaterial as long as they were fit for purpose.

5.4.13 *Structure/accountability*

This theme offered a few surprises. The structural alignment of EAM to strategy has already been mentioned. What was of significance was the need for a formal relationship between EAM and the CEO/COO. Historically EAM has been an IT function and a backroom function at that. CEOs have had very little exposure to EAM. The basis for the assertion that EAMs should have greater access to CEOs lies in the realisation that “the CEO is actually the chief business architect”. The exact method for achieving this is not explored in detail but

one important suggestion is that EAMs need greater visibility at board level and that they should be participates in key business strategy and leadership meetings.

The exact mechanism for this is not explored in detail and is an area requiring further inquiry.

The final surprise in this theme is accountability for change. Views on this varied from “arm’s length” accountability to “directly responsible” but there was general agreement that EAM needs greater control over what is actually delivered during change programmes. EAM should be the most informed group within an organisation and are best equipped to understand the impact of decisions.

This idea, however, is not popular with one respondent who felt that the EAM capability within his organisation simply did not have enough power to influence the outcome of change activities. As one respondent put it, “you need a stick” in order to achieve EAM objectives.

5.4.14 *The cycle of success*

A clear message from this research is that merely executing effectively is not enough to ensure EAM success. EAMs need to actually deliver and make good on their promises of improving the organisation. This in turn increases EAMs capacity for future value delivery and scope expansion. This is a reinforcing cycle and is an important aspect to EAM success or failure. As one of the respondents said, “The proof is in the pudding and in the eating”.

The diagram below expresses a simplistic explanation for this cycle:

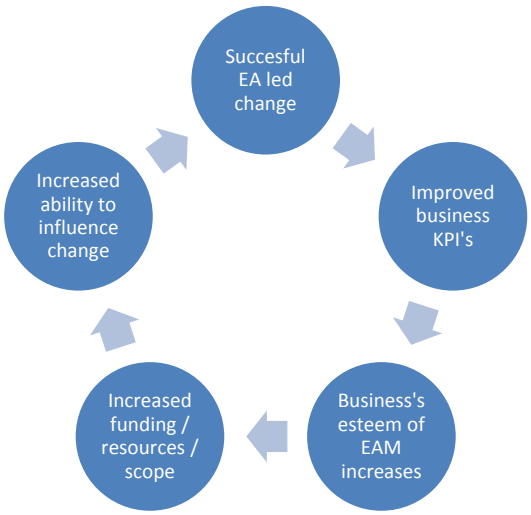


Figure 18: The EAM success cycle

In as far as this cycle can be used to understand where EAM success is coming from; it can also be used to identify potential areas which underlie unsuccessful EAMs. It is vital for EAMs to deliver meaningful valuable change as quickly as possible initially and then on an ongoing predictable basis to ensure that the EAM is not regarded as irrelevant.

5.4.15 *Support generating outcomes*

Given the above, there were a number of outcomes which were considered to be critical success factors. These outcomes are generally products of effective EAM and as such there exists a cause and effect relationship between these outcomes and effective EAM. There were no real surprises to the outcomes as one respondent put it, “it’s the usual suspects”.

One success generating outcome worth noting is cost reduction. When EAMs are initially establishing themselves there are usually lots of “low hanging fruit”. This includes reductions in the cost of hardware/software or fixing a burning platform. When EAMs are first being established these quick wins should be pursued rapidly as any cost savings which can be achieved can serve as justification for funding future EAM activities.

5.4.16 *Governance – Keeping things on track*

The literature identified good governance as a critical success factor. What was clear from the research is that governance should not be focused on internal EAM characteristics alone (like standardisation, documentation reviews and approvals, etc.) but should focus on ensuring business benefit delivery. Many EAMs governance functions fail to make the pursuit of business value delivery their primary function. Rather they tend to spend a lot of time and energy on non-value adding reviews and corrections.

In one extreme example there was a delay to a critical programme because the consultants had not used the correct document template when submitting their architecture for review. As a result it was denied approval to proceed, not because of an issue in design but because of a trivial issue like font and font size.

The message is simple. Governance should be simple, fit for purpose and focused on ensuring the successful delivery of business value.

5.4.17 *Trust*

Trust is not demanded, it is earned. It is the product of consistency, dependency and predictability. In order for EAM to be able to influence and guide it needs to hold the trust of organisation. There are many ways in which trust can be earned but one is common: it takes time.

Consistency and reliability of EAM capabilities need to be a long-term focus area. Failure to win the trust of the organisation will ultimately lead to a failure of the EAM capability.

5.5 Conclusion

Measuring EAM capabilities is essential and highly context specific. Internal measures are useful to the running of the EAM capability but are not very useful when trying to measure the value of the EAM capability.

The value of an EAM capability must be defined in business terms and should reflect the critical measures of organisation success. Establishing the cause and effect relationships

between changes and organisation success can be difficult. Costs and cost reduction metrics are useful for demonstrating EAM effectiveness. Although establishing measures can be time consuming and require considerable effort the benefits of appropriate measures far outweigh the costs.

Like measures, critical success factors for effective EAM capabilities is a complex topic. The most important success factor is “It’s all about the business”. There are many historical reasons why this has generally not always been the case for many EAMs however there is growing awareness of the need to focus EAM activities on the business.

A surprising success factor deals with soft skills, particularly politics. This is often overlooked and formal soft-skills training does not form the part of many EAM development programmes.

There is a need to realign EAM capabilities within business and move them away from IT and closer to strategy and the office of the CEO. There are a number of benefits to doing this but ensuring the realisation of these benefits requires the successful adoption of many other success factors and should only be pursued once the EAM capability is running effectively and delivering measurable value to the organisation.

6 CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This chapter concludes the research. It offers recommendations based on the findings and suggests topics for future research.

6.2 Conclusions of the study

Enterprise architecture is an emerging and maturing discipline with great promise. The potential benefits of effective EAM capabilities are massive and can have a profound impact on the profitability and sustainability of many organisations.

The need to establish a solid academic foundation for measuring the effectiveness of EAM capabilities is therefore of great future value.

The research confirmed those measures identified in the literature review and identified a number of new options for measuring EAM effectiveness, particularly the theme of measuring EAM effectiveness directly using business measures. There are still a number of obstacles which stand in the way of achieving this in practice. Ways of overcoming these obstacles have been partial answered by question 2 but further research is needed.

This research is useful to both EAM practitioners and business leaders in that it demonstrates the importance of increasing the focus of business architecture and business benefits within the EAM capability. It also helps business stakeholders understand how better to measure the value of EAM and to better fulfil their role in realising the benefits of an investment in an EAM.

The critical success factors of effective EAM capabilities is a highly complex set of interdependent factors. These include both technical and non-technical considerations. The results of the research greatly enhances the understanding of this topic as there has, to date, not been significant research into this area in South Africa. Those studies which have been conducted on this topic have tended to focus on the improvements to the IT architecture as the measurement for successful EAMs and as such have tended to focus

largely on success factors within EAM capability. This research highlights the importance of non-technical and external success factors.

The relationship map below provides a high-level view of all the success factor themes and clusters identified by this research. In addition the relationship between success factors and measures is given in the diagram.

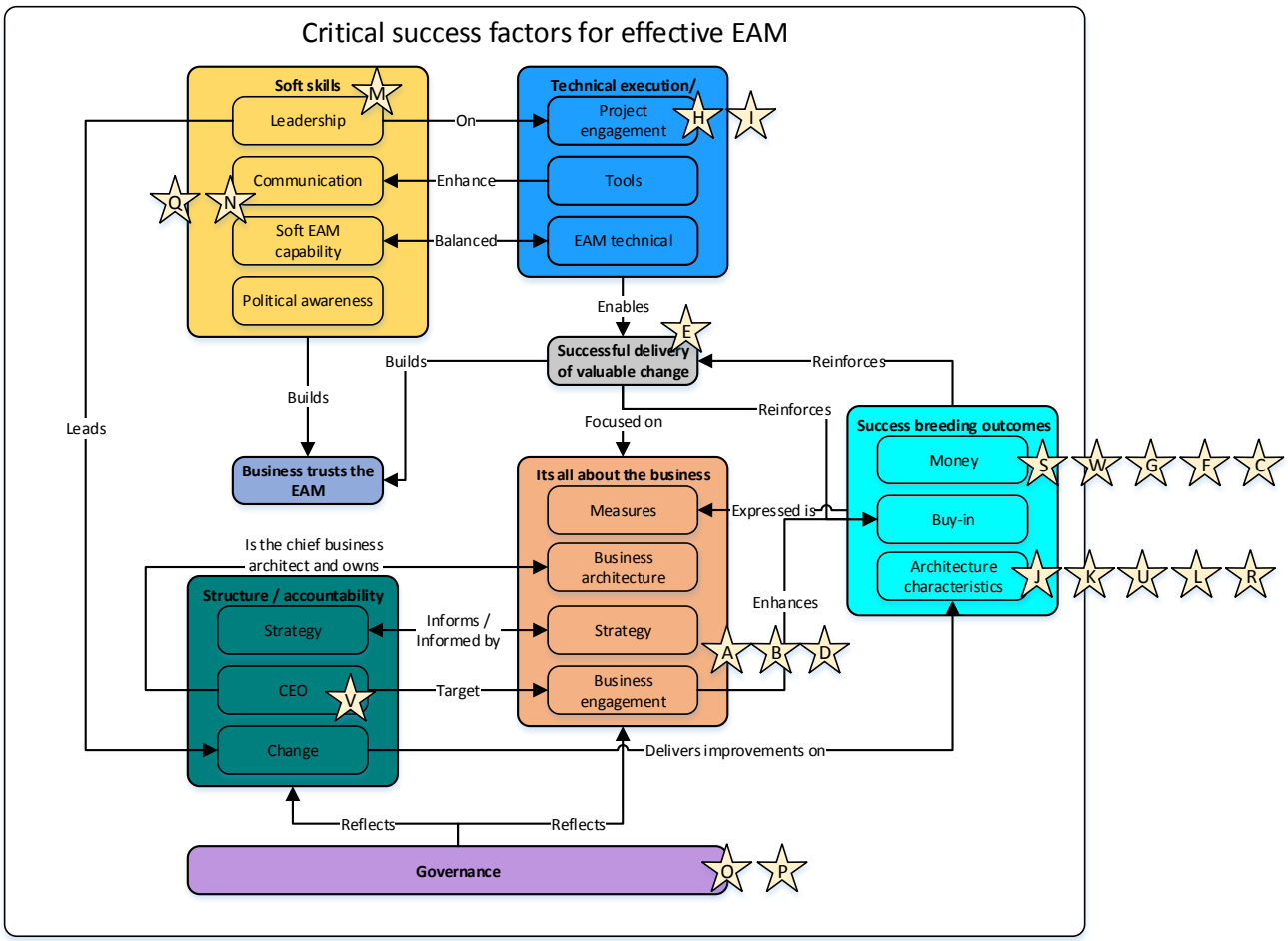


Figure 19: Relationship map – Summary of success factors

Measures									
A	Business outcomes	F	Business operations costs	K	Flexibility	P	Reference measures	U	Performance
B	Business case metrics	G	Costs of keeping the lights on	L	Degree of standardisation	Q	Meetings attended	V	Internal organisation customers
C	Profitability	H	Change costs	M	Influence: Enhanced decision making	R	Outages	W	Customers of the business
D	Business metrics	I	Project count	N	Documentation usage / quality	S	Cost of outages		
E	Customers services	J	Agility	O	Gaps in architecture	T	Support calls		

As depicted above, many of the success factors can be mapped to EAM effectiveness measures. There are a number of critical success factors which do not seem to have

defined ways of measuring their performance. Further research is recommended to try to identify if there are appropriate measures.

The relationship map also provides insight into the inter-connectedness of the critical success factors and the complex nature of this topic. Success in EAM is not a once off activity but the culmination of the consistent application of good EAM practice by good EAs.

6.3 Recommendations

There are a number of key takeaways from this research which can be useful to chief enterprise architects and chief executive officers:

- Measuring the effectiveness of EAM capabilities is challenging but a worthwhile undertaking. It requires deliberate effort and focus. If not in place already, mechanisms need to be established to measure organisational performance metrics.
- EAM effectiveness measures should directly relate to organisational measures with clear causal relationships understood and mapped.
- Measures should include both internal (EAM practice) measures and external (organisational performance) measures in order to ensure an appropriate balance between internal and external delivery.
- Costs are useful as a measure for EAM effectiveness and cost savings should be sought early in any EAM implementation as this provides immediate quick wins, buy-in and can help fund EAM programmes.
- Effective EAM capabilities rely on a number of success factors. EAM capabilities should carefully consider areas of strength and weakness. Programmes should be put in place to address any deficiencies.
- EAM capabilities should not report into ICT but should have a much closer reporting and accountability line to business.
- EAM capabilities which lack business architecture domain focus need to establish them, either internally, or by integrating their work with existing business architecture capabilities within the organisation.

- EAM capabilities should work closely with organisations strategy capabilities. Establishing a direct reporting line should also be considered. This will facilitate both quicker reactive and more proactive alignment to business strategy.
- The importance of soft-skills to EAM capability effectiveness should receive greater focus with deliberate training opportunities identified and executed.
- EAM capabilities should assume or be given greater responsibility and accountability for the attainment of organisational objectives and programme outcomes. To facilitate this increase in accountability EAM capabilities should also be given greater decision making powers in programmes to better protect business value and interest.
- EAM capabilities should develop stronger relationships with business stakeholders and should be seen as representing business to IT and not IT to business.
- A key objective and measure of EAM is to establish trust and credibility with key business stakeholders. This is a long term process and will require deliberate effort on the part of the EAs to achieve.

6.4 Suggestions for further research

During the course of this research a number of additional topics for further research were identified. This includes quantitative studies, case studies, qualitative exploration of organisational context and the design and testing of diagnostic tools.

6.4.1 *The need for additional quantitative studies*

This study has identified a number of potential measures and success factors which could prove incredibly valuable in furthering the effectiveness of EAM capabilities. However, the measures and success factors identified here require additional research in order to become generalizable measures and factors.

Although this research seeks to contributes to the theory base a quantitate research approach will be needed in order to achieve external validity. This research would need to quantitatively assess:

- Which measures are of highest significance for a given EAM context?
- Which critical success factors are of highest significance for a given EAM context?

A research effort of this nature would benefit greatly by the inclusion of more participants from the different EAM stakeholders as this would also provide a better understanding of the reasons for the seemingly different priorities given to the different measures and success factors of each stakeholder.

Finally, a research report of this nature would need to include stakeholders from the same organisation as organisation context seemingly effects the perceptions of the different stakeholders.

6.4.2 *Case studies*

A number of areas have been identified which require additional qualitative research in order to further develop the theory base. One approach for this would be in the form of case studies based on interviews and observation as follows:

1. A case study on an organisation that has added a business architecture domain function to their EAM capability to determine the extent of the benefits realised by the inclusion of business architecture in the EAM capability.

This case study would greatly aid in identifying the extent to which the value of EAM is enhanced by increasing its scope to include business architecture. This study would also prove useful in that it would provide insights into the process of this change as well as the results of such a change.

2. Perform a case study on an organisation that has restructured their EAM capability and removed it from IT and given it a direct reporting line to business leadership or strategy in order to identify the gains or losses of this change.

The impact of the above change is potentially significant. It would require considerable restructuring and would require considerable buy-in from senior business stakeholders. The potential benefits of such a change would need to be assessed against the disruptions and costs involved. A case study would provide an early insight into the benefits as well as provide a narrative around the change which could provide further insights into the critical success factors.

3. Perform a case study based on an organisation that has adopted business measures in order to measure the effectiveness of their EAM capability to determine if this has helped improved the effectiveness and perceived value of their EAM capability.

This is perhaps the crux of question 1. Could an EAM capability be effectively measured based on business measures. A case study could be based a successful or unsuccessful example. Both of these outcomes would be useful in furthering the theory bases as they could yield either success factors or lessons learned or both.

6.4.3 *Further exploration of the lack of EAM measures*

As indicated by this research there appears to be a gap between what EAM stakeholders say should be the basis of measures of effectiveness and what is currently being practiced by most of the EAM capabilities surveyed. Identifying what the underlying reasons are why there are so few organisations which are currently measuring the effectiveness of their EAM capabilities could be useful in the development of methodologies and approaches to overcoming them so as to increase the number of organisations that have effectiveness measures for EAM capabilities.

The approach to follow would likely be a qualitative research approach similar to the one used by this research report and would be conducted in a similar way with similar significance and value.

6.4.4 *Applications*

The final area requiring additional research is in areas of practical applications of the outcomes of this research. Given that this is a qualitative research approach with minimal external validity the results of such applications would prove useful in furthering the theory base. One such application would be the development and testing of a diagnostic tool for diagnosing what critical success factors are being performed poorly or are missing in order to develop remedial actions to increase overall effectiveness of EAM capabilities.

6.4.5 *Conclusion*

The above suggestions for further research are by no means exhaustive. This is an exciting topic with many unanswered questions. The value of further research is huge given the relative importance and the potential for organisation improvement EAM capabilities could potentially deliver.

REFERENCES

Abaas, K. (2010). *Impact of enterprise architecture on architecture agility and coherence.* (71), ProQuest Information & Learning, US. Retrieved from **http://search.ebscohost.com/login.aspx?direct=true&db=psyh&AN=2010-99140-520&site=ehost-live** Available from EBSCOhost psyh database.

Ahlemann , F., Stettiner, E., Messerschmidt, M. and Legner C. (2012). *Stratregic Enterprise Architecture Management - Challenges, Best Practices, and Future Developments* (1st ed. ed.). New York City: Springer.

Armstrong, M., & Baron, A. (2000). Performance management. *Human resource management*, 69.

Aziz, S., Obitz, T., Modi, R., & Sarkar, S. (2005). *Enterprise Architecture: A Governance Framework.* Paper presented at the Infosys Knowledge Sharing Series.

Bell, J. (2014). *Doing Your Research Project: A guide for first-time researchers* (Sixth ed.). New York: McGraw-Hill Education (UK).

Bologa, C., Faur, G., & Ghisoiu, N. (2010). Generic Model of an Enterprise Information Architecture for a Public Institution. *Journal of Computer Science & Control Systems, 3*(1), 19-24. Retrieved from **http://search.ebscohost.com/login.aspx?direct=true&db=iih&AN=51502176&site=ehost-live**

Boucharas, V., van Steenbergen, M., Jansen, S., & Brinkkemper, S. (2010). *The Contribution of Enterprise Architecture to the Achievement of Organizational Goals Establishing the Enterprise Architecture Benefits Framework*. Technical Report, UU-CS-2010-014. Utrecht University, Utrecht. Retrieved from **http://www.cs.uu.nl/research/techreps/repo/CS-2010/2010-014.pdf**

Brewer, M., Reis, H., & Judd, C. (2000). *Handbook of Research Methods in Social and Personality Psychology - Research Design and Issues of Validity*. Cambridge: Cambridge University Press.

Broer, J., & Roeleven, S. (2009). Why two thirds of Enterprise Architecture projects fail. *ARIS Expert Paper*.

Brown, T. (2004). The value of enterprise architecture. *Zachman Institute for Framework Advancement (ZIFA), www. zifa. com*.

Calder, B. J., Phillips, L. W., & Tybout, A. M. (1982). The concept of external validity. *Journal of Consumer Research, 9*(1), 240-244.

Chauvin, L., Genest, D., & Loiseau, S. (2009). Ontological Cognitive Map. *International Journal on Artificial Intelligence Tools, 18*(5), 697-716. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=44911629&site=ehost-live

Cole, F. L. (1988). Content Analysis: Process and Application. *Clinical Nurse Specialist, 2*(1), 53-57.

EA Directions. (2007). Critical Success Factors for EA Effectiveness. *EA Directions*.

Eto, S., & Kyngäs, H. (2008). The qualitative content analysis process. *Journal of Advanced Nursing, 62*(1), 107-115. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=31321822&site=ehost-live

Fauber, P. (2008). Architecting the future enterprise. *Brainstorm.* Retrieved from http://www.brainstormmag.co.za/index.php?option=com_content&view=article&id=324:architecting-the-future-enterprise&catid=91:roundtable&Itemid=125

Fauber, P. (2010). Moving beyond the diagrams. *Brainstorm.* Retrieved from http://www.brainstormmag.co.za/index.php?option=com_content&view=article&id=4015:moving-beyond-the-diagrams&catid=91:roundtable&Itemid=125

GOA, U. (2006). Enterprise Architecture: Leadership Remains Key to Establishing and Leveraging Architectures for Organizational Transformation: GAO-06-831. *GAO Reports*, 1. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=f5h&AN=22327024&site=ehost-live

Golafshani, N. (2003). Understanding reliability and validity in qualitative research. *The qualitative report, 8*(4), 597-606.

Günther, W. A. (2015). Measuring Enterprise Architecture Effectiveness. *Journal of Enterprise Architecture, 11*(1).

Hoepfl, M. C. (1997). Choosing qualitiative research: a primer for technology education researchers. *Journal of Technology Education, 9*(1), pp 47 - 63.

Hussey, R., & Collis, J. (1997). *Business Research: A practical guide for undergraduate and postgraduate students*. New York: Palgrave Macmillan.

Kamhunga, S. (2011). Absa aims to spend R5bn on IT systems by 2015. *Business Day*. Retrieved from http://www.businessday.co.za/Articles/Content.aspx?id=154805

Leedy, P. D., & Ormrod, J. E. (2001). *Practical Research: Planning and Design* (7th ed.). Upper Saddle River: Merrill Prentice Hall.

Long, A. M. (2009). Enterprise Architecture: Origins, Tools, and Insights. *Air Force Journal of Logistics, 33*(2), 116-125. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=47364606&site=ehost-live

Matthee, M. C., Tobin, P. K. J., & Van der Merwe, P. (2007). The status quo of enterprise implementation in South African financial services companies. *South African Journal of Business Management, 38*(1), 11-23. Retrieved from

http://search.ebscohost.com/login.aspx?direct=true&db=awn&AN=545448&site=ehost-live

Morganwalp, J. M., & Sage, A. P. (2004). Enterprise architecture measures of effectiveness. *International Journal of Technology, Policy & Management, 4*(1), 81-94. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=27869962&site=ehost-live

Needham, W. (2010). Government-Wide Enterprise Architecture (GWEA) Framework Implementation Guide. Retrieved from http://gissa.org.za/special-interest-groups/open-source/foss-documents/GWEA%20Framework%20Implementation%20Guide%20v1.2%20Jun%202010.pdf/at_download/file

Perry, S. (2009). Misunderstood EA seeks acceptance. *Brainstorm*.

Pope, J. L. (1993). *Practical Marketing Research*. New York: AMACOM.

Rao, S., & Perry, C. (2003). Convergent interviewing to build a theory in under-researched areas: principles and an example investigation of Internet usage in inter-firm relationships. *Qualitative Market Research: An International Journal, 6*(4), 236. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=11429419&site=ehost-live

Razavi, M., Aliee, F. S., & Tafreshi, A. E. S. (2009). A Fuzzy AHP Based Approach Towards Enterprise Architecture Evaluation. *Proceedings of the European Conference on Information Management & Evaluation*, 408-421. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=48916789&site=ehost-live

Reuters. (2011). Absa to ramp up IT spend by 2015. *Financial 24*. Retrieved from http://www.fin24.com/Companies/Financial-Services/Absa-to-ramp-up-IT-spend-by-2015-20110930

Ross, J. W., Weill, P., & Robertson, D. (2006). *Enterprise Architecture as Strategy: Creating a Foundation for Business Execution*. Boston, Massachusetts: Harvard Business Press.

Rubin, H. J. R., Irene S. (2005). *Qualitative Interviewing: The Art of Hearing* (Second Edition ed.). New York: Sage Publications.

S., E., & H., K. (2008). The qualitative content analysis process. *Journal of Advanced Nursing, 62*(1), 107-115. Retrieved from https://books.google.co.za/books?id=N1dJAwAACAAJ

Santos, L.-A. D. (2009). Where is the IT Spend? Retrieved from http://www.bmi-t.co.za/?q=content/where-it-spend

Saunders, M., Lewis, P., & Thornhill, A. (2009). *Research Methods for Business Students*. Harlow: Financial Times Prentice Hall.

Schmidt, C., & Buxmann, P. (2011). Outcomes and success factors of enterprise IT architecture management: empirical insight from the international financial services industry. *Eur J Inf Syst, 20*(2), 168-185. Retrieved from http://dx.doi.org/10.1057/ejis.2010.68

Shah, H., & Kourdi, M. E. (2007). Frameworks for Enterprise Architecture. *IT Professional, 9*(5), 36-41.

Simon, D., Fischbach, K., & Schoder, D. (2013). An Exploration of Enterprise Architecture Research. *Communications of the Association for Information Systems, 32*, 1-72. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=89545129&site=ehost-live

Stenbacka, C. (2001). Qualitative research requires quality concepts of its own. *Management decision, 39*(7), 551-556.

The Open Group. (2009). *TOGAF Version 9*: The Open Group.

United States Congress. (1996). *Information Technology Management Reform Act*. Washington.

Walker, R. (1985). *Applied qualitative research* (First ed.). Farnham: Gower.

Wilkinson, D., & Birmingham, P. (2003). *Using research instruments: A guide for researchers*. London: Psychology Press.

Winter, G. (2000). A comparative discussion of the notion of'validity'in qualitative and quantitative research. *The qualitative report, 4*(3), 1-14.

Zachman, J. A. (1987). A framework for information systems architecture. *IBM Syst. J., 26*(3), 276-292.

Zachman, J. A. (1997). Enterprise Architecture: The Issue for the Century? *Database Programming and Design, 10*(3), 44-53.

APPENDIX A – SCHMIT AND BAXXMAN QUESTIONNAIRE FOR ASSESSING EA EFFECTIVENESS

Factor	Question
DOC1	Our architectural descriptions reveal the major dependencies between business processes, applications, data and infrastructure components
DOC2	Our architectural descriptions are based on a common meta-model
DOC3	Architectural descriptions are stored within an integrated repository tool
DOC4	Our documentation of the Enterprise IT Architecture is updated continuously
PLN1	Architecture planning covers all relevant architectural domains (e.g., business, application, infrastructure and data architecture)
PLN2	Architecture planning is not restricted to certain segments of the overall IT landscape (e.g., loan applications)
PLN3	Architecture planning often involves the application of systems engineering concepts 'in the large' (e.g., modularization, decoupling)
PLN4	We frequently adjust architecture plans to better adapt them to changing conditions
PRG1	We make use of architecture principles to guide systems development and maintenance projects (e.g., service-orientation)
PRG2	Our organization employs standard catalogs to restrict the use of IT components and technologies (e.g., DBMS, operating systems)
PRG3	We utilize reference architectures to standardize the design of individual applications (e.g., Web Application Architecture)
PRG4	Our organization has defined data to be shared across business units (Duncan, 1995)
IMP1	We may carry out non-business-driven projects to accelerate architectural transformations
IMP2	We build and maintain common integration infrastructures to facilitate application integration (e.g., EAI platform)
IMP3	We create and operate shared technical services (e.g., security)
IMP4	Our organization develops and maintains reusable application services
COS1	Target architecture plans are communicated to all relevant stakeholder groups
COS2	The documentation of rules and standards can be accessed easily by all relevant stakeholders (e.g., via the intranet)
COS3	Stakeholders are provided with consulting services concerning the application of rules and standards
COS4	Architects work within projects to ensure the application of rules and standards
GOV1	We constantly evaluate and review conformance to architecture plans (Grover & Segars, 2005) 61
GOV2	We have in place well-defined review and approval processes to ensure project conformance to rules and standards

GOV3	Internal directives require the compliance with rules and standards for all projects
GOV4	Violations of rules and standards are tracked and sanctioned consistently
PAR1	Target architecture plans are approved by governance committees representing all relevant stakeholders (e.g., architecture board)
PAR2	Top-management is actively involved in architecture planning
PAR3	We ensure adequate stakeholder participation in setting rules and standards
PAR4	Rules and standards are set by governance committees representing all relevant stakeholders (e.g., architecture board)
Please estimate for how long your organization has been engaged in these activities in terms of a continuous process (scale: [1] o1 year, [2] 1–3 years, [3] 4–6 years, [4] 7–10 years, [5] > 10 years)	
DUR1	Documenting the Enterprise IT Architecture, i.e. creating (and maintaining) architectural descriptions of the existing architecture
DUR2	Planning the Enterprise IT Architecture, i.e. creating (and maintaining) architectural descriptions of the future architecture
DUR3	Setting (and governing) architecture rules and standards (e.g., architecture principles, technical standards)
DUR4	Building (and maintaining) common infrastructure and/or application services (e.g., integration middleware, business services)

APPENDIX B – RESEARCH INSTRUMENT

Question	Supporting prompts
How does your company, [Company X], measure the effectiveness of your EA capabilities?	• IT Efficiency – the outcomes of an IT department relative to its costs • IT Flexibility – the ability and speed of an IT depart to respond to the changing needs of businesses and business environments • Revealing of major dependencies • Common meta-model • Integrated repository tool • Documentation is updated continuously • Architecture planning covers all relevant architectural • Architecture planning is not restricted to certain segments • We frequently adjust architecture plans • We make use of architecture principles to guide systems • Standard catalogues • Utilize reference architectures • Data is shared across business units • Non-business projects • Common integration infrastructures • Shared technical services • Reusable application services • Communicated to all relevant stakeholder groups • The documentation of rules and standards can be accessed easily by all relevant stakeholders • Stakeholders are provided with consulting services • Application of rules and standards • We constantly evaluate and review conformance • Well-defined review and approval processes • Internal directives • Violations of rules and standards are tracked • Governance committees represents all relevant stakeholders • Top-management is actively involved • Adequate stakeholder participation in setting rules • Rules and standards are set by governance committees representing all relevant stakeholders (e.g., architecture board)

What critical success factors have influenced the effectiveness of your Enterprise Architecture Management capability within [Company X]? What specific activities were instrumental in achieving the critical success factor?	• **Culture** – The culture of an organisation influences every aspect of its functioning and as such the type of culture present at an organisation is expected to have an influence on the overall success of an EAM capability. • **Politics** – Given the high profile of EAM capabilities and the degree of influence that they can have on an organisation, it is expected that many organisational EAM capabilities need to be cognisant of the politics of various stakeholders. • **Leadership** – Leadership is identified as being a key capability of EA practitioners by TOGAF (EA Directions, 2007; Ross et al., 2006; The Open Group, 2009). • **Business Linkage** – Various studies have pointed out how important it is to ensure there is adequate linkage between what the EAM capability is undertaking and what the business requires. The primary focus of EA is to ensure this alignment. • **Senior Management Involvement** – The involvement of senior management, or the lack thereof, has been identified as a key component in Enterprise Architecture. Senior management involvement is more than just awareness. It includes sponsorship and buy-in as well as open and visible support. • **Business Participation** – In order for EA to be successful it must involve the business at many different stages. It is not enough to only involve the business at the initial stages of gathering requirements and then not again until prior to architectural change introduction. • **Governance Structure and Compliance Process** – TOGAF highlights governance as one of the most critical factors ensuring EA is effective. The reason for this is the tendency of organisational units to disregard those principals which will ultimately lead to a consistent reusable enterprise architecture. • **EA Resources** – EA resources include, frameworks, architects, repositories, and communications technologies. In order for any programme of this nature to succeed there must be sufficient resources allocated to it. • **EA Scope and Objectives** – The effectiveness of an EA

	programme can be greatly reduced if the scope of the EAM capability is either too broad or too narrow. • **EA Process Implementation** – How the EA process was implemented. • **EA Program Communication** – EA programs, by definition, require many organisations to drastically change the way they perform many decision making functions. • **Technology Investment and Procurement** – Decisions regarding what technology to invest in is central to managing the future costs of a selected IT architecture. As such, the question of the extent to which an EAM capability influences investment and procurement decisions is important. • **Costs** – A key consideration and impediment to implementing EA is the perceived costs associated with its adoption. Given that EA is a long term process for many organisations and that the finical benefits of a successful EAM capability may not be immediately visible the question of how to manage the costs associated with an EAM capability must be addressed.

APPENDIX C: FFEAM

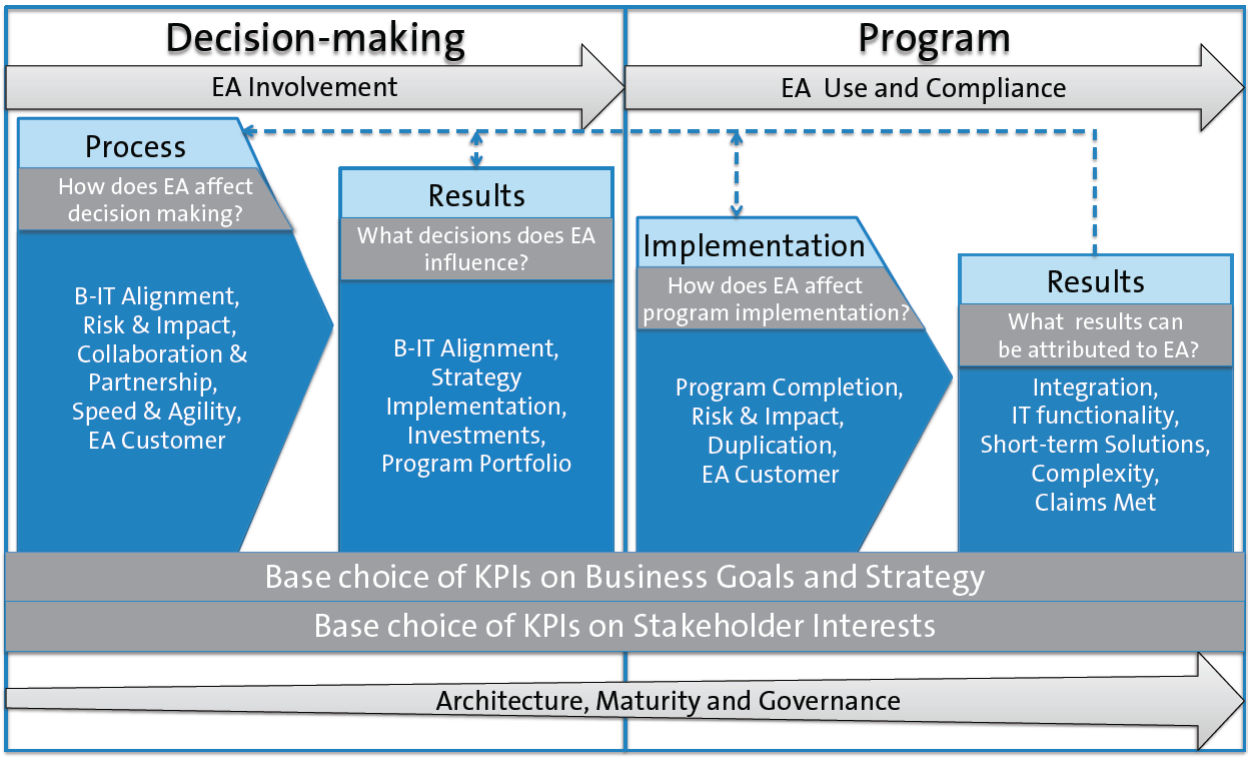


Figure 20: The Focus Framework for Enterprise Architecture Measurements (FFEAM) (Günther, 2015)

APPENDIX D: PATH MODEL

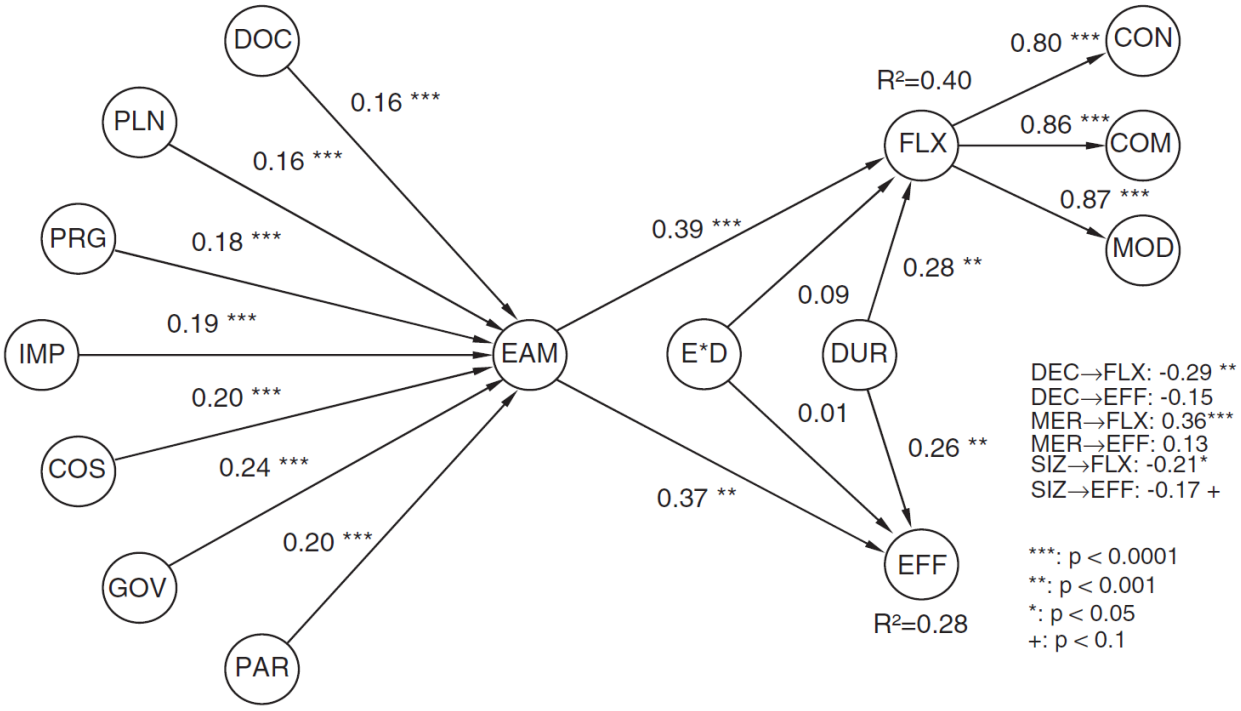


Figure 21: "Path model" (Schmidt & Buxmann, 2011)

APPENDIX E: INTERVIEW CONCEPT MAPS

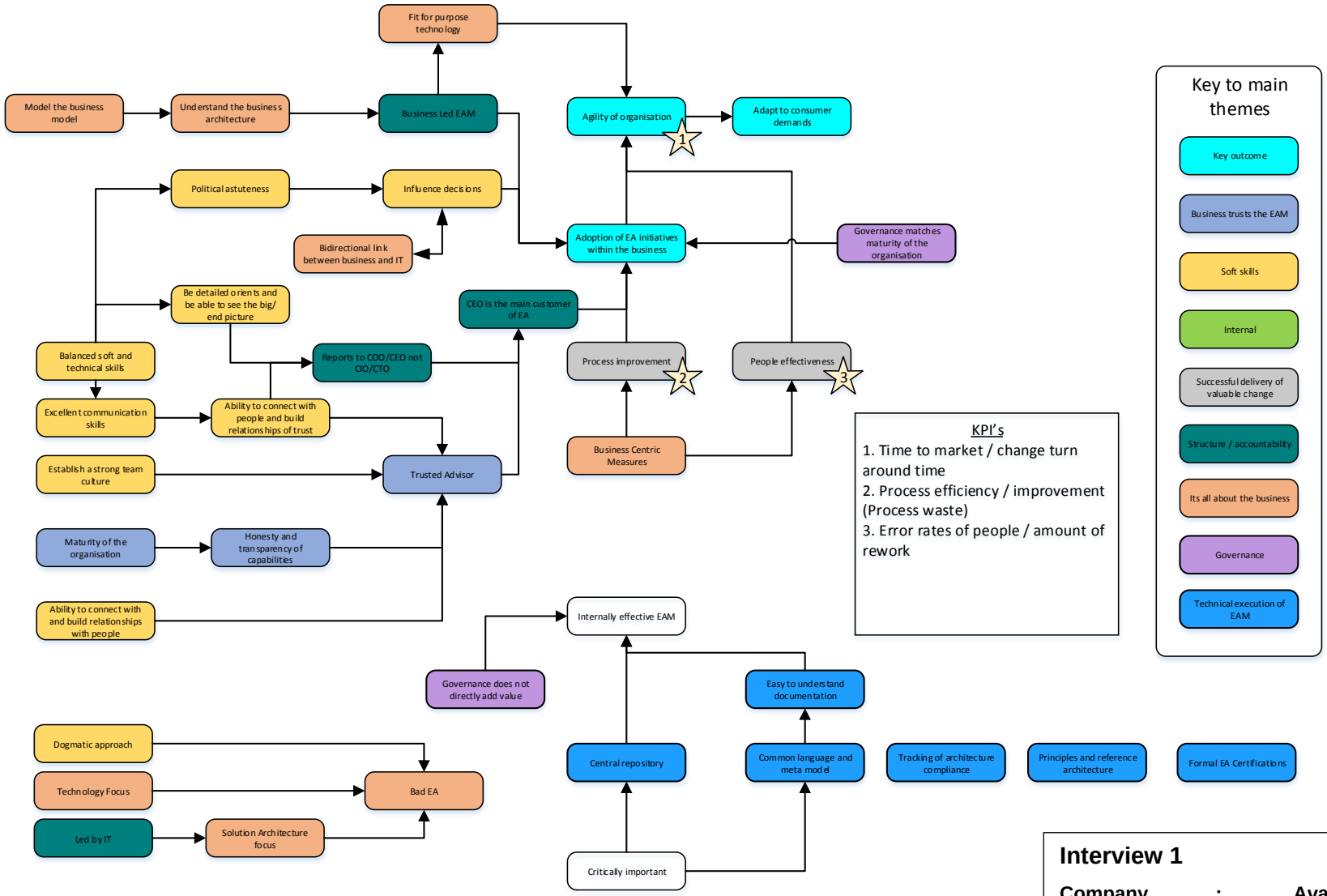


Figure 22: Relationship map – Interview 1

Interview 1

Company	**:**	**Avanade**
Industry	**:**	**Consulting**
Respondent role	**:**	**Solutions delivery / Enterprise architect**
EA Experience	**:**	**10 – 14 years**

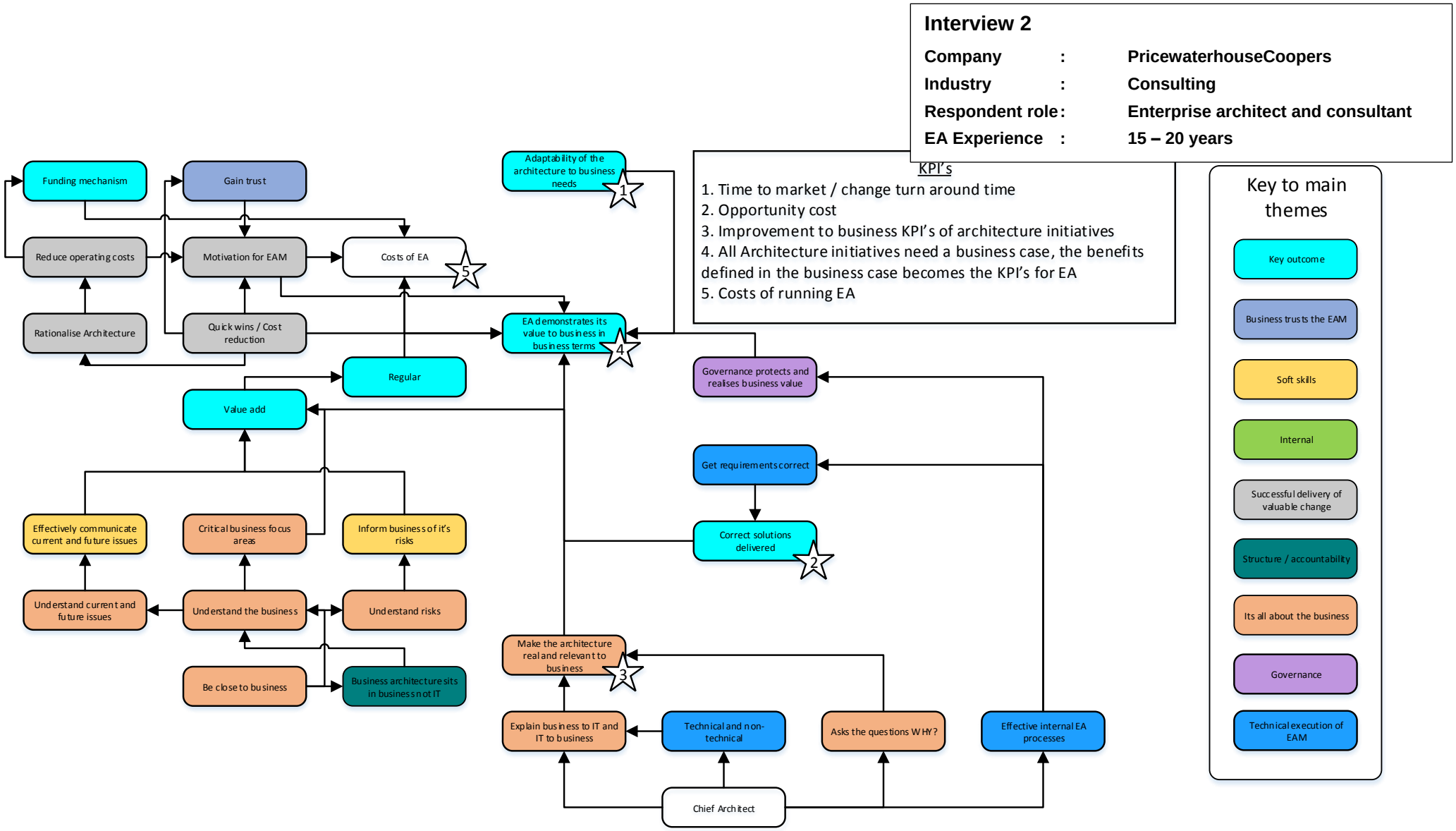
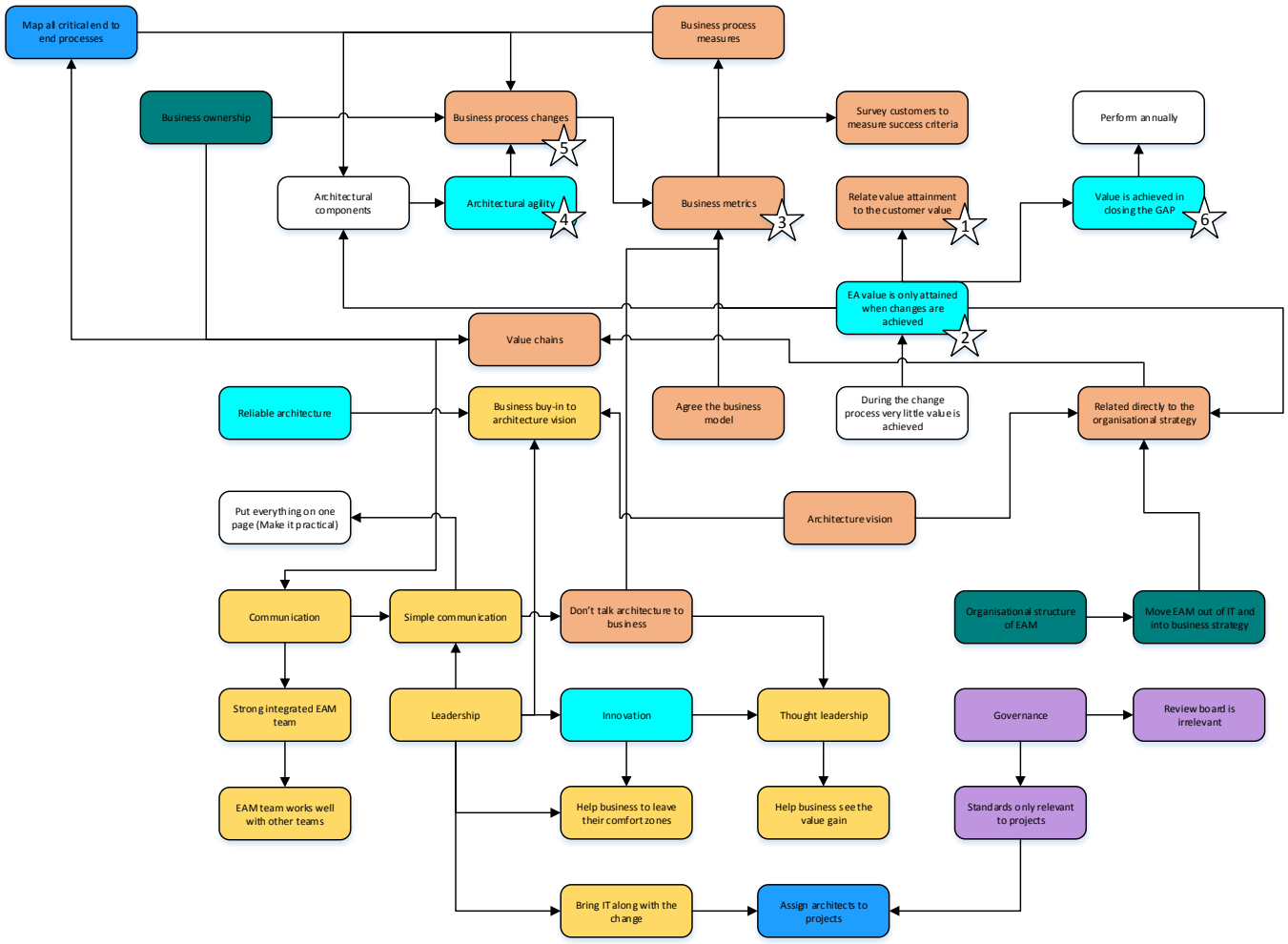


Figure 23: Relationship map – Interview 2



Interview 3

Company	:	**Transnet Freight Rail**
Industry	:	**Freight Rail**
Respondent role	:	**Chief Enterprise Architect**
EA Experience	:	**+20 years**

KPI's

1. How well are we servicing the customer?
2. What have we actually achieved? (Organisational imperatives)
3. Profitability
4. How quickly can we change our architecture?
5. How quickly can we change our business processes? How much reuse do we attain? Degree of standardisation versus customisation?
6. Quantification of the Gap between current and target

Key to main themes

- Key outcome
- Business trusts the EAM
- Soft skills
- Internal
- Successful delivery of valuable change
- Structure / accountability
- Its all about the business
- Governance
- Technical execution of EAM

Figure 24: Relationship map – Interview 3

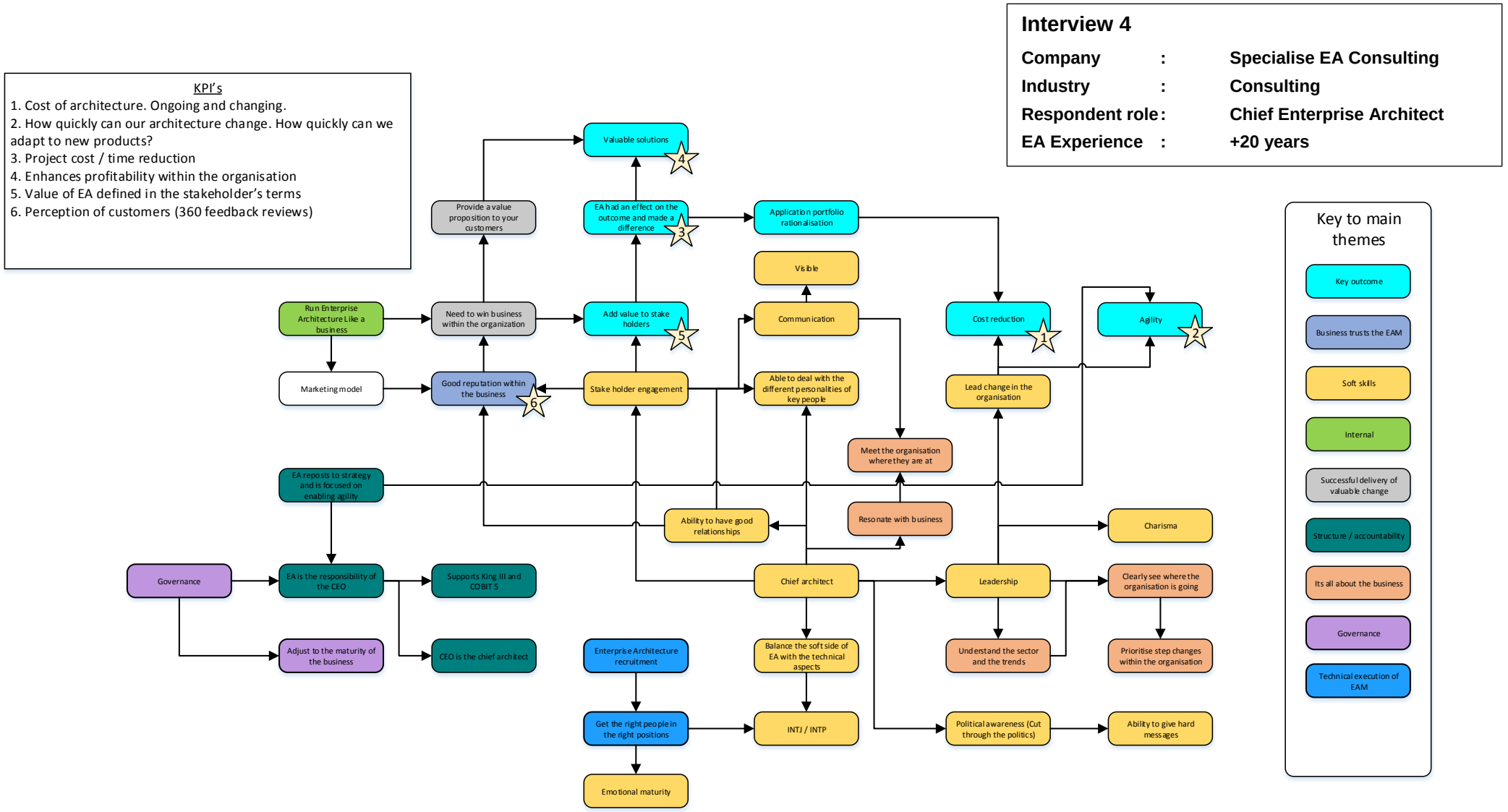


Figure 25: Relationship map – Interview 4

Interview 5

Company	:	**Eskom**
Industry	:	**Utilities**
Respondent role	:	**Senior Enterprise Architect**
EA Experience	:	**15 – 20 years**

KPI's

1. Business benefits (Business case realisation)
2. Business focused outcomes (defined and measure)
3. Benefits of EA need to be defined in business terms
4. Number of decisions influenced. Degree of influence
5. Business based performance improvement KPI's. Cost reduction



Figure 26: Relationship map – Interview 5

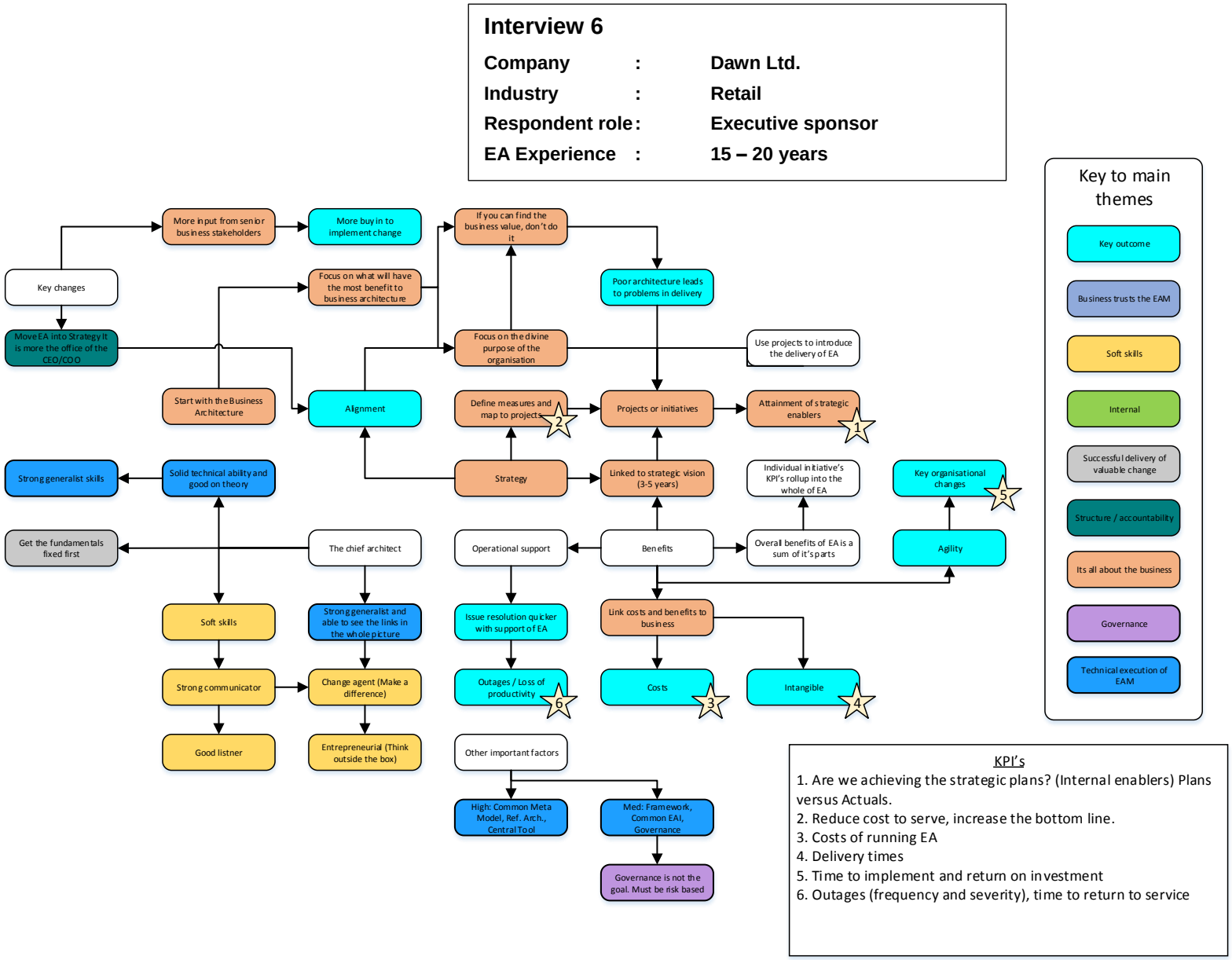


Figure 27: Relationship map – Interview 6

Interview 7

Company	**:**	**Exxaro**
Industry	**:**	**Mining**
Respondent role	**:**	**Chief Enterprise Architect**
EA Experience	**:**	**+20 years**

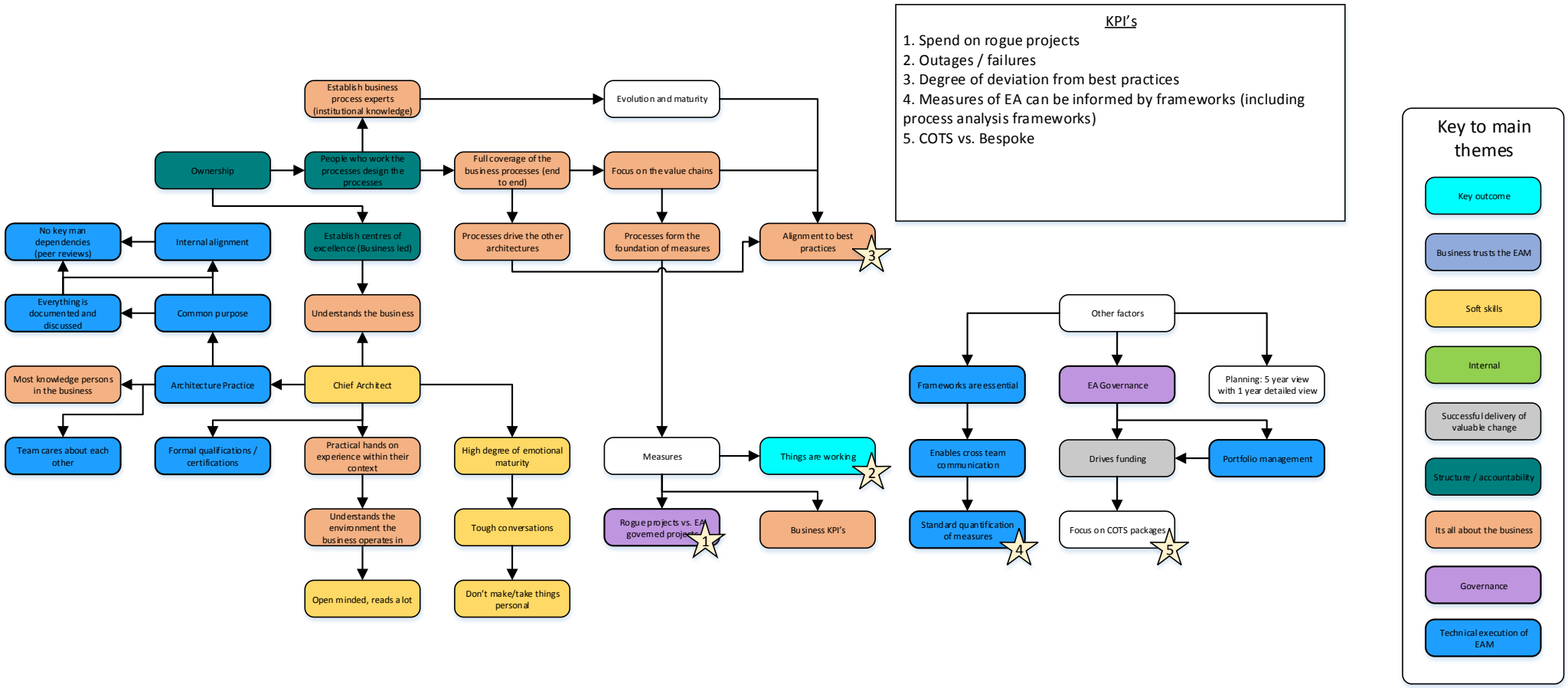


Figure 28: Relationship map – Interview 7

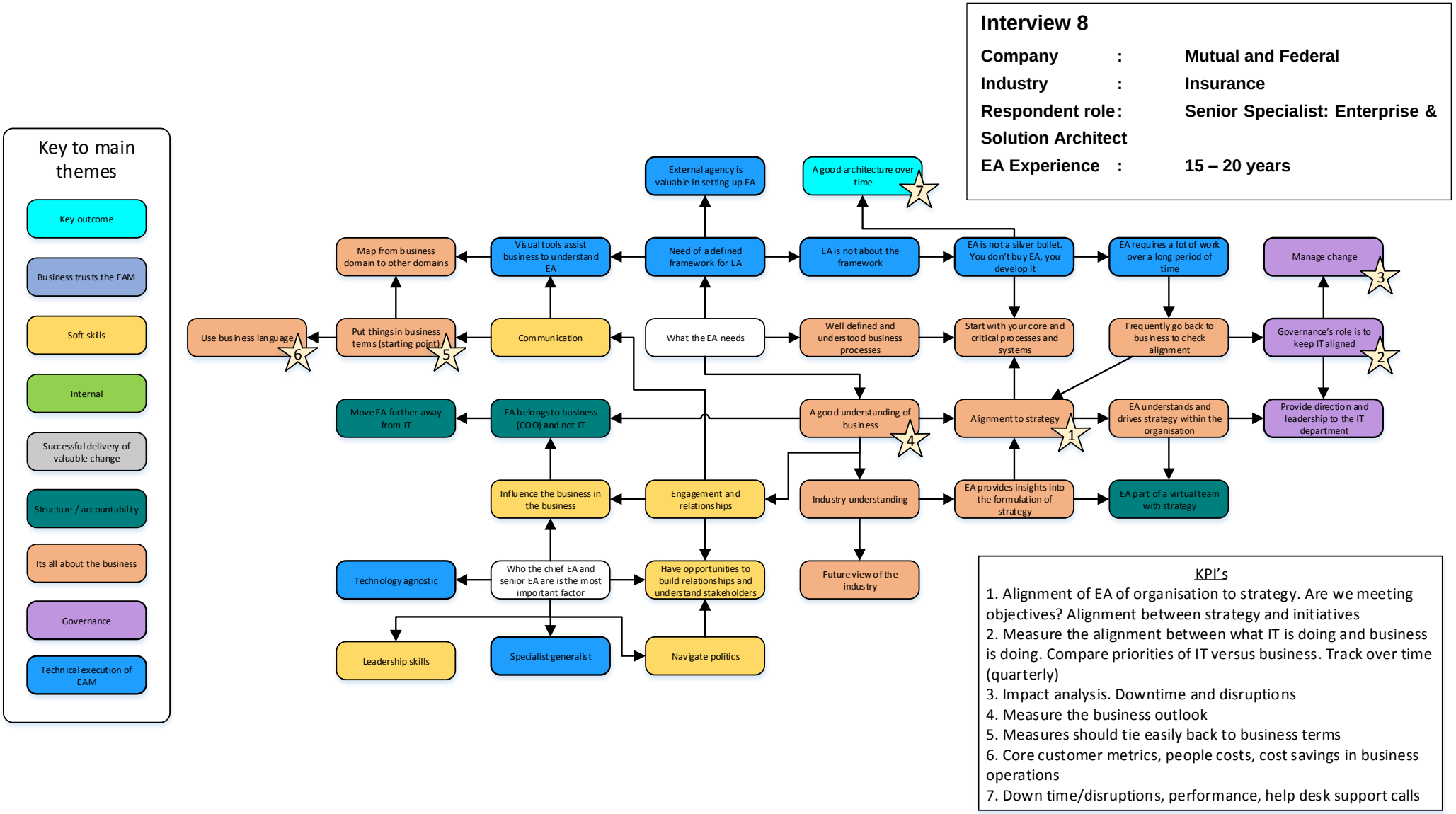


Figure 29: Relationship map – Interview 8

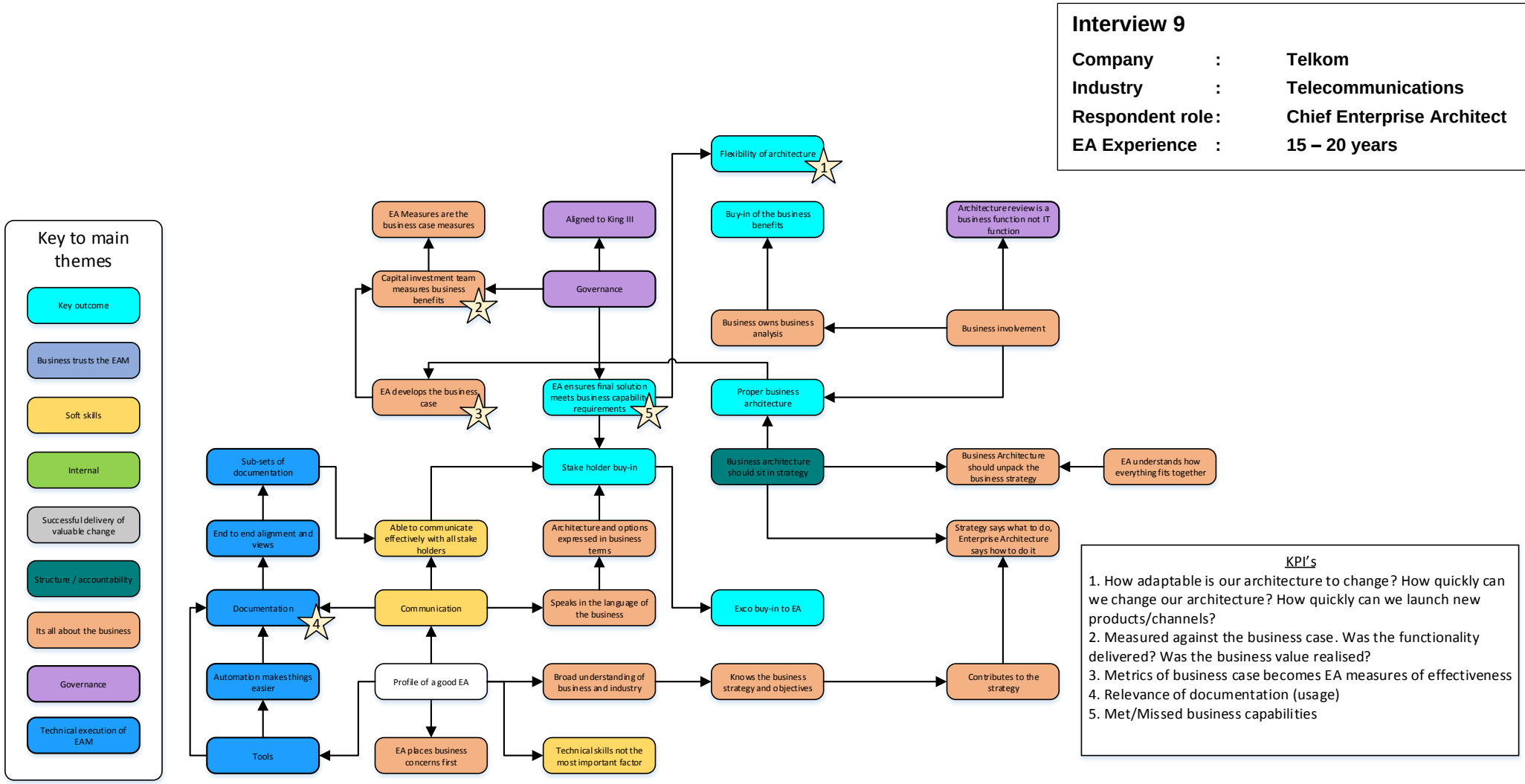


Figure 30: Relationship map – Interview 9

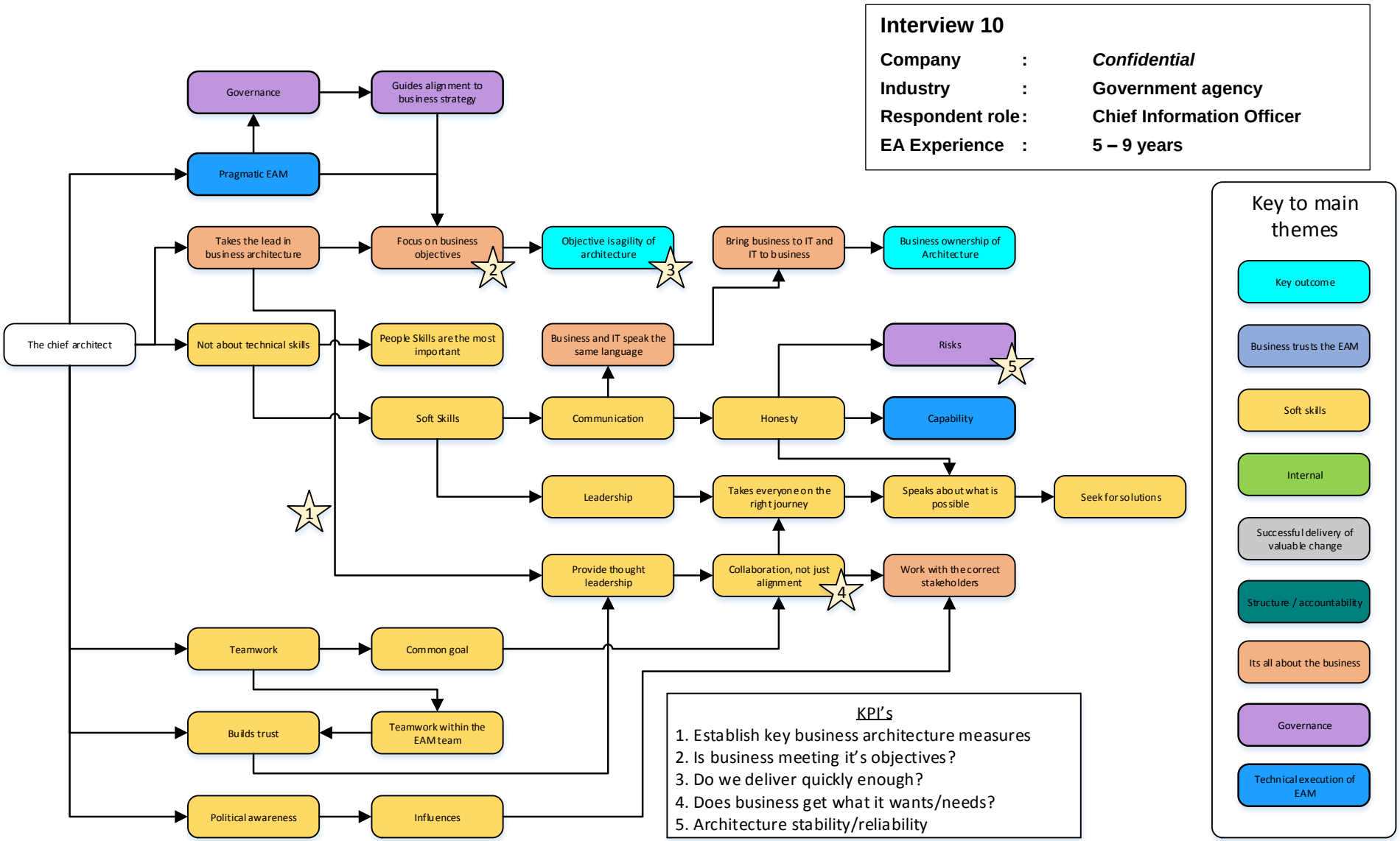


Figure 31: Relationship map – Interview 10

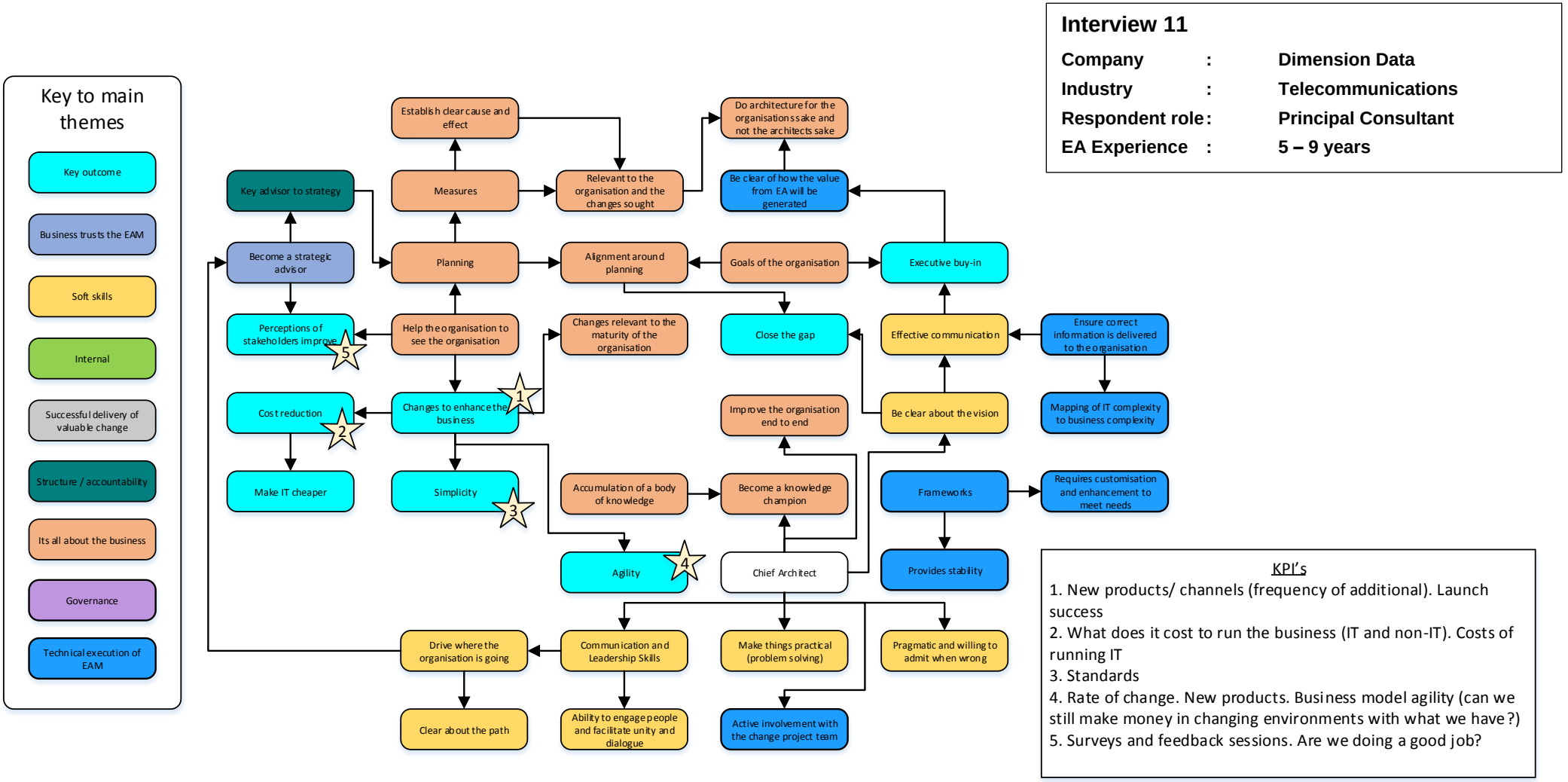


Figure 32: Relationship map – Interview 11

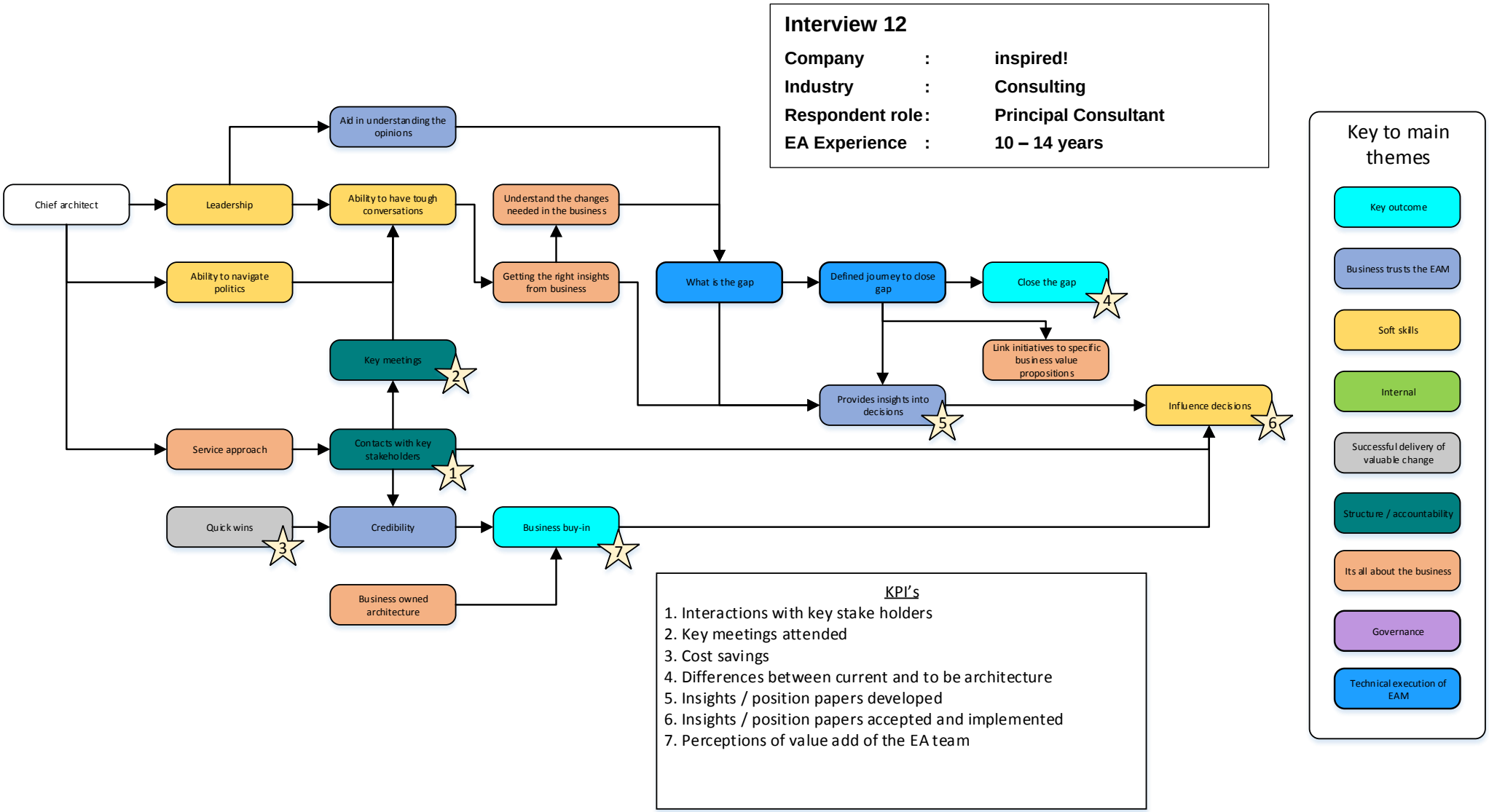


Figure 33: Relationship map – Interview 12

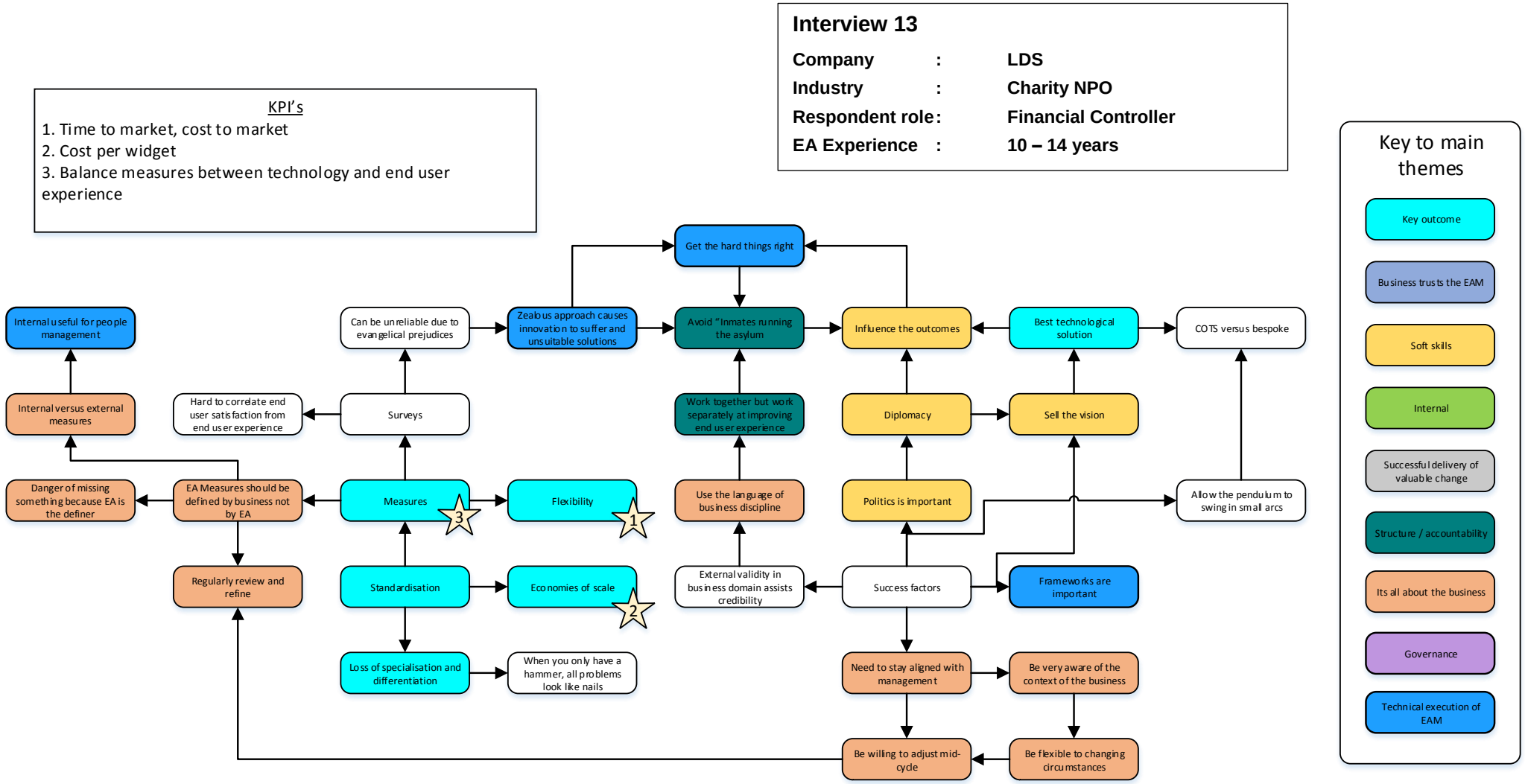


Figure 34: Relationship map – Interview 13

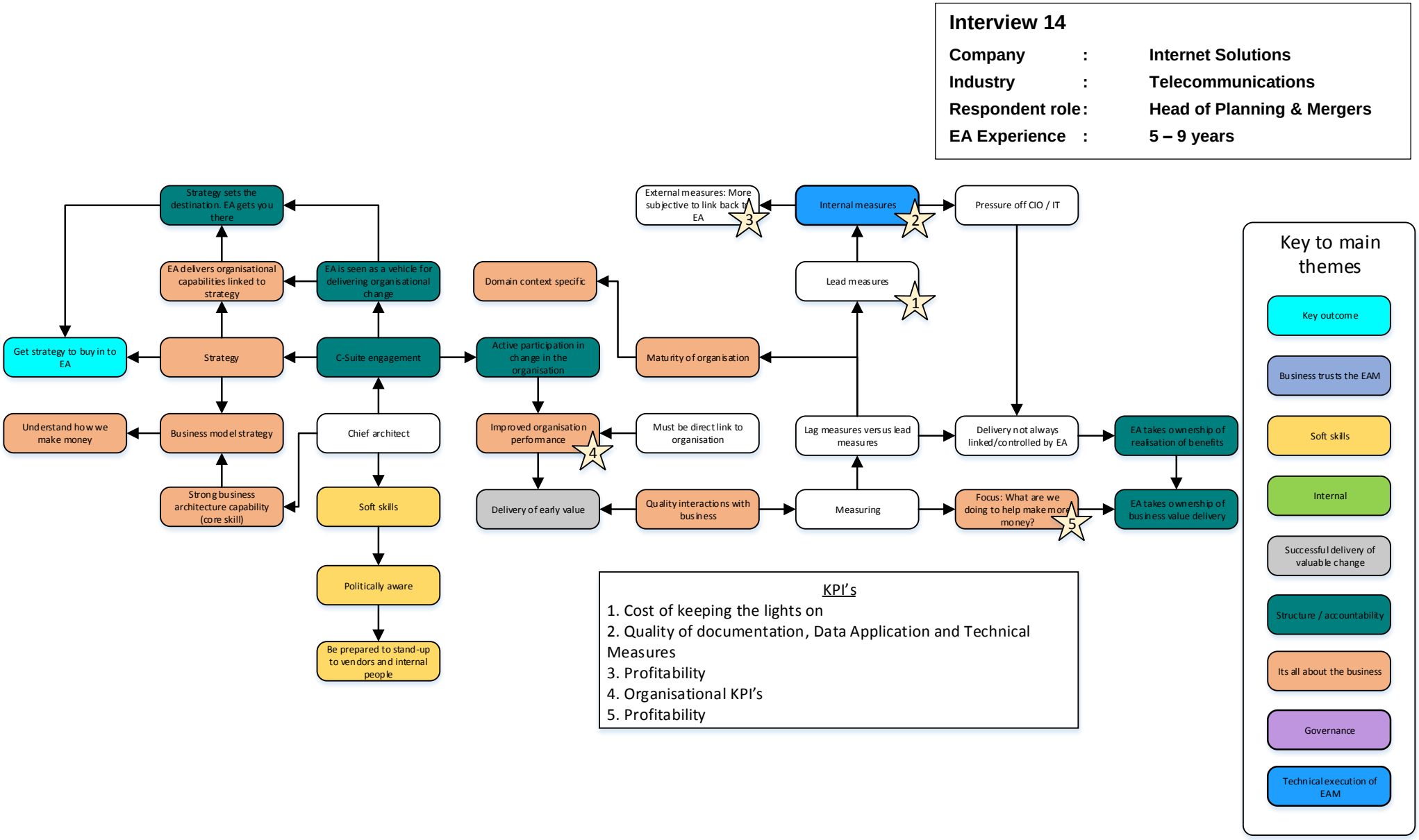


Figure 35: Relationship map – Interview 14

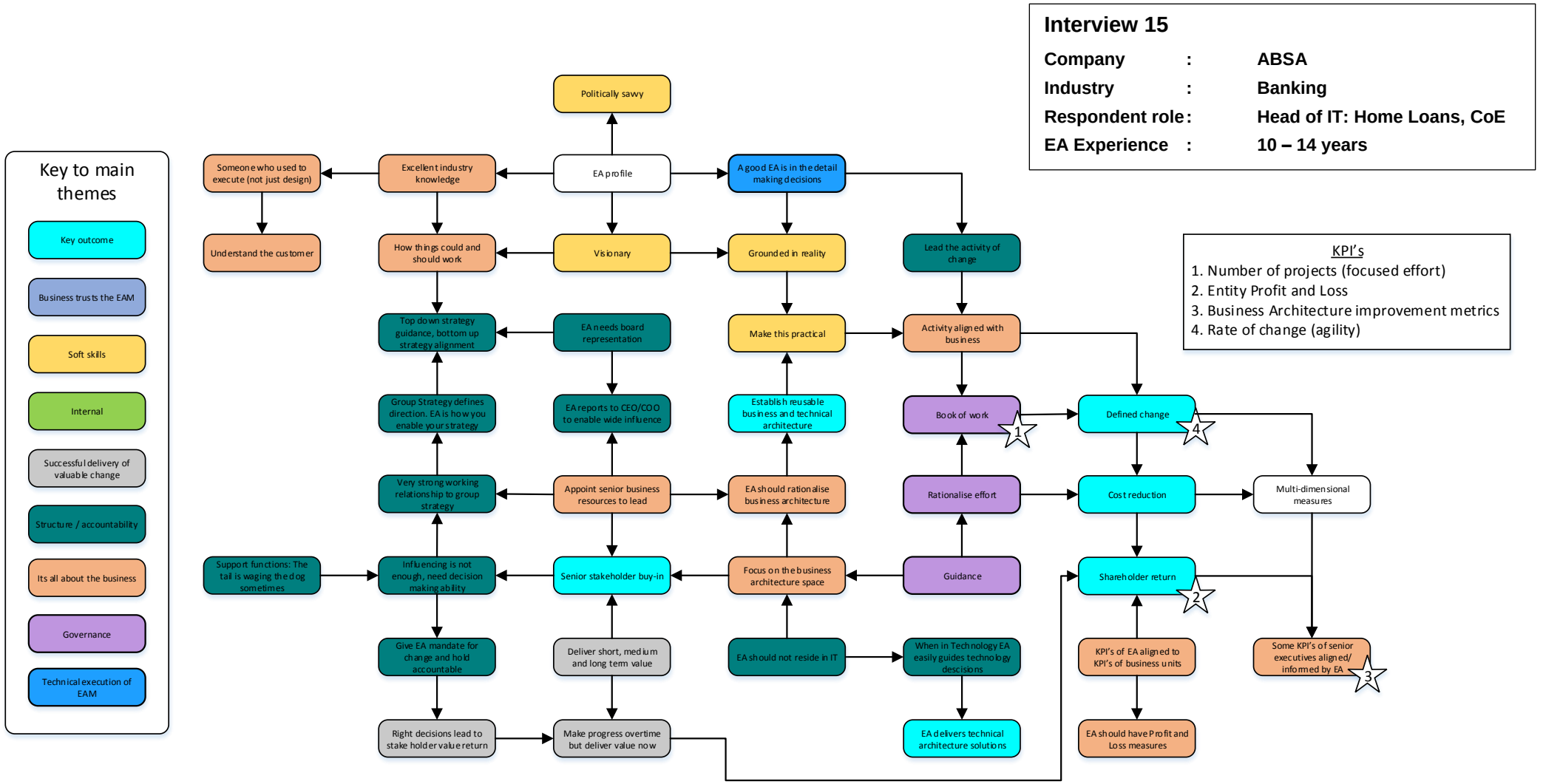


Figure 36: Relationship map – Interview 15

Interview 16

Company	**:**	**Kusaga Taka Consulting**
Industry	**:**	**Recycling**
Respondent role	**:**	**Chief Information Officer**
EA Experience	**:**	**0 – 4 years**

KPI's

1. More detail when considering investment choices.
2. Cost reduction.
3. Cost to service.
4. Headcount.
5. Turn around times. Channels supported. Customer services.

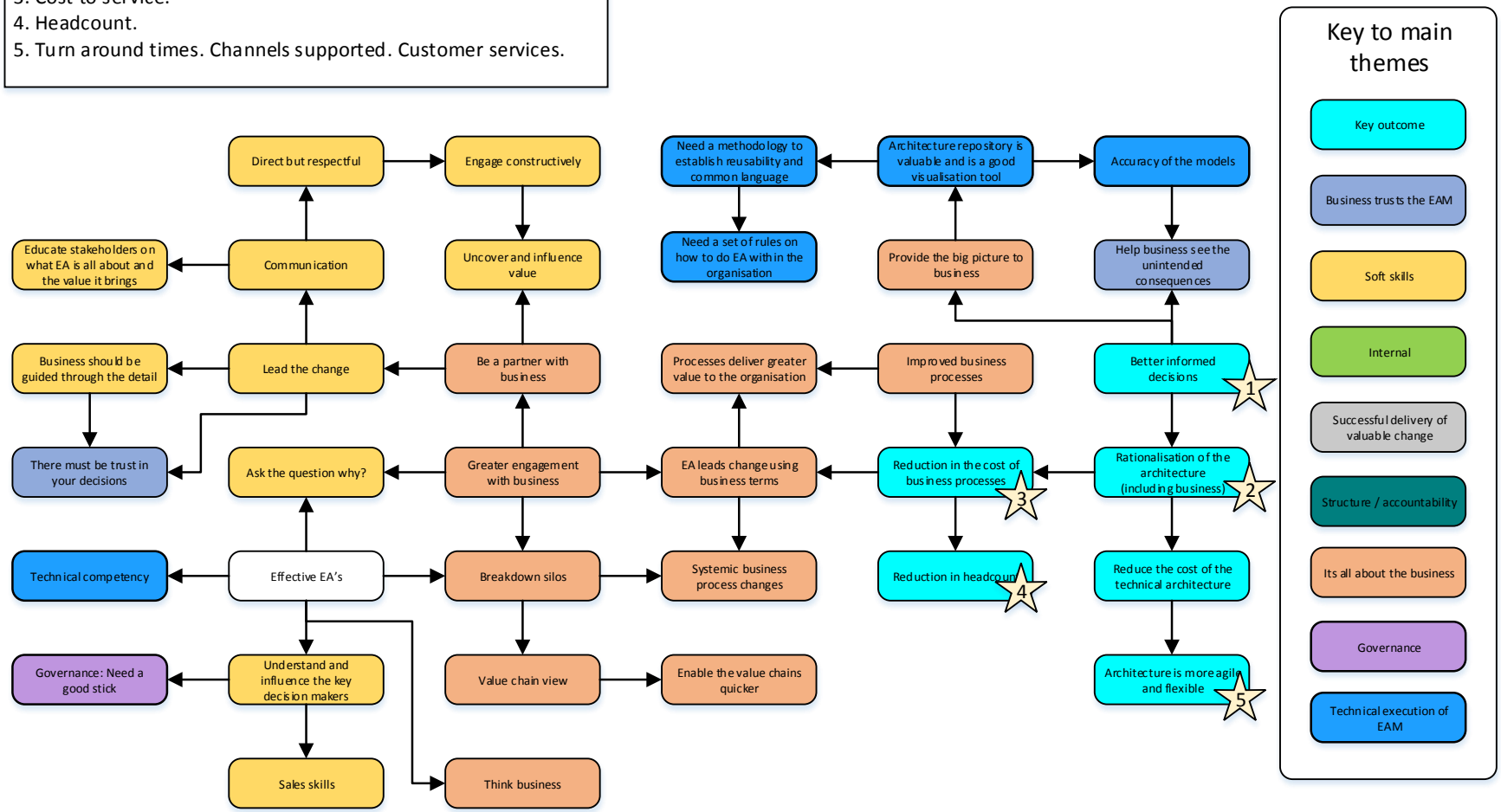


Figure 37: Relationship map – Interview 16

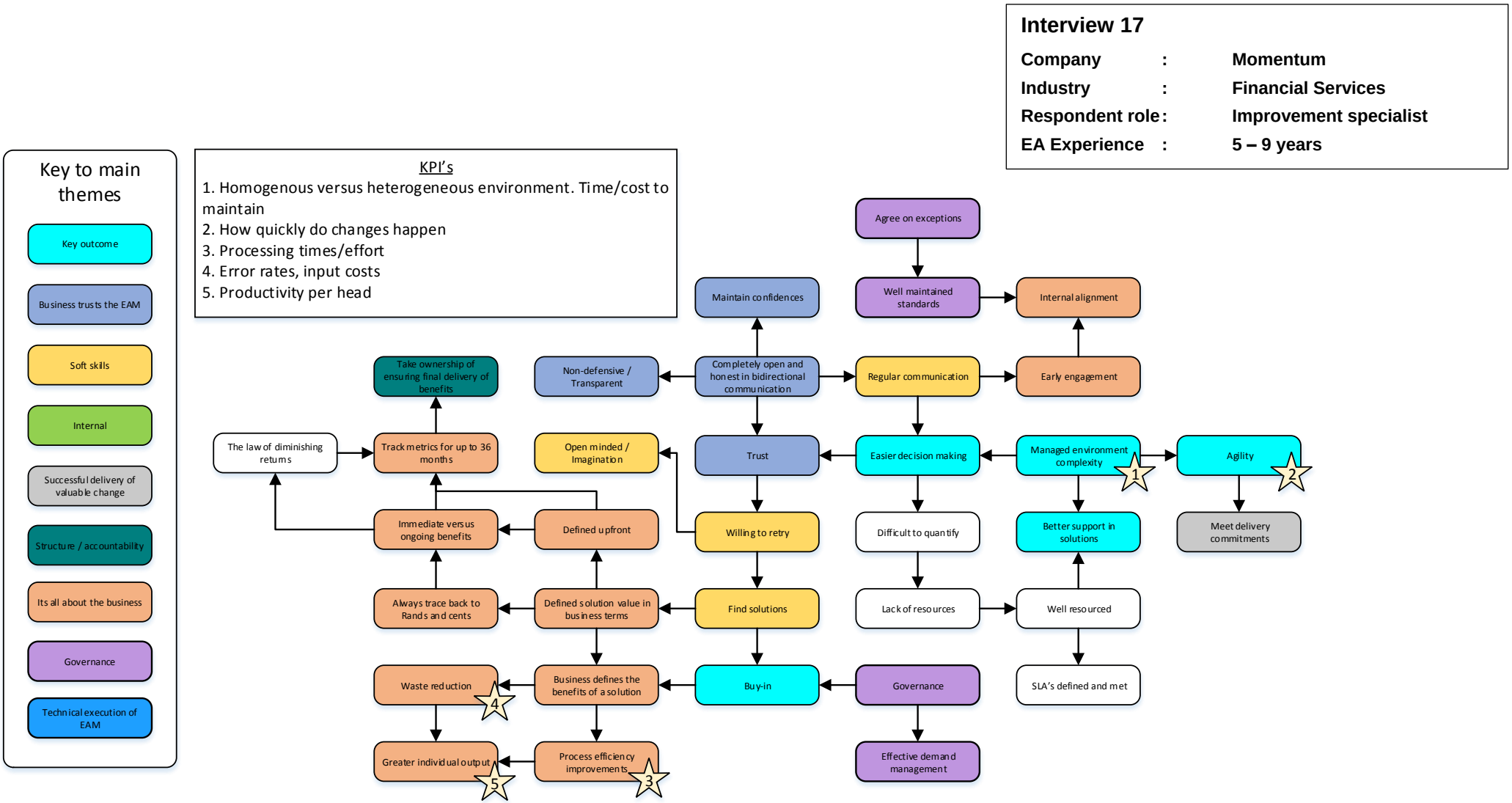


Figure 38: Relationship map – Interview 17