Improving alignment between Business and IT departments: towards an effective Enterprise Architecture and its role within the corporate organisation

A Research Dissertation presented to the Department of Information Systems

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Plagiarism Declaration

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BA	Business Architecture
BITA	Business IT Alignment
CEO	Chief Executive Officer
CIO	Chief Information Officer
EA	Enterprise Architecture
GM	General Manager
SAMM	Strategic Alignment Maturity Model

Abstract

While it is widely acknowledged that alignment between Business and IT is important to remain competitive and for improving business performance, achieving, and maintaining alignment between IT and Business divisions is not always easy. While there are many ways to improve Business IT Alignment, a mature Enterprise Architecture has been proven as a contributor to Business and IT Alignment due to its holistic approach to considering all aspects from a technical and organisational perspective (Kurnia et.al, 2020).

Other factors which are believed to improve Business IT Alignment culture, structure, communication, and strategy, to name a few. To the researcher's knowledge, not many studies have considered how these four factors, together with Enterprise Architecture fit together harmoniously to create, contribute to, and maintain strategic alignment between Business and IT divisions in a single organisation.

This dissertation seeks to fill this gap by establishing which of these four variables contribute to improving alignment between Business and IT and if Enterprise Architecture has a role to play in achieving it.

A conceptual model derived from the literature review guides this research through applying a moderation approach to determine if a balance in alignment can be achieved. This research is an empirical study conducted by an insider of Company A which followed a single organisation survey approach with 40 respondents at a South African Oil and Gas Company. It follows an objectivism ontology, with a positivist philosophical approach as an epistemology. A mixed method approach was followed for data collection, and data analyses was done using quantitative methods.

Six hypotheses are presented of which two of the six hypotheses are rejected based on Regression Analysis testing.

The key findings present that even though Enterprise Architecture and its' benefits appear to be largely understood at Company A, both maturity levels of business-IT alignment and Enterprise Architecture is relatively low so there are indeed opportunities for improving both maturity levels. While literature often indicates that Culture, Communication, Structure and Strategy have been identified as key enablers of BITA, the researcher only proved that two variables, Communication and Strategy has a significant effect of BITA.

After establishing BITA and EA Maturity levels, provides recommendations for improving EA maturity and motivates how these improvements, if implemented, can strengthen alignment between business and IT so that EA can enable better alignment between Business and IT at Company A. These findings can support the existing EA and BITA body of knowledge in two ways: 1. As a case which proved that not all 4 common variables necessarily have a significant effect on BITA, 2, provides practical and implementable opportunities for improving EA at an organisation where its benefits is already understood.

Acknowledgements

It is only but through the grace and mercy of my Creator that I am able to apply my healthy, hungry mind to my studies. I am grateful to Him for blessing me with the ability to learn, read and write, and to share my knowledge with others.

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To my colleagues, family and friends who have shown a genuine interest in my progress, I know who you are, and you know who you are. I pray that you too conquer your goals, and I promise to support you as you have supported me.

To those who participated in my research, I sincerely thank you for taking the time.

And finally, to my supervisor Professor Michael Kyobe, for his patience with me and constructive feedback throughout. I am honoured to have been your student. I could not have done this without your guidance. I wish you all the success with your career.

Dedication

Through His grace, my Creator, I have been blessed with a loving family, my support structure, to whom I dedicate this dissertation.

My mother, my rock, Gadija Kariem, and my father, my guide, Mogamat Kariem, who in my absence, showed up each time for my kids. They loved and cherished them and offered comfort like only a loving grandma and grandpa can. They raised me to be disciplined, motivated, and goal orientated. I hope I have done them proud.

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And finally, to my children, Amaal and Ayyoob who don't yet understand why mommy had to 'work again'. I hope to inspire them to always push past their comfort zone and aim higher. My son Ayyoob was born half-way through this course; it is he who set the pace for completion. Many late nights he slept on my lap while I was typing away. My daughter Amaal, in who I already see so much of myself. I did this for them, to be an example of what can be achieved, to set personal goals and work diligently to achieve them, even if they take a bit longer than planned. Seek knowledge, always.

As I undertook this journey with my family in mind, the many late nights and weekends sacrificed to obtain my master's degree, I hope it brings many blessings into our lives. Words cannot describe my gratitude to my support structure. And the rest of my family who helped us out over the course, I am forever thankful. This is dedicated to all of us!

1. Chapter 1: Introduction

1.1. Introduction

Since the 1960s, as digital adoption progressed, most organisations have become dependent on their information systems and technology. For organisations to remain competitive, they must understand how to strategically manage their Information Systems (Shamekh, 2008). An effective way for organisations to remain competitive is to have the IT strategy support the business strategy (Luftman, 2018; Shamekh, 2008). By having aligned strategies, strategically informed decisions regarding the strategic use of IT can be made.

Several studies have proven that Business-IT Alignment (BITA) has a positive effect on business performance (Tallon, Queiroz, Coltman, & Sharma, 2016). However, strategic alignment between business and IT has been a countless decade-long problem for organisations (Chan & Reich, 2007; Luftman, 2003; Venkatrama, 1989). In fact, Business- IT alignment is among the top three challenges organisations are battling today (Luftman, 2018; Mavengere, Pekkola, & Stefanidis, 2020; Tallon, et, al, 2016; Latinen, 2016; Luftman, Lyytinen, & Zvi, 2017; Zhang, Chen, & Luo, 2018). An ever-changing environment causes business and IT alignment to be a continuous goal and thus a constant concern to business leaders. This is due to the impact that misalignment has on the overall organisation (Luftman, 2018). If organisations manage to obtain their desired level of alignment, benefits such as increased business profitability, enhanced perceived levels of IT business value, competitive advantage, ease of developing a digital business strategy/innovation, and ultimately a positive organisational performance (Latinen, 2016; Mavengere, et al, 2020) will be experienced.

The title of this dissertation is *Improving alignment between Business and IT departments: towards an effective Enterprise Architecture and its role within the corporate organisation*.

Enterprise Architecture is not as great a concern as business IT alignment, but an increased level of interest in this discipline has been reported due its potential ability to improve BITA (Riempp & Gieffers-Ankel, 2007; Zhang, Chen, & Luo, 2018; Zhang, Honghui, Yi, & Aimin, 2020). Enterprise Architecture has evolved since 1980's as "a method for overseeing the information technology resources inside an organisation. Its importance continues to grow" (Halawi, McCarthy & Farah, 2019, p.4) and has recently been recognised for "fostering business IT alignment and driving innovation" (Castro and Jung, 2021, p.1). Enterprise Architecture, hereafter referred to as EA is defined as "where business capability (financial and market goals) and technology capability (products, vendors, and functionality) are tied together with organisational capability (people or process) to drive an on-going strategy or desired outcome" (Kistasamy, van der Merwe & De La Harpe, 2010, p.129). EA is a recognized as a method of obtaining BIA (Kurnia, Kotusev, & Dilnutt, 2020; Zhang, Chen, & Luo, 2018).

1.2.   Background and problem statement

This section provides some background of the organisation being studied to put the problem of misalignment at this organisation into context.

1.2.1. Background

Literature reveals that the CIO reporting line is influenced by the focus of the CIO (Luftman, 2018). This implies that CIOs who report directly to the CEO aim at having the appropriate Level of Authority (LOA) required to fulfil their responsibilities as a CIO. This structure is advantageous to the IT department as the ability to influence strategic IT direction is greater if the CIO reports to the CEO (Aljazzaf, Mithas, & Park, 2019). On the other hand, the focus of CIOs who report through the CFO, while not reducing the authority of the CIO, is instead on risk and financial accountability to shareholders, or 'back-office' operations (Marboah, 2011). Such a responsibility Luftman (2018) considers a more 'traditional' role considering the progress from a digital transformation perspective (Luftman, 2018).

This research was conducted at an organisation which will be referred to as Company A. Company A is a South African petroleum company which serves in the oil and gas/petrochemical industry. Company A's board of directors comprises of the CEO and his 11 General Managers (GMs), also referred to as level 2s in terms of hierarchy structure. The corporate structure permits for only GMs to sit on the Company A Management Committee (Mancom) and board meetings in which strategic decisions about the organisation are made.

Within Company A, the Chief Information Officer (CIO) does not share the same rank as a GM. The CIO reports to the CFO (GM of the Finance division) and occupies a level 3 position. This means that there is one level between the CIO and the CEO. The structure influences the location of decision-making which ultimately affects alignment (Chan and Reich, 2007).

The reporting structure of the CIO at company A is more in line with the latter focus described above, traditionally focusing on reporting to the CFO instead of to the CEO. The more reporting levels there are between IT leaders and CEO, the less unaligned the organisation is (Chan and Reich, 2007).

1.2.2. Problem statement

Literature has for decades mentioned that a problem contributing to misalignment in many organisations is caused by a lack of synergy between business leaders, as CIOs are often not involved in business and strategic planning (Luftman, 2018, Aljazza et, al. 2019).

Strategic planning takes place at the Company A board /Mancom (MC) level as described above. Because the CIO does not have a seat on the board he does not regularly and actively participate in board or monthly Management Committee (MC) meetings, unless invited for a specific agenda item. Therefore, this structure excludes the CIO from strategic planning, ultimately leading to IT tactical plans being misaligned to business strategy if communication about decisions made at MC executive level is not filtered down effectively.

The structure and culture of company A does not necessarily see IT as a strategic partner, but rather as a support function. This can be seen by the position of the CIO in the organogram below. IT not being viewed as a strategic partner is also highlighted in corporate communications in which the '2020 strategy' is communicated. In these communications, IT (and other support divisions like HR) are seen to be 'key enablers', as opposed to 'partners' as other business areas are referred to. This highlights

the problem statement of this dissertation that problems of strategic misalignment arise because IT Leaders such as the CIO, are not involved in corporate or executive level strategic planning.
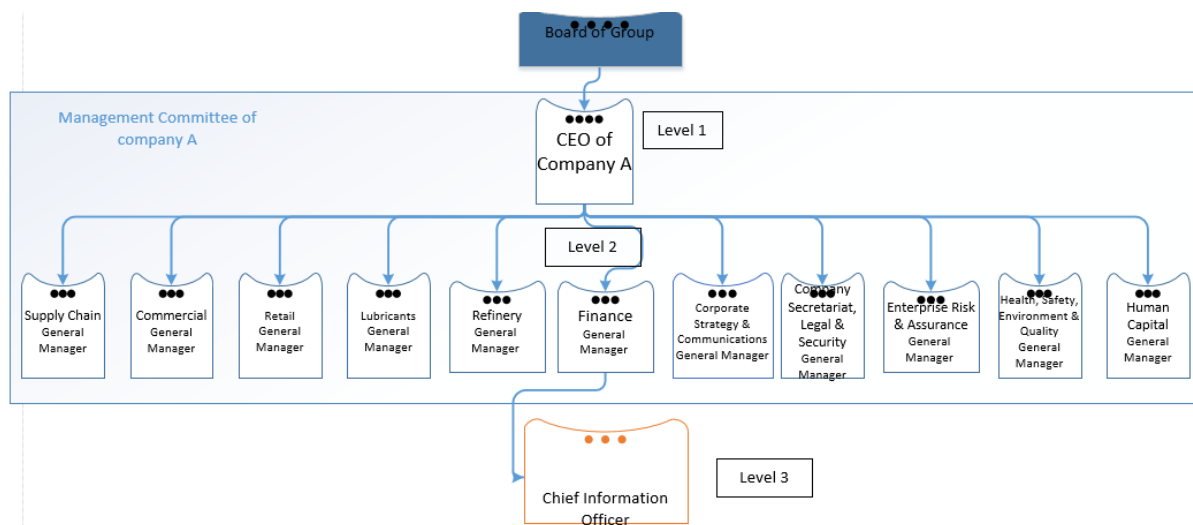
Figure 1: Org Structure of Company A highlighting the CIO's position and reporting levels between CEO and CIO (Source: Internal Org structure software)

As can be seen from the above organogram created by the researcher with information obtained from the internal organogram software within Company A, the current organisational structure includes 11 divisions.

The IT department is one of many departments reporting into the Finance Division. This implies that the researcher's assumption that the focus of the CIO is on managing the risk and financial accountability associated with the Information Systems and Technology as opposed to its strategic focus is accurate. If the CIO is not involved in strategic planning, it implies that he is informed of the strategy. Ultimately, the organisation's strategic direction is the responsibility of the CEO. CEOs and General Managers are responsible for formulating and implementing business strategy. They must also enable optimal business performance results to guarantee that shareholders obtain an acceptable return on their investment. The CEO leads the company's direction, and he has an entire department ensuring the strategy is achieved under the guidance of the GM Corporate Strategy. This structure emphasises the strategic decision-making at executive level, a level which does not include the CIO as a permanent member.

Enterprise Architecture is a strategic function, so one would assume that a strategic department has architects overseeing the technological roadmap for the company. However, the Corporate Strategy mandate does not include enterprise architecture as part of its responsibilities. The prime function of the Corporate Strategy department is to coordinate and manage the Business and Strategic Planning activities of Company A, which includes developing and implementing a digital and innovation roadmap.

The IT architecture team is expected to fulfil the role of enterprise architecture. This is maintained in the IT Business Plan in which the CIO states that "we have a sound set of architectures that define our environment and focus on standardization to ensure economies of scale and reduced costs for maintenance and support. IT has architectures defined for applications, Information Management, System Integration, Security, Master Data Management, Technical Infrastructures, etc." (CIO, 2017, IT Strategy). However, as discussed, IT is not represented at the enterprise level. This has a negative effect on

alignment because the architectural design does not include a holistic view of the enterprise. This structure clearly highlights that architecture is part of the CIO's mandate, not the mandate of a strategic division. The structure of Company A causes the CIO to have a limited area of focus as he is not highly involved in strategic business planning. This contributes to the CIO not having a holistic view of the organisation.

Literature suggests that when terms like 'aligning' with the business are used, it implies that IT is part of the business, or is going in the same direction as the business (Russel & Chuba, 2016). The rest of the organisation refers to IT as IT, and everyone else is part of 'the Business'. The researcher defines business as "every other division within Company A's primary function (such as Supply Chain or Retail), or support function (such as HR or Finance), which generally requires technology and support services from IT to run their operations". The un-unified language of IT and Business may stem from a behaviour problem and an 'us and them' attitude which speaks to disunity, incongruence, and misalignment, and ultimately a cultural issue.

From the problem described above including CIO reporting structure, current architecture scope and position, and un-unified language, this dissertation will determine how, or if Enterprise Architecture and communication, culture, structure, or strategy has a significant impact on Business IT alignment at Company A.

1.3.   Objectives of research

The rationale of this research is due to the current CIO reporting structure and layout of Company A's IT Architecture Department. Currently, architecture is only practised within the IT department. Literature states that there are opportunities for improving alignment between business and IT by maturing the architecture practice (Riempp & Gieffers-Ankel, 2007; Kurnia et.al, 2020).

Therefore, *the primary objective of this research is to:*

1. Identify opportunities for improving alignment between Business and IT divisions within Company A.

The secondary objectives are to:

1. Determine the level of alignment maturity between Business and IT and Company A
2. Prove that structure, culture, strategy, and communication contribute towards improving alignment between business and IT.
3. Provide recommendations for improving EA maturity so that EA can enable better alignment between Business and IT
4. Determine what structural change, if any, is required to further improve BITA

1.4.   Research Questions

The primary research question for this study is:

1. How can BITA be strengthened at Company A?

The sub-research questions are:

2. Is there a problem of strategic misalignment between Business and IT at Company A?

3. What is the current maturity level of EA processes at Company A?

4. What are some of the reasons for the Alignment maturity level at Company A?

1.5.   Importance of the research

Many studies have also confirmed that Enterprise Architecture can certainly contribute towards improving alignment between IT and business divisions due to its holistic approach to considering all aspects from a technical and organisational perspective (Kurnia et.al, 2020). However, not many studies have considered how all these factors, namely Culture, Communication, Strategy, Structure, and Enterprise Architecture as variables fit together harmoniously to create, contribute to, and maintain strategic alignment between Corporate and IT divisions. This study aims to determine if a balance in alignment can be achieved using the moderation approach.

This study could also be useful to Company A management in terms of understanding the current immature state of the EA practice. If proposals are implemented and prove effective, this would lead to improved business performance of Company A and ultimately provide benefits to majority shareholder, Company B in terms of an improvement to the expected ROI.

Finally, this study will contribute to the existing body of knowledge on the application of the moderation approach in the social science research area.

1.6.   Dissertation overview

The dissertation is presented the following way:

Chapter 1 Introduction: Included an introduction to the topic being researched, background and problem statement, research objectives and questions, as well as the importance of the research.

Chapter 2 Literature Review: Includes the literature reviewed related to alignment and Enterprise Architecture, introduces the conceptual model and its constructs, as well as the hypotheses tested.

Chapter 3 Research Design and Methodology: Discusses the research design which includes the philosophical stance applied, the research methodology, purpose and strategy, method of collecting data, and ethics issues considered for the study.

Chapter 4 Data Analysis and Results: Provides the analysis and results of hypotheses tested.

Chapter 5 Discussion: Answers the research questions, lists limitations makes suggestions for future research and concludes the dissertation.

2. Chapter 2: Literature review

2.1. Introduction

The term Business-IT alignment is referred to throughout this dissertation. IT refers to "the entire spectrum of technologies for information processing, including software, hardware, communications technologies, related services and sub-organizations providing the technologies and services" (Latinen, 2016, p. 13), and in this case includes IT Architecture services.

2.1.1. Alignment definitions

There are many definitions of alignment (Chan & Reich, 2007; Venkatraman, 1989, Kurnia, et.al 2020). Chan and Reich (2007) conducted a review of alignment literature and concluded that although there is no single definition (Latinen, 2016), alignment implies "the degree to which the business strategy and plans, and the IT strategy and plans, complement each other" (Chan & Reich, 2007, p. 300). Another definition by Henderson and Venkatraman states that alignment is the degree of fit and integration among business strategy, IT strategy, business infrastructure, and IT infrastructure (Chan & Reich, 2007). Although defined differently, all descriptions imply that alignment is the extent to which the business and the rest of the organisation work in harmony towards a common goal.

Alignment literature also suggests that the concept of alignment is referred to by many different terms, the most commonly 'fit' defined as "the degree of coherence between realized business strategy and realized IT strategy" (Chan & Reich, 2007, p. 300). Other than fit, terms like integration, congruence, harmony, fusion, and linkage (Chan & Reich, 2007, Kurnia, et.al, 2020), contingency, co-alignment, consistency (Venkatraman, 1989) are all synonymous to alignment. However, 'fit' is more associated with the measurement of alignment and not as a synonym or definition for the concept of alignment (Chan & Reich, 2007).

Literature also discusses various dimensions of alignment. These dimensions are strategic, structural, social, cultural (Chan and Reich, 2007); business, IT, and contextual (Baker and Jones, 2008). The Business alignment perspective refers to aligning business resources with business strategy, the IT alignment perspective refers to aligning IT resources to the IT strategy, and Contextual alignment refers to aligning organisation resources with the external context in which it competes (Baker and Jones, 2008). The Social and Cultural dimensions are more internally focused on employees as the social dimension refers to the relationship between IT and business leaders/resources and their interaction towards achieving the business objectives, and the Cultural dimension refers to the alignment of people's behaviour to reaching business goals. Structural alignment refers to the congruence between business and IT resources, and strategic alignment refers to the link between IT and Business strategy. Significantly more attention is given to strategic IT alignment in alignment research, but it is important to note that both Strategic and Structural alignment influence business performance (Baker & Jones, 2008).

The conclusion is that the actual definition of alignment as provided by the literature is vague and indefinite, (Chan & Reich, 2007; Maes, Rijsenbrij, Truijens & Goedvolk, 2000; Latinen, 2016; Luftman, Lyytinen & Zvi, 2017). The definitions describe how Business, and IT should support and be in harmony with each other, but the literature lacked a clear and explicit definition that one would expect when searching for a definition of a concept which has been studied for decades.

The definitions provided imply that alignment is an end-state. Some researchers consider alignment as a process, not an end-state (Luftman, 2018, Luftman, Lyytinen, & Zvi, 2017; Maes et al., 2000) as previous definitions suggested. Other definitions are not limited to the strategic level but instead take all aspects of the business-IT relationship into account (other alignment dimensions, Cultural, etc). Kurnia et al., (2020) refer to BITA as a representation of congruence between Business and IT strategies, and Business and IT infrastructure and processes (2020). Maes et al., (2000) most interestingly did not use terms such as harmony or balance between the different elements, but instead they assume that these elements are interrelated in a conscious way. It is for these reasons that the researcher selected the below, timeless definition of alignment when referring to Business-IT alignment (BITA) in this dissertation.

"The continuous process, involving management and design sub-processes, of consciously and coherently interrelating all components of the business-IT relationship in order to contribute to the organisation's performance over time."

(Maes et al., 2000, p.19)

Simply put, successful Business-IT alignment requires an effective two-way action and communication between both business and IT (Latinen, 2016; Kurni et.al).

2.1.2. Alignment models
Many alignment models have been developed to measure strategic alignment of an organisation, but it was the Strategic Alignment Model (SAM) which formed the basis of the later models (Latinen, 2016, Zhang et al, 2020).

The SAM developed by Henderson and Venkatraman in 1993 was influenced by the MIT Model and it was the first of its kind to develop a holistic framework for strategic alignment as SAM considered the external aspects as well (Marboah, 2011).

The SAM is based on four related key domains of business strategy, organisational infrastructure and processes, IT strategy, and IT infrastructure and processes (Chan and Reich, 2007). SAM implies that these four domains should always be combined and must be aligned to obtain business-IT alignment (Luftman et al., 2017), as excluding either one could prove dysfunctional (Marboah, 2011).

The SAM model is illustrated below depicting the elements and how they interact:
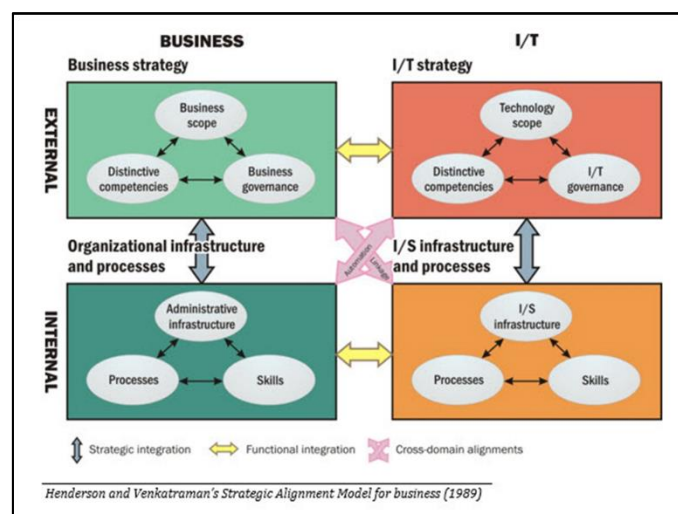
Figure 2: Strategic Alignment Model by Henderson and Venkatraman (Chan and Reich, 2007).

Although SAM is fundamental in alignment research and has been widely adopted in BITA research (Zhang et al, 2020), it has its limitations as it does not look at business and IT as whole entities, instead divides them according to their focus: the internal or external environment of the organisation (Hout, 2012, p.28) and emphasises that these two streams and their relevant components need to be balanced. Moreover, the original SAM model was "purely conceptual and offered no means to analyse and detect alignment and their levels" (Luftman et al., 2017).

Due to the limitations of SAM, many models have since evolved which are based on the fundamental elements of SAM (Chan &Reich, 2007; Maes et al., 2000; Latinen, 2016).

There have been extensions to SAM such as the Generic Framework developed by Maes et al (2000) which addresses cultural, political, and financial aspects in terms of the business-IT relationship, elements missing from SAM (Hout, 2012; Luftman et al., 2017). Another extension includes the Strategic Alignment Maturity Model (SAMM) created by Luftman (Luftman, 2000). Luftman introduced six criteria for on which alignment maturity can be measured. These are discussed in the next section, alignment measurement.

2.2. Alignment measurement

The ability to measure alignment is important (Chan & Reich, 2007). If BITA is measured it allows for a known alignment level, which then provides direction for further improvement, therein promoting improved business performance (Zhang et al, 2020).

Alignment can be measured quantitatively and qualitatively (Baker & Jones, 2008; Chan & Reich, 2007; Ors, 2009, Luftman, et al., 2017). Quantitative measures could be in the form of questionnaires or Likert-type scales. Evidence suggests that quantitative measures are direct, robust, and appropriate for testing theories about the antecedents of alignment (Coltman et al., 2015), and is a common approach in alignment research (Luftman, et al., 2017).

One such quantitative tool is Luftman's SAMM model (2000) which is holistic in that is measures alignment from six different dimensions (Luftman, 2000), 1 - Communications, 2- Competency, 3- Governance, 4-Partnership, 5-Scope and Architecture, 6- Skills.

The below image depicts these dimensions and the characteristics measured within each to determine the maturity of alignment within an organisation.
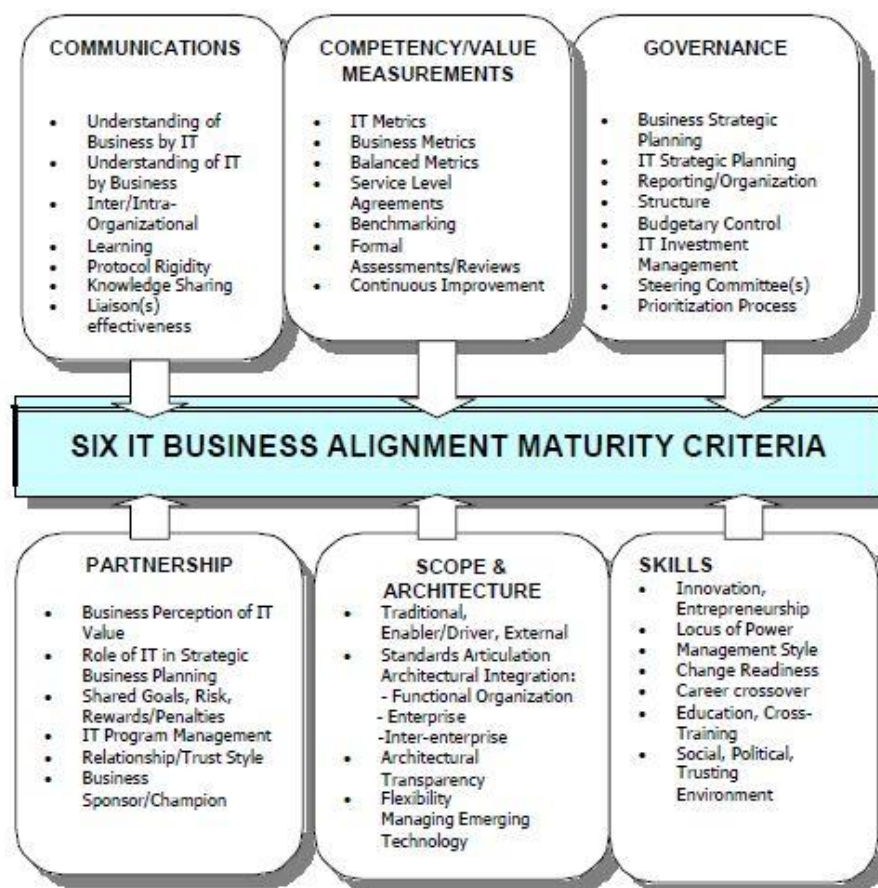
Figure 3: Criteria for measuring business-IT alignment according to Luftman (2000)

According to this assessment tool, the maturity of alignment within an organisation ranges on a scale of 1–5. Organisations that operate at level 1 indicate that alignment is an ad hoc or immature process, there is little to no alignment between business and IT. Level 5 means that alignment is an optimised process which implies there are strong levels of alignment between business and IT departments.

The five levels of alignment maturity are depicted in the below image:
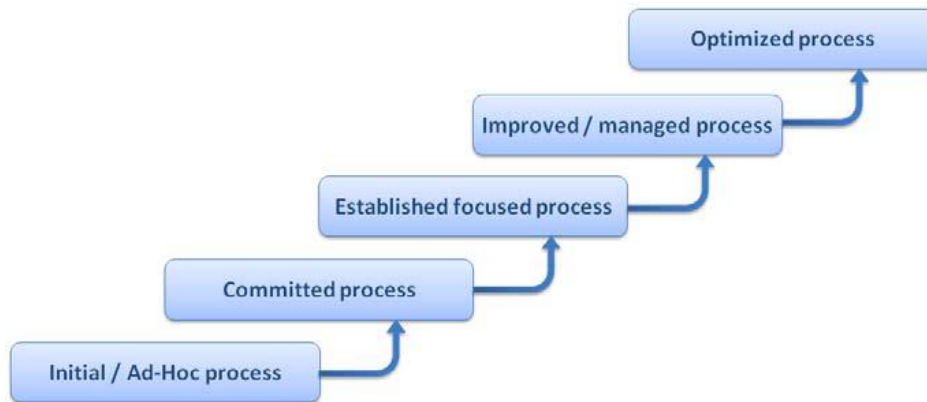
Figure 4: 5 Stages of alignment maturity (Luftman, 2000)

Another form of quantitative measurement is by fit. Venkatraman (1989) identified six perspectives of fit which are appropriate for strategic alignment measurement. The selected perspective of fit must be specified to avoid contradictory results (Bergerona, Raymond, & Rivard, 2003). In addition, "specifying one type of fit conceptually and then using measures designed for another type of fit introduces errors" (Chan & Reich, 2007, p.303). Chan and Reich summarised each perspective and highlighted the differences between them in terms of statistical application (Chan and Reich, 2007). These perspectives have been frequently applied by IT researchers to calculate the extent of alignment between business and IT strategy (Coltman et al, 2015, p. 93).

These perspectives of fit are as follows:

1. **Fit as moderation** –the impact of a predictor variable on a criterion variable is fundamentally dependent on the level of a third variable, the moderator. Thus, the fit between predictor and moderator is a significant determinant of performance. Moderation is calculated using interaction terms (Chan and Reich, 2007, p.302).

2. **Fit as mediation** –the existence of a significant intervening mechanism, between an independent variable and the dependent variable. Modelled using indirect or intermediate variables.

3. **Fit as matching** – views fit as a theoretically defined match between two theoretically-related variables. Measure of fit between two variables is developed independent of any performance anchor, unlike the previous two perspectives. Measured using difference scores.

4. **Fit as gestalts** – Gestalts are configurations or patterns of organisational variables that have attained an adequate level of coherence with one another, no direct causation is implied. Arrived at via cluster analysis.

5. **Fit as profile-deviation** – signifies adherence to an externally-specified profile. This type of fit is examined using pattern analysis.

6. **Fit as covariation** – this perspective views co-alignment as reflected in the pattern of covariation among a set of dimensions and is usually computed using factor analysis (Ajumobi & Kyobe, 2017)

The above descriptions for the six categories of fit reference three sources (Ajumobi & Kyobe, 2017, p.6; Chan and Reich, 2007; Venkatraman, 1989).

2.3.   Theories which address the problems causing misalignment

It is important to identify theories relevant to addressing the problem because measurement is valid only in the light of theory (Brannick & Coghlan, 2007). This section discusses how the Contingency, Congruency, and Configuration theories apply to problems contributing towards misalignment.

2.3.1. Structural problems – contingency theory

Alignment is influenced by the organisation structure (Islam and Hu, 2012) and the location of IT decision-making rights (Chan and Reich, 2007).

All organisations are not structured in the same way. The CIO reporting structure ultimately influences alignment because, the CIO's line of reporting influences the entire IT department (Banker, Hu, Luftman, & Pavlou, 2010).

Literature mentions that a problem contributing to misalignment in many organisations is caused by a lack of synergy between business leaders, as CIOs are often not involved in business and strategic planning due to the reporting structure (Luftman, 2018, Aljazza et al., 2019). There are two general structures of CIO reporting and that is for the CIO to be considered as part of the C-Level executives and report directly into the CEO, or for the CIO to be two levels from the CEO and report to a C-level executive such as the CFO. Neither of these structures is necessarily optimal or correct. However, the structure is influenced by the organisation's strategic positioning, differentiation, or cost leadership. Companies who adopt differentiation as a strategy consider IT as weapon which should be leveraged to obtain a competitive advantage, whereas a Cost Leadership strategy dictates a cost savings in all processes while IT is relied on for creating operational excellence (Banker, et al., 2010).

2.3.2. Theory to explain structural problems

According to the literature, the underlying notion of the contingency theory is that all organisations cannot be led, organised, structured, and governed in the same way (Islam and Hu, 2012; Muhanguzi & Kyobe,2014). The effectiveness and performance of the organisation depends on the fit or match between many variables technology, organization size, organizational structure, and its information systems (Islam and Hu, 2012).

The contingency theory is appropriate in alignment research because the "search for fit" is central to this theory (Donaldson, 2001). The contingency theory is also suitable for studying the structural alignment perspective where the alignment "is influenced by the location of IT decision-making rights, reporting relationships" (Chan & Reich, 2007, p. 300).

2.3.3. Culture and communication problems

Culture is an abstract concept which refers to organisation culture which can be described as the unique experiences, attitudes and values which form rules and behaviours in an organisation (Shamekh, 2008). If the culture of the company promotes collaboration, then sharing of information will be second nature to employees. However, culture must be formed at the top and drilled down, therefore it is important to have the right type of person in a leadership position to ensure that employees demonstrate behaviour which is aligned with and will contribute to achievement of the strategy. The leaders must have the right character traits for the job, i.e., the character must be compatible or congruent with the culture and strategy. In addition, literature claims that because organizational structure and organizational behaviour are critical components of strategy implementation, it stands

to reason that superior performance is contingent on how well the structure and culture are aligned with the requirements of a specific strategy (Chan & Reich, 2007; Olson, Slater, & Hult, 2005).

2.3.4. Theories to explain cultural and communication problems

Many researchers in the field of alignment claim that desired levels of business performance are achieved when there is coherence or alignment between the organisation strategy and the various organisational elements (Muhanguzi & Kyobe, 2014).

A modern variation of contingency theory is configuration theory, which states that the fit between contingency and structural (and other organisational) variables is limited to just a few configurations or gestalts, that is, fits (Donaldson, 2006, p. 22). Gestalts are "configurations or patterns of organisational elements, constructs or variables that have attained an adequate level of coherence, fit or unity with one another" (Muhanguzi & Kyobe, 2014, p. 5). Researchers adopting the gestalt perspective of fit have claimed that it is difficult to look at things from linear perspective (Venkatraman, 1989; 1992). Given the interplay between variables, all variables and their interrelations should be considered as they have an impact on each other and ultimately impact alignment and subsequently business performance.

If we think of the congruency, we think of the systems theory, a theoretical perspective which analyses a phenomenon in its entirety, instead of in parts. Communication is the basis of forming relationships, so if leaders communicate with each other, silo operations will be reduced, and each division will be working towards the same goal. By the same token, if each division sets their own strategies and it is not related towards the overall organisation strategy, the organisation will perform poorly. Therefore, the goals of all divisions, especially IT and the corporate business division must be aligned, and the leaders must ensure that their goals are congruent with this strategy. If IT and Business work in silo, it means the goals and strategies are incongruent, and therefore misaligned.

Venkatraman, who is considered to be the father of alignment research claims that if alignment is to be understood and measurable, it must be viewed as a pattern. A pattern can be unified, strong, and unique which means there is configuration and therefore alignment. It is important to understand the interplay between all variables and identify the most appropriate pattern of combination to provide alignment (Muhanguzi & Kyobe, 2014).

2.3.5. Summarising the alignment theories

Alignment is impacted by the strategy of an organisation which influences its reporting structure. The reporting structure ultimately influences the location of decision-making, which then impacts on the level of communications and knowledge sharing, and this contributes to formulating behaviours of employees and subsequently contributes to the culture of an organisation. Therefore, each element has an impact on creating alignment and subsequently improving business performance. Each theory discussed above posits that all variables such as strategy, structure and culture, and communication within the system or organisation should have an appropriate fit and balance if alignment is to be achieved. The contingency, congruency, and configuration address these elements and the concept of fit between them, thus these theories are appropriate in the study of alignment.

The next section introduces Enterprise Architecture.

2.4.   Enterprise Architecture

Enterprise Architecture (EA) has been developing continuously since the mid-1980s. As is the case in Alignment research, there too is a lack of consistent definitions within the EA discipline (Halawai, et al, 2019).

EA is defined as "where business capability (financial and market goals) and technology capability (products, vendors, and functionality) are tied together with organisational capability (people or process) to drive an ongoing strategy or desired outcome" (Kistasamy et al., 2010). EA is also described as a structured and aligned collection of plans for the integrated representation of a given business and IT landscape, in past, current, and future states, as it is a comprehensive tool for achieving and maintaining BITA (Zhang et al., 2018, p.95). There are many other definitions provided in literature, but what is common is that EA involves both corporate strategy and technology (Halawi et al., 2019), and that due to EA's interrelated capabilities, EA is required to measure BITA (Zhang, et al. 2020).

Benefits of a mature EA include a decrease IT costs (Luftman, 2018) and improving business IT alignment (Castro and Jung, 2021, Kurnia et al, 2020). EA is the "blueprint of the architectural framework that drives and communicates the business strategy and information systems visions" (Halawi et al., 2019, p.7).

2.4.1. Enterprise architecture frameworks

Enterprise Architecture Frameworks have been used to facilitate alignment between the strategic goals of an organisation (Zhang et al., 2018). An EA framework provides guidelines and methods for describing and understanding all variables within an organisation ecosystem (Halawi et al., 2019), and helps to produce documentation or business artefacts of complex architectural descriptions (Zhang et al, 2020). If organisations are guided by an EA framework, the organisation is provided with the ability to understand and analyse weaknesses or inconsistencies to be identified and addressed within the architecture of the organisation (Urbaczewski & Mrdalj, 2006). This ability allows organisations to understand areas of misalignment, which can then be addressed appropriately.

Due to EA's significance, many enterprise architectural frameworks have been created.

John Zachman is considered to be one of the 'pioneers' of Enterprise Architecture (Halawi et al., 2019; Urbaczewski & Mrdalj, 2006). He developed one of the first frameworks in the discipline of Enterprise architecture, the Zachman Framework in 1987. It consists of six perspectives (Planner, Owner, Designer, Builder, Subcontractor, and User) and six questions (What, How, Where, Who, When Why) for describing a complex enterprise system. A Zachman framework is beneficial for categorisation of artefacts but does not provide a process for creating them (Urbaczewski & Mrdalj, 2006). Various EA frameworks were inspired by Zachman (Halawi et al., 2019).

The Federal Enterprise Architecture Framework (FEAF), Treasury Enterprise Architecture Framework (TEAF) and Department of Defence Enterprise Architecture Framework (DoDAF) were developed for the various US Government Departments. All are improvements on Zachman as they include aspects of integration and focuses on creating alignment (Halawi et al., 2019; Urbaczewski & Mrdalj, 2006.

It was claimed that TOGAF (The Open Group Enterprise Architecture Framework) was developed on the principles of DoDAF (Urbaczewski & Mrdalj, 2006). Further research found that different frameworks address different elements of the architecture process, whereas TOGAF is focused on an architecture methodology and "how to", DoDAF provides an architecture description via a set of views, without specifying methodology, which could be considered a limitation of the framework.

TOGAF is the "proven enterprise architecture methodology and framework used by the world's leading organisations to improve business efficiency" (The Open Group, 2013) and is one of the most prominent frameworks (Castro & Jung, 2021, p.2). TOGAF was developed in 1995 and it focuses on four major architecture domains, Business, Applications, Data, and Technology, and focuses on process and security architecture. This holistic view ties in with the aspects of alignment as discussed in sections 2.1 on alignment models and definition.

2.4.2. Measuring enterprise architecture maturity

The maturity of enterprise architecture was found to increase strategic alignment between Business and IT (Coltman et al., 2015; Kurnia, et al 2020, Zhang et al, 2020). If the intention is to mature EA processes, the current EA maturity level must be established. According to Kurnia et al (2020), "there is no single or 'right' way to assess EA Maturity" (Kurnia, et al, 2020, p.4.).

Since its establishment in 2010, the Gartner EA Maturity Assessment has been successfully used by more than 1 000 organisations worldwide. The assessment, developed by leading IT research firm Gartner, provides a guideline regarding the areas to consider for improving an organisation's EA maturity. Essentially, this assessment assists architects to identify constraints, determine priorities, and establish goals for an EA practice.

The EA Maturity Assessment tool assesses "enterprise architecture maturity at five levels based on eight major dimensions of an EA program "(Blosch & Burke, 2015, p. 2). The five maturity levels of EA:

L1: Non-existent — An EA practice, if any, is informal, or just starting. Processes and activities related to the EA practice is undocumented, the actual processes are not widely understood or known.

L2: Reactive — The EA practice focusses on random and ad hoc technically related issues within projects. Architecture related work is done reactively to address existing technical challenges instead of having a proactive, future focus.

L3: Functioning — A value-adding business supporting EA practice exists. The basics are done well, and a strong EA foundation is visible. Processes and plans to support a long-term view is lacking.

L4: Integrated — Value is derived from the EA practice and processes can be repeated while supporting certain elements of the organisations business strategy. The role of enterprise architect has been defined and introduced while the EA team is considered competent and value-adding organisationally.

L5: Ubiquitous — EA frameworks and approaches are adopted and widely used as EA has become a standard way of working for the organisation, supporting the digital business strategy.

(Blosche & Burke, 2016)

If results of the assessment are on level 1, this implies that no formal EA programme exists, and scores of level 5 indicate that EA enables business outcomes. The scores in between vary on this scale from highly immature to optimising.

The eight dimensions of maturity which are measured are:

1. **Stakeholder support and involvement**: EA is a collaborative involving stakeholders from across the Business. The level of their support and involvement is important for a successful EA practice.

2. **Team resources**: Skills required from EA resources include problem-solving abilities, team-work, and technical competencies.
3. **Architecture development method**: With business strategy determining the priority of EA focus areas, a subset of EA deliverables is defined to meet requirements to support business strategy.
4. **Organisational integration**: EA processes are intertwined and complements other business processes.
5. **Deliverables:** EA deliverables support decision-making. These deliverables are influenced by and designed to meet the needs of the Business and the outcomes it is supporting, including capability models and solution architectures.
6. **EA governance:** Stakeholders collaborate based on the governance model which provides oversight of the EA practice.
7. **Metrics:** Metrics ensure that the EA practice is delivering value. Metrics form part of the governance model and drives continuous improvement of the EA practice.
8. **Stakeholder perception**: The perception of EA practice by stakeholders can be more significant than the measurable metrics value.

2.4.3. Conclusion on the enterprise architecture review

The researcher concludes that there is no single framework that can easily be applied to an individual organisation. Frameworks need to address the unique needs, culture, and goals of an organisation (Kurnia, et al, 2020). This also relates to the contingency theory in that all organisations cannot be managed and led in the same way (Donaldson, 2006, 2016; Islam and Hu, 2012; Muhanguzi & Kyobe, 2014).

2.5. Summary of the literature review

The alignment section reviewed the contingency, configuration, and congruency theories and how they can contribute towards achieving alignment and thereby improve overall business performance. These theories are appropriate to the study of alignment because the concept of fit is central to each theory.

The Enterprise Architecture section reviewed the five most common EA frameworks, and how to measure EA. This section concludes that a framework is purely a guideline and does not have to be followed precisely as there is no single framework which if applied in an organisation in its entirety is guaranteed to meet all the needs of that organisation.

After reviewing the literature available, the researcher found there are many articles on Business-IT Alignment and Enterprise Architecture, and alignment within EA frameworks and principles. The work done by Halawi et al., (2019) summarises the developments in literature for EA and EA frameworks. The work by Chan & Reich (2007) and Luftman (2018) summarises many aspects of alignment literature and were therefore strongly referenced in this section.

What is clear is that EA is connected to the organisation's strategic plans and is a main base for investing decisions (Halawi 2019). The EA practice is also considered to bring 'harmony' across all the different components that make up an enterprise and how those components connect (Halawi et al, 2019). Thus, the researcher concludes that there indeed a link between Alignment and EA. EA definitions include words such as harmony, fit and congruency, terms synonymous with alignment.

2.6.   Conceptual model

The conceptual model consists of variables related to alignment theories. Variables from the contingency, congruency, and configuration theories relevant to creating alignment, as well as the moderation perspective of fit as defined by Venkatraman (1989) are applied in the conceptual model.

Through the moderation perspective, the researcher is proposing that the alignment or level of congruence between the structure, strategy, culture, communications, and Enterprise Architecture processes will have an impact on Business IT Alignment.

This conceptual model depicts alignment as a moderator. As per the definition of a moderator variable, and how it is applied to this conceptual model, the impact of a predictor variable (Structure, Strategy, Communication and Culture) on a criterion variable (Business-IT Alignment) is fundamentally dependent on the level, or maturity of a third variable, the moderator (Enterprise Architecture). Thus, "the fit between predictor and moderator is a significant determinant of performance" (Chan and Reich, 2007, p.302).

Conceptual Model
Perspective of fit = Alignment as a Moderator
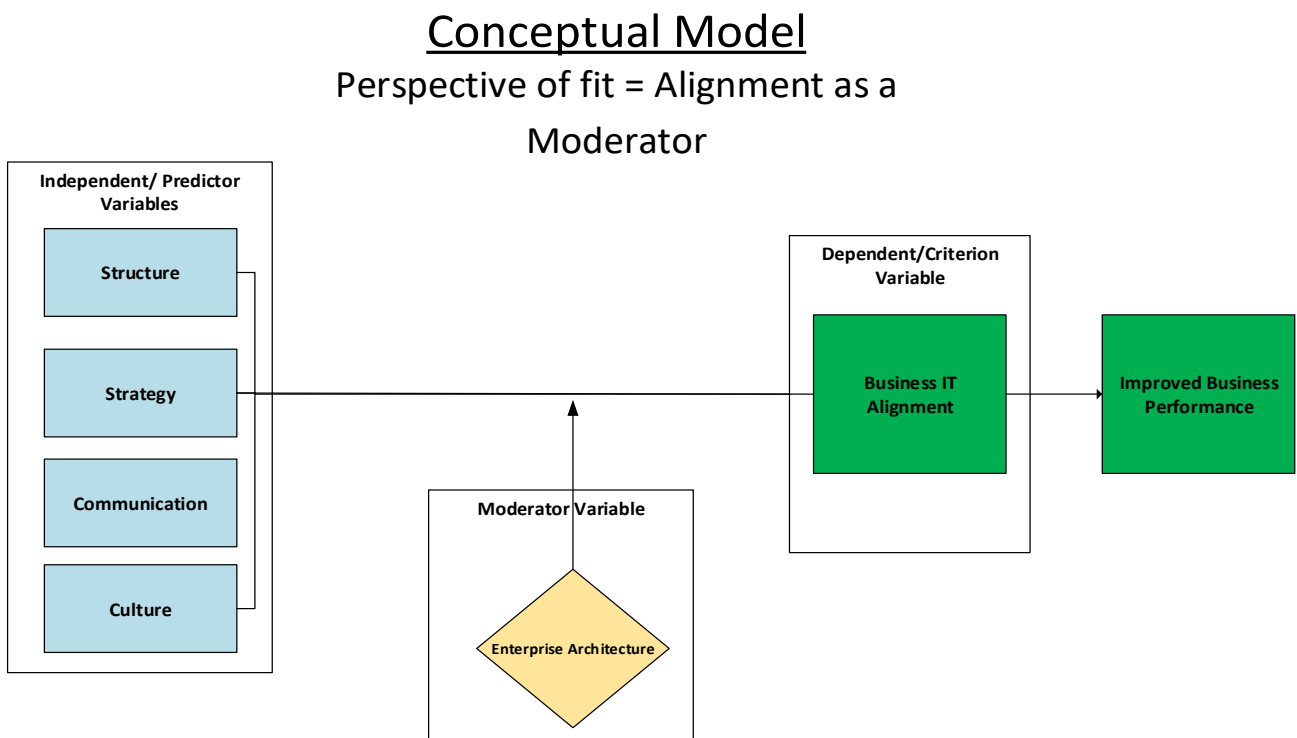
Figure 5: Conceptual model depicting EA as a moderator

To test and measure the above conceptual model, the researcher applies the moderation perspective of fit as recommended by Chan and Reich (2007). Each construct is defined briefly below.

2.6.1. Definition of constructs

Strategic alignment research proposes that organisational performance is the consequence of fit between two or more factors such as strategy, structure, technology, culture, and environment (Bergerona, et al, 2003; Venkatraman, 1989). The variables which will be measured are defined below because without concepts/variables and their definition, it is impossible to design valid measures (Brannick & Coghlan, 2007).

Structure: Organisation structure is a formal configuration of people grouped according to descriptions and requirements of their job positions. The structure of an organisation determines the layers of hierarchy, allocation of authority and responsibilities, determines how people are organised and how work gets allocated. In the context of this paper, structure will relate to positions, responsibilities, and reporting lines.

Strategy: Strategy is the plan for directing decisions and application of resources in an organisation. It is a" systematic long-term plan of action designed to achieve the basic long-term objectives of an organization" (Shamekh, 2008, p.19)

Communication: The dynamic, ongoing process of verbal and non-verbal interactions, including conversations, customs, stories, and the other practices oriented towards the achievement of organisation goals (Mumby & Kuhn, 2018). This relates to how various levels of management interact and connect with each other, what is custom (meetings), and what is not with Company A.

Culture: A set of norms, beliefs, principles, and ways of behaving that together give each organisation a distinctive character (Willcoxson & Millett, 2000, p. 93).

Business performance: The performance and attainment of goals/strategy can be measured by return on investment, gross profit, market share, and other financial factors (Maduenyi et al., 2015), Business-IT alignment is associated with improved overall organizational Performance (Jonathan, 2018).

Enterprise architecture: As defined above, is "where business capability (financial and market goals) and technological capability (products, vendors, and functionality) are tied together with organisational capability (people or process) to drive an ongoing strategy or desired outcome" (Kistasamy et al, 2010, p.129). It is the moderating element which the researcher sets out to prove will bring about BITA.

Business-IT alignment: as defined earlier, BITA is the "continuous process, involving management and design sub processes, of consciously and coherently interrelating all components of the business-IT relationship in order to contribute to the organisation's performance over time" (Meas et al., 2000, p.19). The moderation perspective of fit has been adopted for this paper. When EA moderates' other elements, then BITA should be attained.

2.8. Hypotheses

The hypotheses were developed based on literature, the moderation perspective of fit, and the conceptual model. These hypotheses will be tested to confirm or reject the claims presented below.

Ineffective Communication and silo corporate Culture are noted as common barriers to achieving BITA. Similarly, they are also identified as enabling factors of Business IT Alignment (Dairo, Adekola, Apostolopoulos,2021, Chan and Reich, 2007). Therefore, the following Hypothesis will be tested:

H1: Constant and effective communication between Business and IT divisions has a significant effect on alignment between Business and IT at Company A.

H2: Company Culture has a significant effect on alignment between Business and IT at Company A.

While culture and communication are important factors influencing BITA, it is also generally recognised that alignment is influenced by the organisation structure (Islam and Hu, 2012). Literature states that because organizational structure and organizational behaviour are critical components of strategy implementation, superior performance is contingent on how well the structure and culture are aligned with the requirements of a specific strategy (Chan & Reich, 2007; Olson, Slater, & Hult, 2005).

The role of organizational structure on the efficient use of information systems in general and its effect on BITA has long been the focus of alignment research" (Jonathan, 2018). The location of IT decision-making rights and CIO reporting structure ultimately influences alignment (Banker, Hu, (Chan and Reich, 2007, Luftman, & Pavlou, 2010). A general problem contributing to misalignment is caused by the organisation structure impacting the CIO reporting line as this determines whether CIOs are involved in business and strategic planning (Luftman, 2018, Aljazza et al., 2019).

Organisation structures that generally separates the IT function from the rest of the organisation risks the creation of sub-cultures within the same organisation. These disparities create varying levels of what is acceptable which could affect the credibility of the IT unit (trust) which ultimately can affect business-IT alignment. Literature also acknowledges the importance of maintaining a fit between organizational structure and organizational culture (Jonathan, 2018), therefore the researcher will test if:

H3: The structure of Company A has significant effect on alignment between Business and IT

Alignment implies "the degree to which the business strategy and plans, and the IT strategy and plans, complement each other" (Chan & Reich, 2007, p. 300).

Different types of organisation's require different strategies to achieve BITA. In relation to structure, companies who adopt differentiation as a strategy consider IT as weapon which should be leveraged to obtain a competitive advantage as a Business Strategy, whereas a Cost Leadership strategy dictates a cost savings (Banker, et al., 2010). An effective way for organisations to remain competitive is to have the IT strategy support the business strategy (Luftman, 2018; Shamekh, 2008). By having aligned strategies between Business and IT, strategically informed decisions regarding the strategic use of IT can be made, therefore the following will be tested:

H4: The strategy of Company A has a significant effect on alignment between Business and IT

H5: The level of alignment between Business and IT strategy is not high at Company A.

EA involves both corporate strategy and technology, due to EA's interrelated capabilities, EA is required to measure BITA (Zhang, et al. 2020).

Enterprise Architecture has evolved as "a method for overseeing the information technology resources inside an organisation and has recently been recognised for "fostering business IT alignment and driving innovation" (Castro and Jung, 2021, p.1). EA is a recognized as a method of obtaining BIA (Kurnia, Kotusev, & Dilnutt, 2020; Zhang, Chen, & Luo, 2018).

The maturity of enterprise architecture was found to increase strategic alignment between Business and IT (Coltman et al., 2015; Kurnia, et al, 2020, Zhang et al, 2020). Benefits of a mature EA include a decrease IT costs (Luftman, 2018) and improving business IT alignment (Castro and Jung, 2021, Kurnia et al, 2020), therefore the researcher will test if:

H6: Enterprise architecture and its benefits are largely understood within Company A

3. Chapter 3: Research design and methodology

3.1. Introduction

It is important to identify the researcher's epistemological and ontological perspective as this frames the way in which research is conducted. This chapter presents the research design and methods followed.

3.2. Research philosophy and framework

The research philosophy defines "a system of beliefs and assumptions about the development of knowledge" (Saunders, 2009, p.124). Being aware of the philosophical stance taken by a researcher is vital as it impacts the entire investigation.

Each philosophy makes a different assumption. The research assumptions which influence a philosophy are discussed below.

3.2.1. Ontology

Ontology determines the researchers view of the world. There are two major ontological stances, objectivism, and subjectivism.

Subjectivism proclaims that people's perceptions and actions create reality (Saunders, 2009). Objectivism implies humans can be characterised and measured, i.e., reality is independent from human cognition (Saunders, 2009).

The researcher will be adopting Objectivism as the ontology.

3.2.2. Epistemology

Epistemology has to with assumptions about knowledge (Saunders, 2009). In research there are three common epistemologies: critical research, interpretivism, and positivism.

Critical research considers the nature of political or societal influences, human empowerment, and the underlying power structures that influence current world views. It includes Critical Theory and Critical Realism which has similarities, but different focuses (Ryan, 2018). Interpretive research provides insight through shared meanings, language, artefacts, and consciousness. This stance does not assume objectivity (Ajumobi & Kyobe, 2017). Positivism considers the research to be an objective process in which the researcher has a detached role while trying to understand a phenomenon (Brannick & Coghlan, 2007). Positivism comes from traditional empirical research based on deductive reasoning and it is the most common epistemology organisation studies.

For positivists, theory consists of three basic components:

1. Concepts or constructs

2. Propositions or statements

3. Rules for connecting concepts with the empirical world (measurement)

(Brannick & Coghlan, 2007).

The four constructs and how these were measured were presented chapter 2, and the hypotheses presented in chapter 2. Positivism is the most suitable research philosophy for this study as positivists believe in sticking to what can be observed and measured.

3.3. Research methodology

Kothari (2004) defines research methodology as a way to systematically solve the research problem. The following section present the methodology and approaches applied.

3.3.1. Research strategy

A single organisation survey strategy was applied which includes the use of standard surveys for collecting data from people to obtain their views in a methodical way (Bhattacherjee, 2012). The survey research strategy was deemed suitable as it enables the researcher to collect data about a population that is too large to observe directly. Furthermore, it supports the positivist philosophical stance, i.e., to carry out the research objectively.

3.3.2. Purpose of the research

There are generally three types of research, exploratory, descriptive, or explanatory.

- Exploratory: applicable when not much is known about the phenomenon being researched with the intention of better understanding the topic. An exploratory research may develop hypotheses, but it does not seek to test them.
- Descriptive: study attempts to identify and explain factors associated with the item or scenario being studied.
- Explanatory research is useful for cause-effect relationships and is grounded in theory. Researchers who use explanatory research as a purpose seek to understand, explain, predict, and control relationships between variables instead of detecting causes. Researchers rely on existing theories or develop hypotheses to represent the influences which may have led to a certain situation being studied (Kothari, 2004).

The reasons mentioned above is why explanatory research is most appropriate to this study as the positivist epistemology is applied, and the research is based on theories of enterprise architecture, alignment, and many others which contribute towards the variables in the conceptual model.

3.3.3. Research approach

Inductive and Deductive approaches are the two major approaches used for developing and testing theories or hypothesis.

Inductive approaches aim to build a new theory, starting from specific to general. In the deductive approach, the goal of the researcher is to develop propositions or hypotheses based on existing theories, and ultimately accept or reject the propositions/hypotheses by testing them (Bhattacherjee, 2012), working from general to specific (Soiferman, 2010). A deductive approach was followed as a review of literature was conducted and included all areas relevant to the scope of the study such as alignment concepts, theories, measurements, and models. A Conceptual Model was then developed which was based on constructs learnt from literature which then resulted in hypotheses development, testing and acceptation or rejection of hypotheses. Studies applying a deductive approach requires the researcher to formulate a set of hypothesis, apply the relevant research method to prove or disprove the hypothesis (Soiferman, 2010).

3.3.4. Population and sampling

Sampling is the process of selecting a segment which represents a population that is representative of a whole (Onwuegbuzie & Collins, 2007).

3.3.4.1. The population

The unit of analysis is Organisation A.

A population refers to the group the researcher would like to sample since this is the group which will be generalized to. The population is 95 made up of mainly executives and senior business or IT staff who participate in strategic or IT planning, and the architects within Company A who participate in the architecture processes.

The table below categorises the population (95).

Table 1: Breakdown of population

IT or Business	Number of partici-pants	Team/department
IT Department	11	Architecture team
	11	General IT, non-management, not architecture
	10	IT Managers
	4	Pilot testers in IT
	36	**Total IT**
Non-IT / Business	**59**	All levels and divisions in the business
	95	**Total population size**

3.3.4.2. Sampling techniques

Many researchers believe that the research method selected will determine the sampling technique to be used, i.e., random/probability-sampling techniques are associated with quantitative methods, and non-probability/non-random techniques are associated with qualitative methods.

The image below developed by Onwuegbuzie & Collins, (2000) is a matrix which highlights four types of sampling schemes and encompasses methods for selecting samples that have been traditionally associated with the qualitative paradigm (non-random sampling schemes) and those that have been typically associated with the quantitative paradigm (random sampling schemes). According to their study, "both qualitative and quantitative studies use non-random samples. Type 4 is by far the most common combination of sampling schemes in mixed methods used, regardless of mixed methods research goal" (Onwuegbuzie & Collins, 2000, p.284).

Figure 6: Matrix crossing sampling technique by research approach (Onwuegbuzie & Collins, 2000)

3.3.4.3. Non-random technique: Judgement sampling

The population was selected through the non-random Judgement sampling technique. Judgement sampling is a non-probability technique also known as purposive sampling whereby the researcher selects from the population only the members who he/she feels will give him the desired or accurate information (Annum, 2016).

Judgement sampling allows the researcher to select a sample which is well equipped with information relevant to the researcher. This approach is used when a limited number of people or a certain category of people possess the information which the researcher requires (Annum, 2016). Including participants in the population who do not have a role in strategic decision-making or enterprise/IT architecture would be insignificant to the research objectives. Therefore, the judgement is limited to those resources who possess expertise specific to this study.

Judgement sampling was used when selecting the population for both research instruments, i.e., the Alignment maturity survey and EA maturity assessment. The judgement sampling technique is appropriate for selecting participants for a focus group because Judgement sampling is a non-random sampling technique, and non-random techniques are associated with qualitative methods (Onwuegbuzie & Collins, 2000). Focus groups are considered as a qualitative method of research.

3.3.5. Data collection methods

The data collection process comprises two phases. The first phase was the EA Maturity Assessment to assess the maturity of the EA programme which was conducted as a focus group. The second was the alignment maturity assessment to determine the maturity level of alignment between business and IT at Company A which was conducted as a survey.

The first survey relied on quantitative methods and the second survey relied on qualitative methods, thereby adopting a mixed method research approach. Mixed method designs utilise time orientation and sampling relationships. Sampling relationships may be identical, parallel, nested, or multilevel. The parallel sampling relationship is appropriate to this research as a "parallel relationship specifies that the samples for the qualitative and quantitative components of the research are different but are drawn from the same population of interest" (Onwuegbuzie & Collins, 2007, p.292; Fielding, Lee, & Blank, 2008). Time orientation refers to whether the qualitative and quantitative phases occur at approximately the same point in time (concurrent), or if one phase is dependent on another (sequential) (Onwuegbuzie & Collins, 2000).

This study assumes a concurrent time orientation in that the two methods took place approximately around the same time, a few weeks apart. The one did not need to be completed before the other could commence.

3.4. Data collection process

Data collection commenced after hypotheses formulation, finalising research instruments and ethics committee approval. Mixed- method research was applied to this study.

3.4.1. Phase 1: Qualitative

Instrument 1. Enterprise Architecture Maturity Assessment

The maturity of Enterprise Architecture was found to increase strategic alignment between Business and IT (Coltman et al., 2015). The details of this survey were discussed in the Literature Review, section 2.4. The detailed survey can be found in Appendix B.

Process of data collection

The focus group method was used for data collection for the EA maturity assessment which was used to determine the maturity of the EA practice at Company A.

Focus group research is "a way of collecting qualitative data, which—essentially— involves engaging a small number of people in an informal group discussion/s, 'focused' around a particular topic or set of issues" (Onwuegbuzie, Dickinson, Leech, & Zoran, 2009, p. 2). For this focus group, 10 members of IT, the Architecture team, participated in discussing the EA practice at Company A. All 14 members of the population were invited to attend a meeting in which the researcher would conduct the assessment in a group setting. The researcher facilitated the session, explained the background and the objective which is to determine if there was a change in the EA maturity score since 2013 when it was first conducted at Company A.

Only an hour was booked with the participants to collect the data for the EA maturity survey. The hour was sufficient as the tool, being a Gartner tool, was well-designed, objectives and questions were clearly stated. Generally, focus groups should be in the duration of 1 and 2 hours (Onwuegbuzie, et, al. 2009). The researcher logged in to the Gartner tool and presented the survey on the projector screen.

The researcher posed the questions and then asked the group to discuss, and collectively select the answer which they felt best answered the question. Some of the questions required more of a discussion amongst the participants than others, but ultimately the best answer to the question was easily identifiable. The group answered unanimously to all questions. The researcher remained objective and did not get involved in the discussion or try to influence the answers in any way.

The assessment is an online diagnostic tool on the Gartner website which the researcher had access to as part of her role in the IT architecture team. Most of the items were measured on a Likert scale without numbers available as an answer selection. The questions were posed on frequency (e.g., never to always), agreement (yes/no, strongly agree- strongly disagree), and so on. The options were in rank order of maturity for example 'never' would indicate low maturity and 'always' would indicate highest level of maturity.

The collective answers were then input into the survey by the researcher and the report was run by her, based on the input from the 10 respondents. The researcher thanked everyone for participating in the first assessment and again for making the time and agreeing to participate in a second assessment which is the Alignment Maturity Survey. All participants identified for the EA sample worked in same team as the researcher at the time, and the researcher has a good relationship with all of them.

This was the concern raised during ethics that too much time would be required of colleagues to participate. However, they were willing to participate in the Alignment survey as well. The researcher believes that because of her being an insider and having such a strong relationship with her team that they were so willing to assist her in obtaining the information required for her research.

3.4.2. Phase 2: Quantitative

Instrument 2. Alignment maturity assessment survey

The SAMM was discussed in 2.2 of the literature review and applied as a method of data collection. By conducting this assessment, the researcher attempted to determine the level of alignment between business and IT at Company A. This tool is assessed on a Likert scale of 1–5 where 1 is low and 5 is high, thereby deploying a direct measure of alignment (Coltman et al.,2015). The Alignment maturity survey can be found in Appendix A.

Process of data collection

Various measures to assess the extent of IT alignment at a point in time has been developed "over the last 25 years" (Coltman et al. 2015 p.93). One such measure is the Luftman Alignment Maturity Assessment. This tool was designed to measure the degree of misalignment between the corporate and IT departments and informs the level of alignment within an organisation (Luftman, 2003).

The assessment was largely based on the Luftman Alignment survey, the SAMM model. The survey was distributed to the population of 95 via an email. Being an insider, the researcher used her work email account to distribute the survey to the respondents' work email. The content of the email contained a brief description of the objective of the research, time required to complete, a disclaimer about the participants' confidentiality, and a link to the survey. Once the linked was clicked, the survey opened up in Qualtrics online survey tool and more information about the survey was provided, with the option to participate or to decline.

3.5. Data analysis techniques

Due to the quantitative nature of the Alignment maturity survey, the data obtained from this survey was analysed through quantitative techniques. In Microsoft Excel, step one included removing anomalies from data collected in the Alignment Survey and step two involved coding the clean data. The data was then imported into Statistica 10 software for statistical analysis including quantitative data analysis, testing for reliability and validity.

3.5.1. Data cleansing

Before conducting any statistical analysis, the dataset was analysed for any anomalies or outliers, "any value that is more than 2 standard deviations from the mean" (Hellerstein, 2008, p.8).

The survey results (hereafter referred to as the dataset) from Qualtrics was extracted into an Excel format for analysis. Initially the dataset showed a survey response rate of 60. However, upon analysing and cleaning, the total dataset used in the statistical analysis is 40.

The Qualtrics extract were presented in a raw format by which all the questions were categorised according to codes as headings. An example of the raw code pushed out from Qualtrics was 'C1' which referred to the first question in the Communication construct, 'C2' to the second question and so on. The questions in the alignment maturity survey were based on the six maturity areas in the Luftman Alignment survey discussed in the literature review.

The next step was data editing. Data editing involves changing the value of data shown to be incorrect (Zaiontz, 2016). The assumption made for the data cleaning process was that a blank/unanswered question was due to human error such as forgetting to answer as not all questions were set as mandatory. The researcher made this assumption because although the questions had a sixth option to select 'N/A' or an 'I don't know', she acknowledges that the survey was not very short and therefore she assumes that the respondent could have got tired or even bored of answering towards the end of the survey and therefore chose not to answer.

Most of the unanswered questions were related to the EA competency which the researcher considers to be a niche area of expertise and therefore also contributes to the assumption of human error as the respondent might not have comprehended the question or knowledgeable enough about the area to answer accurately. These answers were edited by single imputation, inserting the mean of the particular variable, i.e., 1 or 2. Using the mean in this case is justified because using the mean of the non-missing data elements for a particular variable is acceptable in cases with a small number of missing data elements (Papageorgiou, Grant, Takkenberg, & Mokhles, 2018; Zaiontz, 2016). Varying guidance exist in literature for what is considered 'small' in terms of single imputation, the ranges vary between 5%-40% of the entire dataset, depending on the method of imputation used (Madley-Dowd, Hughes, Tilling, & Heron, 2019).

A total of 22 (9+5+8) unanswered questions were edited across 2 variables, Strategic and Enterprise Architecture (EA) to include the mean as outlined in the table below. Since the unanswered questions in these variables individually were not many (<25% on any variable), the researcher felt using the mean would not skew the results (Zaiontz, 2016) and imputation using mean would be acceptable (Madley-Dowd et al, 2019). These responses with missing data were not deleted because the respondent answered an all-other variables, so deleting the entire entry was not justified for these cases as deleting them would increase the likelihood of losing essential information on other variables, i.e., result in a significant loss of data and result in reduced sample size (Papageorgiou et al, 2018).

The table below illustrates which variables had unanswered questions, the percentage of total dataset that was changed, and which value the unanswered questions were replaced with(mean):

Table 2: Missing elements in initial dataset

Assumption	Variable	No. of missing data elements per variable	Corrected/Replaced by mean of:	% Of variable changed/answered using mean
Human error	Strat3-Use of architecture tools in strategic planning	9	2	22.5%
Human error	CMPEA2- Artefact being used by organisation	5	1	12.5%
Human error	CMPEA3- Agreement with EA benefits	8	2	20%

Descriptive statistics was run after the data cleaning and editing process because the dataset was more reliable in terms of having usable data from respondents who answered most or all of the questions.

The table below is the result of the descriptive statistical test run on the cleaned dataset:

Table 3: Descriptive stats on cleaned dataset to identify further outliers

	Variable	Descriptive Statistics (Alignment Maturity Survey)							
		Valid N	Mean	Me-dian	Mode	Frequency	Min	Max	Std.Dev.
Comm-1	Bus. Mgmt. understand-ing of IT	40	2.5	2.0	2	20	1.0	5.0	0.8
Comm-2	IT Mgmt. understanding of Bus	40	2.9	3.0	3	16	1.0	5.0	0.9
Comm-3	Knowledge Sharing	40	2.3	2.0	Multi-ple	14	1.0	5.0	1.2
Comm-4	IT/Business Liaison rela-tionship	40	3.0	3.0	3	20	1.0	5.0	1.1
Comm-5	Frequency of B-IT Steerco	40	2.3	2.0	3	13	1.0	5.0	1.1
Cult-1	Investment rationale	40	2.8	2.5	4	17	1.0	5.0	1.4
Cult-2	Project prioritization	40	2.2	2.0	1	14	1.0	4.0	1.2
Cult-3	Bus-IT relationship	40	2.6	2.0	2	15	1.0	5.0	1.2
Cult-4	Acceptance to change	40	2.7	3.0	1	12	1.0	5.0	1.4
Cult-5	Perception of IT value	40	2.7	3.0	Multi-ple	12	1.0	5.0	1.1
Struct-1	Org structure reporting line	40	1.1	1.0	1	38	1.0	4.0	0.5
Struct-2	Project sponsor location	40	3.0	3.0	3	21	1.0	5.0	0.9
Strat1	IT Invlmt in Bus. Strategic planning	40	2.5	2.5	3	11	1.0	5.0	1.2
Strat2	Bus. Invlmt in Bus. Strate-gic planning	40	2.1	2.0	1	14	1.0	4.0	1.1
Strat3	Use of Architecture tools in bus. Planning	40	2.0	2.0	2	27	1.0	3.0	0.6

The results in the 'Maximum' column were visually inspected to identify any inconsistencies. The re-sults indicate there were five weighted options with 3 being the midpoint. The sixth option was ex-cluded from calculating the mean in descriptive statistics. Option 6 was given to respondents to avoid blank answers and does not affect the reliability or validity of the instrument, therefore the values in the table are accurate for the Likert scale measurement. An additional confirmation that the high-lighted variables in the maximum column were indeed outliers was represented by the standard de-viations as they match the variables < 5 with a Std.Dev < 2 (Hellerstein, 2008). Clearly there are no further data anomalies in the four constructs, thus the statistical analysis can proceed on the assump-tion that the dataset being used is clean.

3.5.2. Data distribution – Normality testing

The clean data was used to determine the extent to which the data distribution is normal for each construct. Normality must be tested for to calculate the probability that the sample was drawn from a normal population (Asthana, 2013).

The technique used to test for normality per construct was the Shapiro-Wilk test. Formal numerical tests such as the Shapiro-Wilk (SW) test and the Kolmogorov-Smirnov (KS) test could be performed before making any conclusions about the normality of the data (Razali & Yap, 2011). The Shapiro-Wilk test requires a sample size of between 3 to 50 (Ahad, 2011; Razali & Yap, 2011) thus allowing this test to be appropriate for a sample size of 40. SW was also applied because literature claims that the Shapiro-Wilk test is the most powerful test for all types of distribution and sample sizes and it rejects the null hypothesis of normality at the smallest sample size (Ahad, et al., 2011, Razali & Yap, 2011), and at all levels of skewness and kurtosis (Ahad, et al., 2011).

When a p-value is greater than a critical value ($\alpha=0.05$), the null hypothesis is not rejected, and can then be concluded that data is normally distributed. Probabilities > 0.05 mean the data is normal. Probabilities < 0.05 mean the data is not normally distributed (Asthana, 2013).

The table below highlights the p-value, SW value, and indicates whether the distribution per construct is normal or not based on Asthana (2013).

Table 4: Normality per construct

Construct	P value	P>0.05?	SW Value	Normally distributed (Asthana, 2013)	Reject null hypothesis of normality
Communication	0.47	Yes	0.97	Yes – normally distributed	No
Culture	0.00	No	0.91	No – Not normally distributed	Yes
Strategy	0.02	No	0.94	No – Not normally distributed	Yes
Structure	0.00	No	0.86	No – Not normally distributed	Yes

The null hypothesis of normality is rejected for small samples (n < 50) if a p value < 0.05 (Asthana, 2013). Communication is the only normally distributed construct. Culture, Strategy, and Structure constructs are not normally distributed. Further analysis is done analysis using non-parametric statistics as this assumes a non-normal distribution (Razali & Yap, 2011, p21).

3.5.3. Timeframe

The timeframe applied is cross-sectional. Cross-sectional studies imply that the research is focused on a situation or collection of data at a single point in time. A cross-sectional timeframe is appropriate to this study of alignment because if "strategic alignment is viewed as an end state, and is measurable at a single point in time, these measurements can be taken periodically, to assess the progress towards (or regress from) strategic alignment over time" (Baker & Jones, 2008, p.10). Therefore, the alignment and EA maturity surveys are appropriate to this study as they assess the maturity of alignment, and EA respectively, at a particular point in time.

3.6. Ethics and confidentiality

This research was conducted on Company A, the researcher's company of employment and is therefore referred to as 'insider research'. Typically, due to the researcher's nativity, they are perceived to be too close to the study, therefore un-objective, therein, raising concerns regarding the validity of the findings of an insider's research (Brannick & Coghlan, 2007). An alternate, more positive perspective is that insider research provides details of what businesses are like, details which may not be uncovered by a traditional, non-insider approach (Brannick & Coghlan, 2007).

Insider research is a challenge because it requires the researcher to distance herself from the setting and obtain objectivity, and then integrate back into the system once the research is completed. This was not tough for the researcher as the data collection for the alignment surveys/quantitative section was via email and no face-to-face interaction involved other than the pre-lobbying. Only an hour was spent with the respondents of the qualitative focus group. Thus, once the data was collected, the researcher continued to interact with her colleagues as she usually would, there was no difficulty to 'integrate back'.

The researcher initiated informal conversations with colleagues (those not part of her team structure) whom she had intended to include in her sample size. Being mindful of the upcoming restructuring announcements, and the effects and anxiety the process caused to staff, the researcher had a strategy in place to ensure an acceptable participation rate was obtained, i.e., informal conversations to gauge interest in participating in the research. This strategy was based on the Social Exchange Theory which suggests that that "building a relationship between the researcher and the potential participant in survey research can improve participation rate". Researchers frequently rely on this theory when using mailed surveys" (Cycyota & Harrison, 2006, p. 136). Contacting potential respondents in advance is a technique used by many researchers, especially researchers targeting executives as was partially the case in this research. In addition, the advanced personal contact allows the researcher to gauge willingness to participate from potential candidates prior to distributing the survey. The surveys are then usually sent only to those individuals who consent to participate (Cycyota & Harrison, 2006). Thus, being an insider allowed the researcher to have informal conversations and warm the participants up to the idea of the participating in the research study.

To the participants, the cover letter of both research instruments stated the researcher's intention with the study, time required of the respondent, and the process for opting out of the study. For the participants of the EA maturity assessment Focus Group, the cover letter was attached to the meeting invite requesting participation in the focus group, as well as emailed individually with a disclaimer that by accepting the meeting they agreed to the terms.

The main concern to the organisation was the handling of confidential information, and the time required by participants. The organisation also did not want to be named; therefore, it is referred to as Company A. The cover letter of the Alignment survey provided a guarantee the survey completion shouldn't exceed 15 minutes and the participant could agree/disagree to continue after reading the disclaimer. The handling of sensitive information is not too much of a concern as there is no company sensitive information being shared such as financial statements, project documents, etc.

Approval from the UCT ethics committee was submitted after obtaining the approval of the CIO at the organisation in question.

3.7. Chapter summary

The table below outlines the summary of research design.

Table 5: Research methodology summary

Methodology	Approach
Ontology	Objectivism
Epistemology	Positivist
Research purpose	Explanatory
Time frame	Cross –sectional
Approach to theory	Deductive approach
Sampling strategy	Non-random Judgement sampling
Data collection method	Mixed methods Qualitative – Focus group - Gartner online EA maturity assessment tool Quantitative – Alignment Maturity Survey – Qualtrics online survey tool
Data analysis	Quantitative - Microsoft Excel 2010 and Statistical Testing in Statistica
Timeframe	Cross-sectional

4. Chapter 4: Data analysis and results

4.1. Introduction

This chapter discusses the demographics and results of analysis.

4.2. Demographics and rate of participation

4.2.1. Alignment maturity survey demographics

Respondents of the Alignment Maturity survey were asked to indicate their level within the organisation, department, and years of employment at Company A. Below the researcher presents the responses.

4.2.1.1. Years of employment

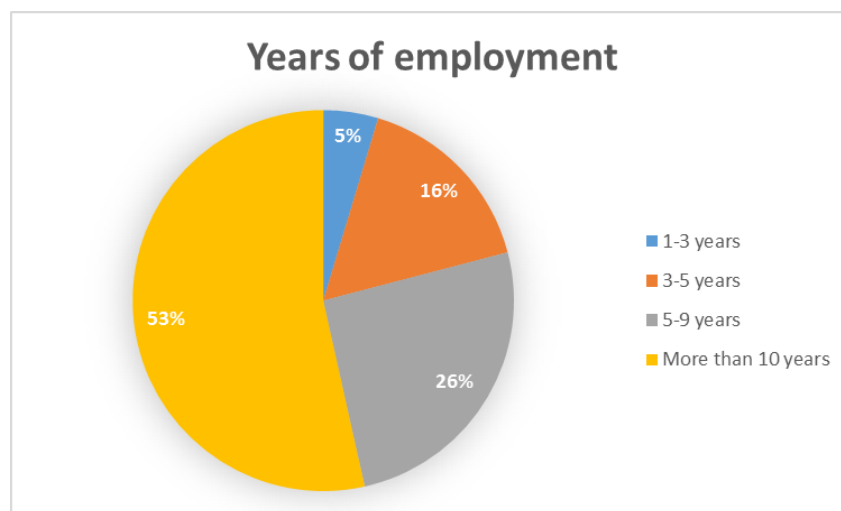53% of respondents had been employed at Company A for more than 10 years.

Figure 7: Respondents' years of employment at Company A

A minority of responses came from employees who had a tenure of 1–3 years. The range of tenure of employees with 10 or more years of experience is illustrated below. Of the 53% respondents with more than 10 years' service with Company A, 36%, or 8 respondents had been with Company A between 26 and 30 years.
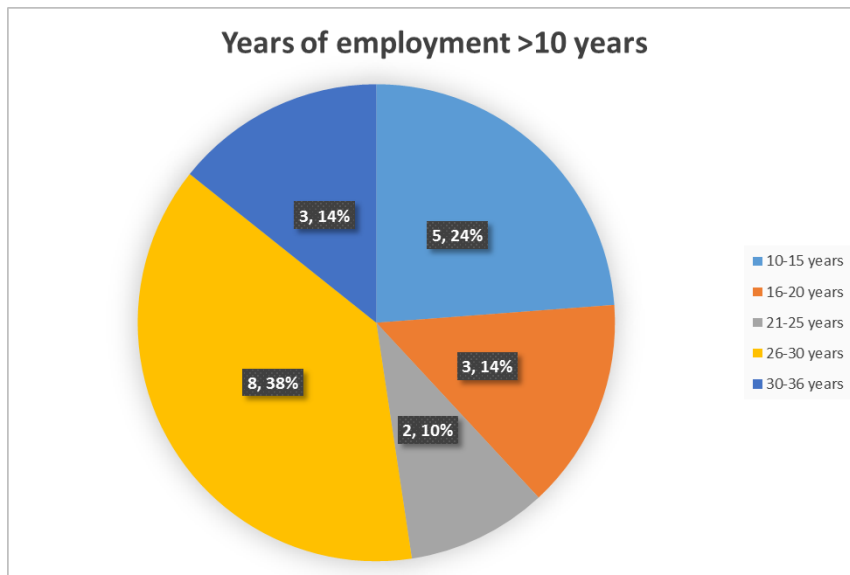
Figure 8: Respondents >10 years tenure at Company A

4.2.1.2.   Level of position

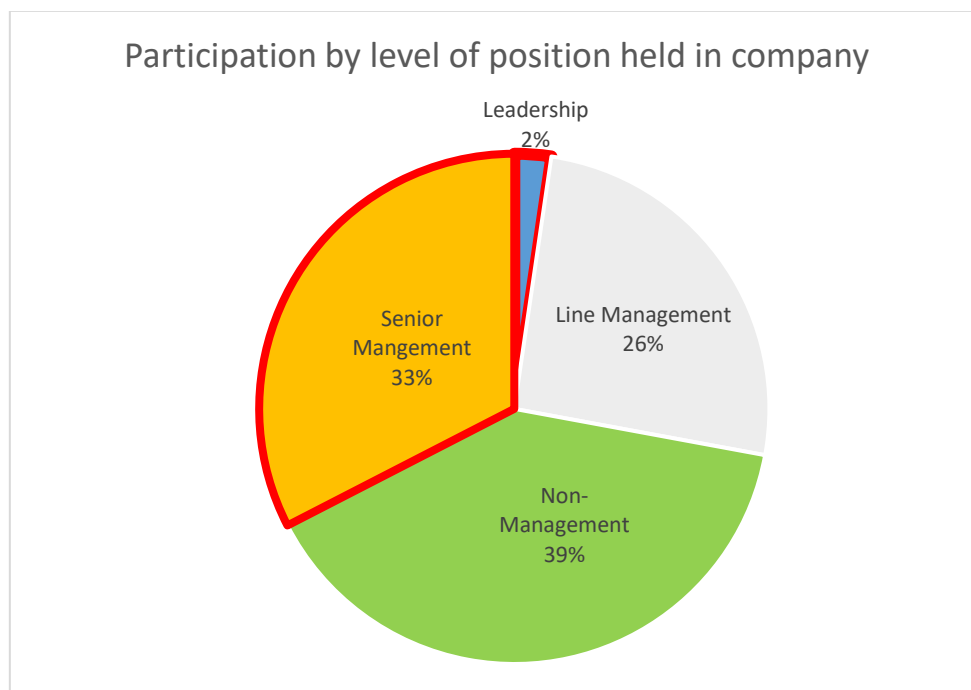Participation response by level of position shown below:

Figure 9: Response to survey by level of position

The above chart illustrates the participation level by position. The executive slices are highlighted in red, i.e., 2% of Leaders responded and 33% of the responses were from senior management. Leaders in this context refers to General Managers (GMs) or above, and senior management are the GM's direct reports as per the organogram presented in chapter 1. It can be seen that at least one-third of responses came from Senior Management.

A large percentage of the sample size were executives, i.e., 32%. Executives in this case include the CEO, and managers up to 3 levels, i.e., General Managers, and their direct reports (limited to those

who are involved in EA and strategic business management). Because 32% of the sample were executives, the researcher had to employ strategies or techniques for ensuring responsiveness. Access by employees increases the response rate to e-mailed surveys (Cycyota & Harrison, 2006). Considering a 46% (44 of 95) overall participation rate, of which 35% were executives (Leadership and Senior Management), being an insider allows access to this network and had an influence on the number of responses received.

4.2.1.3. Department of designation

An interesting observation about response rates per department is that of all the responses from non-IT participants, i.e., the Business, most of the responses came from the Corporate Strategy department (5) who were strategic leaders and senior managers, and the division in which much lobbying was done to garner participation. Response rate per department is shown below:
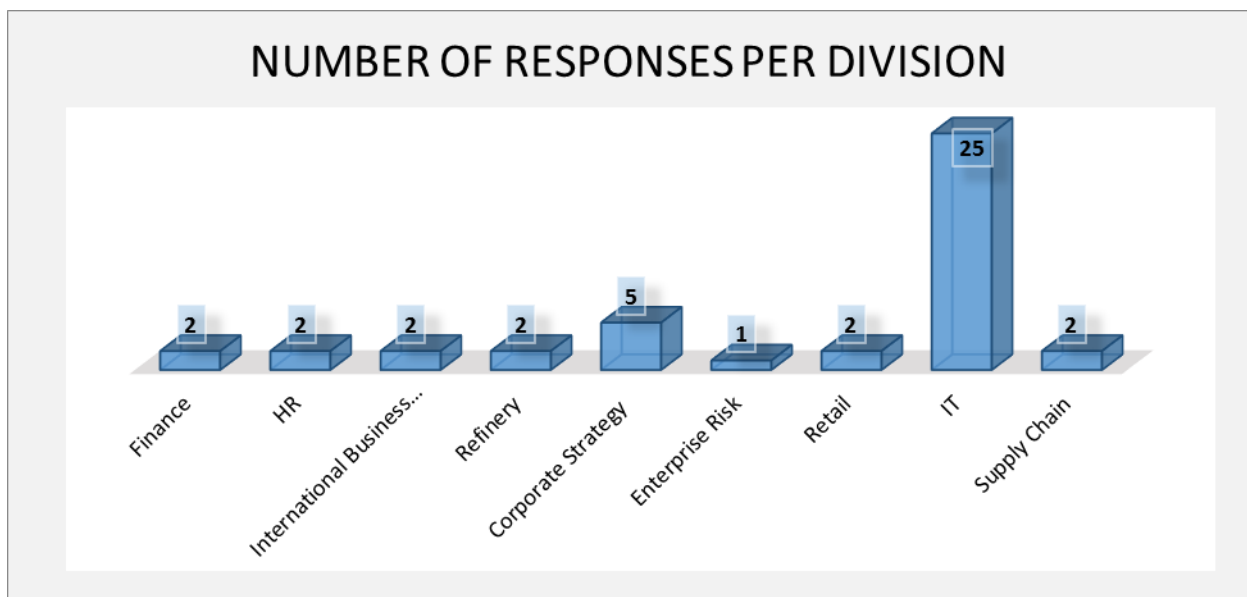

Figure 10: Response rate per division

4.2.1.4. Overall participation rate to alignment maturity survey

The alignment survey was sent to the population of 95 which included business and IT participants as it is important to have both business and technical people participate in evaluating each of the six Dimensions (Luftman, 2003).

After cleansing the data, the response rate was 56%. Of the 56%, 9% responded to the survey but declined to participate. That left 46% of the population who agreed to participate in the survey. However only 42% of responses were actually completed and were valid for statistical analysis. An overall non-response rate of 44% was recorded.

Detailed breakdown to the alignment maturity survey response has been tabulated below:

Table 6: Breakdown of alignment response rate per response, decline, non-response, incomplete

Survey Population	Number of partici-pants	% Of en-tire popu-lation
Survey population (from IT and Business)	95	100%
Responses recorded (responded to the survey by either completing or declining to participate)	53	56%
Participation rate (Agreed to participate in the survey)	44	46%
Declined rate (Number of those who refused to participate in the survey after the survey was sent/recorded refusals)	9	9%
Incomplete surveys (agreed to participate but answered less than 50% of questions)	4	4%
Non-response (sample who did not respond to the survey)	42	44%
Total valid responses for analysis (dataset size)	**40**	**42%**

The alignment maturity survey had a response rate of 46%, which equates to 40 usable responses which was deemed acceptable by the researcher for statistical analysis. There are various views as to what an appropriate response rate is. Some literature says that a response rate of 60% is an acceptable threshold for measuring survey validity and quality (Johnson and Wislar, 2012; Morton, Bandara, Robinson, & Atatoa Carr, 2012). Other views are that 30 responses are acceptable as a minimum response, acknowledging though that a larger sample size prove more reliable (Cycyota and Harrison, 2006).

The figure below is a graphical breakdown of the response to the Alignment Maturity Survey.
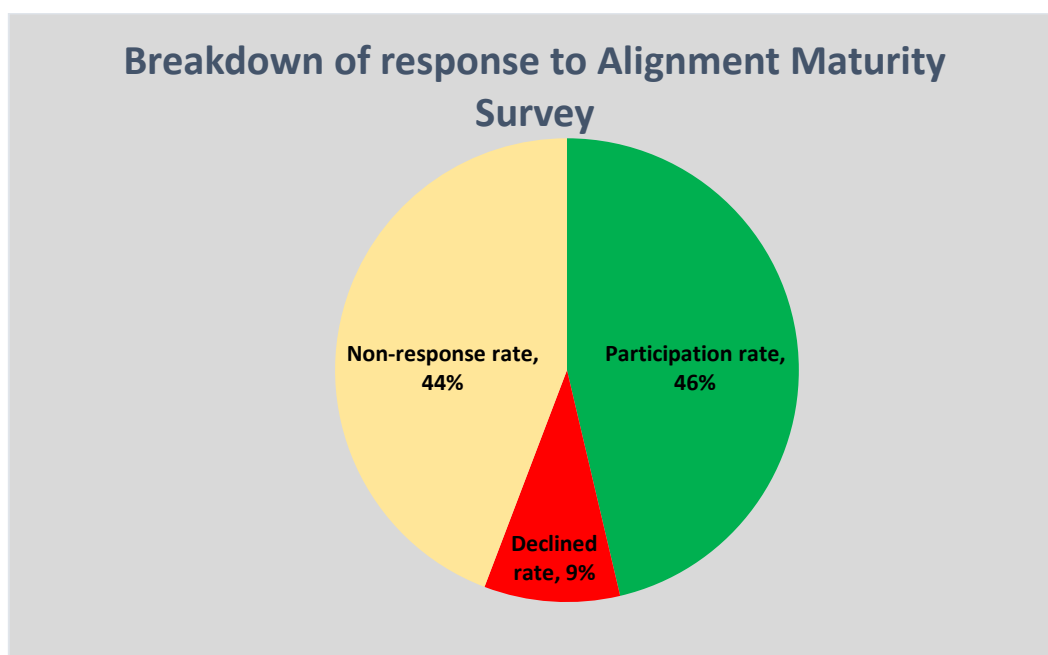

Figure 11: Breakdown of response to alignment maturity survey

Overall, the researcher is satisfied with the participation rate in the alignment maturity survey and more specifically with the rate of participation from various levels within the organisation (non-management to executive management), as well as with the range of experience.

4.2.2. EA maturity assessment

This data for this assessment was only collected from IT resources as it is an EA analysis and the EA/Architecture speciality is situated within IT at Company A, therefore the demographics are not very broad.

The session with the architecture team was held at the head office in Cape Town. The population size for the assessment was 14. These 14 respondents were selected by stratified random sampling and are included in the total population of 95 for the alignment maturity survey. A breakdown of the sample size for the EA maturity assessment is tabled below:

Table 7: Sample breakdown for EA maturity assessment

Role	# Participants identified	Department
Domain Architects	4	IT
Solution Architects	7	IT
Architecture Students	2	IT
IT Manager: Architecture & Governance	1	IT
Population size	**14**	

Although the population was 14, the sample total of 10 participated. This comprised of the Architectures and Governance Manager, 4 Solution Architects, 3 domain architects, and the 2 students. Company A has a strong learning culture in that they are passionate about the development of young people, especially their development of specialised skills, such as architecture. At the time there were two graduates being developed within the architecture team as "organizations are realizing that it is difficult to find suitable candidates and are focusing on developing and training enterprise architects from the talent pool within the organization" (Gartner, IT Score for Enterprise Architecture, 2013).

The appropriate sample size for a qualitative study is not specifically defined. Some say that an appropriate sample size is one that adequately answers the research question (Marshal 2001). When using a subgroup sampling design, then three or more participants per subgroup is acceptable, and 12 participants per focus group (Onwuegbuzie & Collins, 2000).

The below table lists the roles who participated in the EA maturity assessment, the participation, non-response, and refusal rate.

Table 8: Participation in EA maturity assessment

Roles	No. of participants
Domain Architects	3
Solution Architects	4
IT Manager: Architecture & Governance	1
Architecture Students	2
Participation Rate	**10**
Refusal Rate	**2**
Non-response	**2**

The image below illustrates a breakdown of participation, refusal, and decline of the meeting request to complete the EA maturity assessment
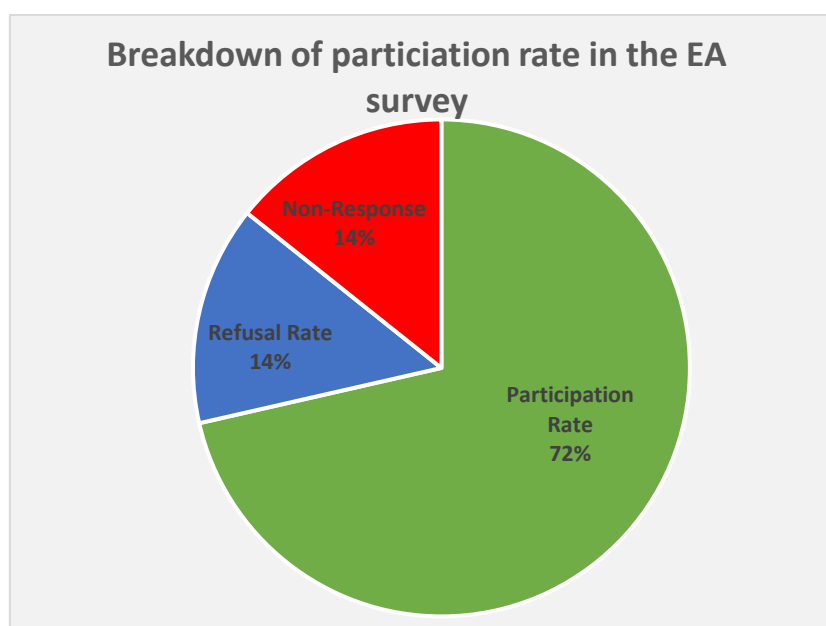

Figure 12: Response rate to the EA maturity assessment

Of the two declines, only one provided a reason in advance; the other declined the meeting request without a reason. Both non-responses are also accounted for, both colleagues were on leave on that particular day and did not read and respond to emails around the time the request was sent. Both, however, apologised for missing the session.

4.2.3. Non-response rate to alignment and EA maturity surveys

The 44% non-response rate is concerning to the researcher as she considers this to be quite high in comparison to the participation rate. It is also concerning as a high non-response rate is thought to impact the validity of the study. However, many studies in the past two decades challenges the belief that lower response rates implies lesser validity. Many researchers have demonstrated that response rate does not always affect validity, there is no direct correlation between the two (Morton, et al, 2012).

There are many reasons to explain the low participation or non-response rates to online surveys such as "decrease in 'volunteerism' (Morton, et al, 2012, p.106). Due to everyone being so 'busy', research found that studies which are invasive, time-consuming, and offer no compensation may be perceived as burdensome, contributing further to a general decline in participation rate, particularly in longitudinal studies (Morton, et al, 2012). The researcher can relate to these reasons as she was aware of other colleagues who have been requesting survey participation from the same group of people, either for their academic research or work-related so there may have been survey fatigue. Considering that the survey requested between 15–20 minutes of the participants' time, and no incentive was offered, the researcher believes they might have found the survey onerous and ignored the invitation to participate, as well as the two reminders which followed which added to the burden. Under the prevailing conditions, 20 minutes was a lot of time to volunteer, however, the researcher doubts that incentives would have assisted as studies show "incentives to have little or no effect on improving response rates to internet-based surveys" (Fielding et al. 2017, p.209).

The researcher doubts that offering compensation for time would have made a difference to participation rate as the timing was not ideal considering the current mood at Company A at the time, where there was talk of retrenchments. The researcher believes that the participation rate would have been higher had the internal environment been better.

4.3.   Constructs

The results of the responses to the constructs are presented here. To begin with, Table 9 summarises the average responses per construct.

Communication and Culture are considered to more matured processes since they resulted in level 3 alignment, 'Established/focussed' processes. Structure and Strategy could be improved since they are at a level 2, immature level of 'Committed'. Table 10 below provides the legend for each of the 5 phases of the SAMM model.

Table 9: Average response (Mean) per construct to determine SAMM Alignment Maturity Level

Descriptive Statistics (Alignment Maturity survey)				
Variable	**Valid N**	**Mean**	**Std.Dev.**	**Maturity level according to SAMM**
Communication	39	2.7	0.7	3- Established/Focussed
Culture	40	2.7	0.9	3- Established/Focussed
Structure	40	2.1	0.5	2- Committed
Strategy	40	2.3	0.7	2- Committed
Alignment Maturity level		**2.4**		**Committed Process**

Table 10: Legend of Luftman's Strategic Alignment Maturity Model (Luftman, 2000) describing the mean value in table 9

Legend: Alignment Maturity Scale based on Luftman's 6 criteria for measuring Business IT Alignment (Criteria = Communications, Competency, Governance, Partnership, Scope/Architecture, and Skills)	
Alignment Level	**Brief description of alignment as a process per level**
1- Initial/ad-hoc	Immaturity across all 6 criteria of BITA
2- Committed	Level of alignment immaturity is acknowledged, there is room for improvement across the 6 BITA criteria
3- Established/focussed	There is some effectiveness across the 6 criteria, IT is seen as an asset, communication is improving, but each element could be improved to increase the level of BITA alignment
4- Improved/managed	BITA is an acknowledged process in which IT is considered a key enabler of strategy, but still room for improvement exist
5- Optimised	BITA is a mature process across all 6 criteria

Based on the results of the alignment maturity survey, it appears that BITA is a 'Committed' process at level 2 (Luftman, 2000), 2.4 rounded down to 2. Organisations at a level 2 alignment maturity imply that in terms of Communication, there is a limited understanding between business and IT; IT is considered to be process enabler; Governance processes are not well established, and architecture is not well developed and integrated across the organisation (Luftman, 2000).

In terms of responses to Enterprise Architecture, to gauge an understanding of the participants' understanding of EA, the researcher asked, 'Which statement/s best describes the activities associated with Enterprise Architecture'.

The below table summarises the respondents' understanding of EA.

Table 11: Respondents' understanding of EA definition

Understanding of EA activities/definition		
Understand EA – Selected definition of EA, BA, or EA and BA	29	73%
Does not understand EA – Selected definitions of solution or technical architecture	11	28%

The results showed that 73% of respondents understand what EA is as they selected either the definition for EA, BA, or both EA and BA, as they could select multiple options.

The next question tried to gauge respondents' understanding of EA artefacts in use at Company A.

Table 12: Respondents' understanding of EA artefacts

	Not created	Partially created	Created and delivered	Created, delivered & approved	Created, delivered, approved & being used	N/A – Don't know
Enterprise Capability Model	8%	10%	8%	13%	20%	43%
Architectural Principles	0%	13%	15%	20%	23%	30%
Architectural Standards	3%	13%	15%	15%	25%	30%
Architectural Roadmaps	3%	28%	8%	15%	15%	33%

The above table indicates that the respondents are not familiar with the EA artefacts in use as the highest response selection was 'don't know'.

The next question had nine statements which are proven benefits of EA (Blosche & Burke, 2016), and one question about the responsibility of EA. Participants were asked to select statements which they agree with. Results are as follows

Table 13: Participants' views of benefits of enterprise architecture

Please select all statements related to Enterprise Architecture which you agree with	Agree	% Agree
EA has a positive impact on reducing IT service provision costs	25	63%
EA has a positive impact on optimizing business processes	25	63%
EA has a positive impact on improving information quality and accessibility	23	58%
EA enables reuse of assets	23	58%
EA has a positive impact on business strategy	22	55%
EA has a positive impact on the overall investment of the organisation	21	53%
EA has a positive impact on reducing project work effort	19	48%
EA has a positive impact on enabling organisational change	18	45%
EA enables innovation	17	43%
EA is the responsibility of the IT department	16	40%

The questions were not asked in this order. It was sorted by percentage response and presented from highest to lowest. Noting results, only 40% of the population believes that EA is the responsibility of another division. This implies that the 60% who disagreed believe that EA should not report into the CIO. 55% agree that EA has a positive impact on business strategy, and 45% agree that EA can have a positive impact on organisational change.

4.4.   Testing for reliability and validity

4.4.1. Cronbach alpha

Cronbach Alpha is a commonly used, objective measure of reliability. Alpha provides a measure of the internal consistency of a test or scale and is expressed as a number between 0 and 1 (Tavakol & Dennick, 2011). It is also acceptable to test for construct validity (Taber, 2017). The Cronbach alpha is an appropriate measure of reliability of the Alignment maturity survey because the questionnaire was based on a Likert scale and alpha coefficient ranges may be used to describe the reliability of factors extracted from multi-point formatted questionnaires or scales (Santos, 1999). The approach taken to conduct the Cronbach alpha was to test the alpha per construct by including the appropriate variables in the construct because alpha is only calculated for each of the concepts rather than for the entire test or scale (Tavakol & Dennick, 2011).

Table 14 shows the results of Cronbach's alpha test on each construct rounded to the closest decimal.

Table 14: Cronbach Alpha results

Construct	Cronbach Alpha	Number of items/variables measured	Qualitative descriptor	Level of reliability
Communication	0.8	5	Relatively High	Very good
Culture	0.8	5	Relatively High	Very good
Structure	-0.2	2	No correlation	Not reliable
Strategy	0.6	3	Moderate	Acceptable

Literature indicates that 0.7 is an acceptable threshold or coefficient for alpha (Santos, 1999), "and maximum alpha value of 0.90 has been recommended" (Tavakol & Dennick, 2011, p. 54). However, a study conducted by Taber, (2017) suggests that there is "no clear consensus on the most appropriate labels to use to describe the values obtained when calculating alpha" (Taber, 2017, p.1278) and there is no consistency with regard to terminology/labels used by different scholars to describe the result of the Cronbach Alpha score. For example, some scholars describe an alpha score as 'high', 'high but not satisfactory', etc. which Taber found overlaps with other descriptions for sufficient and acceptable. This implies that a term described as acceptable to one scholar may be defined as sufficient by another. An alpha result of 0.6-0.7 shows an acceptable level of reliability. Anything higher such as 0.8 or more is a very good indication of reliability (Ursachi, Horodnic, & Zait,2015).

The correlations in the Structure construct have no correlation. There was a stronger correlation between the variables in the Culture and Communication constructs 0.8. It was not possible to use only the two variables to measure Cronbach alpha, as was proven by the score of -0.2.

The alpha for constructs indicates reliability for three of the constructs, i.e., Communication, Culture, and Business Strategy because they fall within the 'reasonable' to 'acceptable' alpha coefficients (0.6-0.9) (Taber, 2017; Ursachi, et.al, 2015). From these results, we accept that reliability is high, thus the above findings indicate that the instrument measures consistently and the variables are correlated to one another in the data, except for the Structure construct. It is therefore concluded that there is internal consistency which implies that all the items or variables in the test measure the same construct.

4.4.2. Spearman correlation test

Spearman rank correlation is a non-parametric test that is used to measure the degree of association between two variables. It is the appropriate correlation analysis when the variables are measured on a scale that is at least ordinal like the Likert scale used in the questionnaire on alignment at Company A.

The tables below are the results of the Spearman Correlation tests. Marked correlations (in red and marked by an *) are significant at p <.05.

Legend applies for tables 16, 17 and 18

Table 15: Legend for Spearman Correlation tables

Significance	Marking	Colour
<=0.05	*	Value is in Red

Table 16: Spearman results for the Communication construct

Communication	Bus. Mgmt. under-standing of IT	IT Mgmt. under-standing of Bus	Knowledge Sharing	IT/Busi-ness Li-aison re-lation-ship	Fre-quency of B-IT Steerco
Bus. Mgmt. understanding of IT	1.00	*0.55	*0.43	*0.52	*0.35
IT Mgmt. understanding of Bus	*0.55	1.00	*0.39	*0.53	0.28
Knowledge Sharing	*0.43	*0.39	1.00	*0.55	*0.36
IT/Business Liaison relation-ship	*0.52	*0.53	*0.55	1.00	*0.39
Frequency of B-IT Steerco	*0.35	0.28	*0.36	*0.39	1.00

Table 17: Spearman correlation for the Culture construct

Culture	Investment rationale	Project pri-oritization	Bus-IT relation-ship	Acceptance to change	Perception of IT value
Investment rationale	1.00	0.41	0.35	0.28	0.45
Project prioritization	0.41	1.00	0.48	0.35	0.43
Bus-IT relationship	0.35	0.48	1.00	0.42	0.64
Acceptance to change	0.28	0.35	0.42	1.00	0.37
Perception of IT value	0.45	0.43	0.64	0.37	1.00

Table 18: Spearman correlation for the Business Strategy construct

Strategy	IT Invlmt in Bus. Strategic planning	Bus. Invlmt in Bus. Strate-gic planning	Use of Archi-tecture tools in bus. Planning
IT Invlmt in Bus. Strategic planning	1.00	0.59	0.01
Bus. Invlmt in Bus. Strategic planning	0.59	1.00	0.26

Table 19: Spearman correlation for the Structure construct

Structure	Org structure report-ing line	Project sponsor location
Org structure reporting line	1.000000	-0.007595
Project sponsor location	-0.007595	1.000000

Significant values (i.e. P <0.05) are indicated in red which implies that statistically there is a 95% confidence level that the values in red in each table are true.

The results of the Spearman Correlation are aligned with the results of the Cronbach Alpha, i.e., Culture had the highest alpha of .8, it also had the highest degree of correlation between all variables. Communication and Strategy constructs had an alpha of 0.8 and 0.6 respectively, and the correlations were closer to 0 than to 1, which means lower levels of correlation between variables for these constructs, which was the same result as for the Spearman tests. The results in table 17 also correlated to results of Cronbach Alpha, there is no correlation between the variables measuring the Structure construct.

One could be inclined to say that the data is reliable, and it is reliable at different levels of correlation and significance. Should this measurement be adopted in a different context, using the same variables and concepts, the results would be similar.

4.5. Testing for interaction – regression analysis

Multiple regression analysis was applied to test the relationships amongst the four variables. This test aimed to determine whether the four independent variables were significantly predictive of business-IT alignment. The strength of a moderating variable can be tested through Regression Analysis as this type of statistical test is appropriate for testing this form of moderation and is more commonly used in strategic management research" (Venkatraman, 1989, p.6).

Regression between the average of Communication (AVGCOM), culture (AVGCULT), structure (ABG-STRU), and strategy (AVGSTRAT) against BITA (AVGBIA) was tested. The results are tabled below

Table 20: Results of multiple regression test excluding EA as moderator

N=40	Regression Summary for Dependent Variable: AVGBIA (Alignment Maturity Survey) R= .69063585 R²= .47697787 Adjusted R²= .41720391 F (4,35) =7.9797 p<.00011 St. Error of estimate: .67484					
	b*	St. Err.	b	St. Err.	t (35)	p-value
Intercept			-0.419891	0.584821	-0.71798	0.477534
AVGCOM	0.437695	0.189853	0.523004	0.226857	2.30543	0.027188
AVGCULT	-0.242616	0.217167	-0.235535	0.210829	-1.11719	0.271525
AVG STRUC-TURE	0.280417	0.133262	0.491992	0.233808	2.10425	0.042609
AVGBSTRAT	0.441418	0.166196	0.542481	0.204247	2.65600	0.011826

Table 21: Result of Regression Model excluding EA

Statistic	Summary Statistics; DV: AVGBIA (Alignment maturity Survey)
	Value
Multiple R	0.69
Multiple R²	0.48
Adjusted R²	0.42
F (4,35)	7.98
p	0.00
St. Err. of Estimate	0.67

The Multiple R (0.69) is the multiple correlation among the four independent variables and the dependent variable, BITA. R Square (0.48) is the variance in the dependent variable accounted for by the four independent variables which means the independent variables (Communication, Culture, Structure, and Strategy) explain 48% of the variability of the dependent variable, BITA. The F ratio of 7.98 at 4 and 35 degrees of freedom is statistically significant at 0.0.

Table 20 shows that Culture is the only variable which does not have an impact on BITA as p = 0.2.

The same regression test was conducted, this time average of EA construct was included (AVGEA)

Table 22: Results of Regression including EA as moderator

N=40	Regression Summary for Dependent Variable: AVGBIA (Alignment Maturity Survey) R= .69234914 R²= .47934734 Adjusted R²= .40278077 F (5,34) =6.2605 p<.00032 St. Error of estimate: .68313					
	b*	St. Err.	b	St. Err.	t (34)	p-value
Intercept			-0.527359	0.652012	-0.80882	0.424244
AVGCOM	0.421380	0.196613	0.503509	0.234934	2.14319	0.039339
AVGCULT	-0.228152	0.222892	-0.221493	0.216386	-1.02360	0.313253
avgstru	0.262363	0.142495	0.460316	0.250007	1.84121	0.074330
AVGBSTRAT	0.433881	0.169328	0.533219	0.208096	2.56238	0.014997
AVGEA	0.053152	0.135123	0.147049	0.373827	0.39336	0.696509

Table 23: Results of Regression model including EA as moderator

Statistic	Summary Statistics; DV: AVGBIA (Alignment maturity Survey)
	Value
Multiple R	0.69
Multiple R²	0.48
Adjusted R²	0.40
F (5,34)	6.26
p	0.00
Std.Err. of Estimate	0.68

The Multiple R (0.69) and R Square (0.48) are the same as in the previous test. The F ratio of 6.26 at 5 and 34 degrees of freedom is statistically significant at 0.0. Note that when EA is included that communication and strategy are the only two constructs with $p<0.05$ and impacting BITA. EA does not, according to these results have an impact on or significantly moderate BITA. The researcher therefore states that EA is not a moderating variable as initially proposed in section the 2.6 Conceptual Model.

Reasons for culture, structure, and EA to be insignificant in impacting BITA could be related to the beta score. The beta score, or regression coefficient explains the strength the independent variable has on the dependent variable. Weak relationships are represented close to 0, and strong relationships close to 1.

4.6.   Hypotheses testing

The results in table 24 answers Hypotheses 1-4 and is presented below.

Table 24: Hypotheses testing H1-H4

Hypotheses	P value	Hypotheses accepted	Context
H1- Constant and effective communication between Business and IT divisions has a significant effect on alignment between Business and IT at Company A	0.03	Accepted	Communication is considered a more mature process as it resulted in level 3 alignment, 'Established/focussed' process. See table 9 and 10. Communication as a single variable influencing BITA at Company A is therefore accepted based on results of p Value, Cronbach Alpha, Spearman Correlation tests, and Regression testing. Communication as a single variable met all testing criteria with and without EA being tested as a moderating variable, the former which qualifies for H1 to be accepted. Ineffective Communication is one of the common barriers of, and enabling factors to achieve BITA (Dairo et al, 2021)
H2- Company Culture has a significant effect on alignment between Business and IT at Company A.	0.3	Rejected	While Culture is too considered a more mature process as it resulted in level 3 alignment, 'Established/focussed' process. See table 9 and 10 and.as a single variable successfully tested for reliability and Spearman testing. H2 was rejected based on the results of the Regression Analysis when assessing Culture with EA as a moderating variable. Table 20 and 22 shows that Culture as variable which does not have an impact on BITA as p = 0.2. Reasons for culture, and EA to be insignificant in impacting BITA could be related to the beta score. Like Communication, Culture is one of the common barriers of, and enabling factors to achieve BITA (Dairo et al,

			2021). While it may be the case generally as supported by literature (Chan & Reich, 2007; Olson, Slater, & Hult, 2005), Culture has not been proven to improve BITA at Company A, with and without EA as a moderator at company A (table 20 and 22).
H3 - The structure of Company A has significant effect on alignment between Business and IT	0.07	Rejected	Structure was a less mature variable at level 2 as per table 9 and 10. Structure also proved unreliable in Cronbach Alpha testing. It was not possible to use only the two variables to measure Cronbach alpha, as was proven by the score of -0.2. As for Spearman, the results in table 17 also correlated to results of Cronbach Alpha, there is no correlation between the variables measuring the Structure construct. It is generally acknowledged that alignment is influenced by the organisation structure (Islam and Hu, 2012). While table 20 showed that Structure does impact BITA at 0.04, when EA was included as a variable for regression testing, Structure no longer proved to be a variable impacting BITA at Company A.
H4- The strategy of Company A has a significant effect on alignment between Business and IT	0.01	Accepted	The strategy variable was proven to be an influencing factor of BITA at Company A in both Regression testing in table 20 and 22, when EA was included and excluded as a moderating variable. Structure variable was also accepted as Cronbach Alpha and Spearman testing. It is therefore accepted that the strategy of Company A has a significant effect on alignment between Business and IT.

H5: The level of alignment between business and IT strategy is not high at Company A. Accepted. The Result of the Alignment maturity survey proved that BITA is level 2, a committed process. See Table 9 and 10 in the previous section. Level 2 is the second maturity level which is considered as immature strategic alignment.

Respondents felt that the CIO only references the business strategy when developing the IT strategy, but the CIO is not involved in development of the business strategy. The IT strategy is presented to

Company A MC for budget approval, but business executive management are not involved in the development of the IT strategy since it is developed from an approved Business Strategy, in which CIO involvement is limited. It is understood that the CIO at Company A has a traditional focus due to the CIO to CFO reporting structure so his involvement in corporate strategic decision making is limited.

Table 25: Responses to strategy questions

Variable	Valid N	Mean	Std.Dev.
Strat 1-IT Involvement in Bus. Strat Planning	40	3	1.5
Strat - 2 Bus. Involvement in IT strategic planning	40	2	1.6

Therefore, H5 is accepted, the level of alignment between Business and IT is not high at Company A. The Alignment maturity survey measured overall strategic alignment between Business and IT across 6 elements which resulted in an alignment as an immature, committed process with the acknowledgement of room for improving or maturing BITA. The table above shows the responses to two questions which measured Strategy elements. This supports accepting H5.

H6: EA and its benefits are largely understood within Company A. Table 11 shows that 73% of respondents possessed an understanding of EA as they selected the correct definition. In terms of understanding the benefits, table 13 shows that 54% was the average agreement rate to the statements made about the benefits of EA. The highest rate of agreement was 63% which related to EA improving business processes and reducing IT provisioning cost, and only 55% agreeing to EA positively impacting business strategy. The researcher considers 63% to be significant enough to measure agreement, especially considering that judgement sampling was used so a high understanding was expected from participants. Although the researcher would have liked to expect a higher percentage from the calibre of sample selected (specialist and management), for at least 54% amongst the sampled group to possess an understanding of what EA is and its benefits, H6 is therefore accepted because at 54%, the benefits are widely understood across the population.

The table below summarises the results of hypotheses testing, two were rejected, and four were accepted.

Table 26: Results of hypotheses testing

Hypotheses number	Hypotheses	Accepted or rejected
H1	Constant and effective communication between Business and IT divisions has a significant effect on alignment between Business and IT at Company A	Accepted
H2	Company Culture has a significant effect on alignment between Business and IT at Company A.	Rejected
H3	The structure of Company A has significant effect on alignment between Business and IT	Rejected
H4	The Strategy of Company A has a significant effect on alignment between Business and IT	Accepted
H5	The level of alignment between business and IT strategy is not high at Company A	Accepted
H6	EA and its benefits are largely understood within Company A	Accepted

4.7.   Chapter summary

This chapter described the data analysis results. The sample size was 40 which comprised of managers, architects, and strategic resources and this resulted in a response rate of 42%. More than half of the respondents hold a tenure at Company A for more than 10 years, in fact most of the responses were from employees who have been employed by Company A between 26-30 years consecutively. The statistical analysis showed that the instrument was reliable with reasonable internal consistency, except for Structure which had alpha of -0.3. The number of items on this construct could be the reason for this. Validity tests showed that there is a high correlation amongst constructs. Regression tests showed that only Strategy and Communication had a statistically significant effect on BITA at Company A. EA did not prove to be a significant moderator for BITA at Company A. Two of the six hypotheses presented were rejected after conducting analysis and statistical tests.

5. Chapter 5: Discussion

5.1. Introduction

This study aimed to determine if Enterprise Architecture, and Culture, Communication, Structure and Strategy variables contribute to improving alignment between Business and IT at Company A. It also attempted to determine the level of alignment maturity between Business and IT and Company A, provide recommendations for improving EA maturity so that EA can enable better alignment between Business and IT and determine what structural change, if any, is required to further improve BITA.

This chapter considers the results in Chapter 4 against the existing literature, research questions and objectives.

5.2. Research questions

The primary research question posed:

Q1: How can BITA be strengthened at Company A?

BITA at Company A can be improved from many aspects. Particularly focussing on EA which if mature can improve BITA. Once the maturity levels are known, it is important to note that "achieving higher levels of maturity is not an end in itself, rather, higher EA maturity will lead to improvements in strategic alignment and effective business change" (Burke, 2012, p.1). EA at Company A is largely immature at level 2. Focus can be given to maturing the EA practice so that EA is matured enough to meet the demands of the business strategy, to support, and enable it.

Other aspects include reviewing reporting lines in the organisation structure. H3 was rejected so a major structural change related to CIO reporting line may not strengthen BITA, however consideration for including Enterprise Architects in a Strategy division can be considered since architects have a tactical and operation focus on the existing structure, therein being unable to mature EA practice as the scope of EA is limited and influenced by structure at Company A. Many IT focused EA teams operating solely within IT address current IT pain points. It is typical for organizations to get "stuck" at this level, having committed significant resources to EA development, but not realizing the benefits (IT Score of EA, Gartner 2017). Level 2 EA Maturity is at a Reactive phase. This implies that the EA practice is not adding business value or matured enough to assist the organisation achieve its strategy (Burke and Bosch, 2015).

Q2: Is there a problem of strategic misalignment between Business and IT at Company A?

The result of the alignment maturity survey proved that there is a lack of alignment at company A (maturity level 2), and immature EA practice (level 2), and it has been for the last few years. Research indicates that EA processes stabilise and become value-adding at Level 3, the Functioning level. Essentially, EA is too immature currently to bring BITA value. Only once value is realised, will EA be able to bring about alignment between Business and IT. The EA practice at Company A must mature.

Q3: What is the current maturity level of EA processes at Company A?

Based on the results of the EA maturity Assessment, the current EA maturity is on level 2. This level is known as Reactive.

Organizations at this level have initiated the EA practice. It may have been in place for some time, but it is not yet delivering tangible business value. As a result, the EA practice is not having a significant impact on the change that is occurring in the organization through projects.

The maturity level at other companies in the Oil and Gas industry against which Company A was benchmarked also resulted in level 2 EA maturity. Thus, through the use of the qualitative data gathering it is established that the EA level of Company A is immature at level 2 and could definitely be improved upon if the discipline is to contribute towards improving alignment between IT and the corporate organisation.

Q4: What are some of the reasons for the alignment maturity level at Company A?

The researcher believes that the current architecture processes failed to bring about alignment because EA practices are siloed as the current EA practices are mainly focussed within IT, not in the broader organisation, as is evident in the EA maturity report provided by Gartner (the actual report cannot be shared as it is considered confidential and permission to include it as an appendix was not granted).

Referring to table 13, surprisingly only 40% of respondents believe that EA is the responsibility of IT, and 55% agreed EA has a positive impact on strategy. These responses indicate an understanding of benefits of EA by the population as the response was mostly in agreement with EA benefits. While the benefits of EA appear to be widely understood, they are not embraced and attempts for maturing EA practice cannot be seen. For EA to contribute towards BITA, EA programs require commitment throughout an organization to be effective and it must be perceived to add value (Halawi, et al 2019, p.4). The commitment from senior management seems to be lacking, since the understanding exists but no action taken to improve, hence negatively influencing architecture's ability to bring about alignment.

5.2. Research objectives

The researcher had set objectives at the beginning of this dissertation:

5.2.1 Primary Objective

Identify opportunities for improving alignment between Business and IT divisions within Company A. Alignment maturity is at level 2, a committed process. Organisations at this level imply that there is a very limited understanding between business and IT, a partnership has not been established, i.e., IT is a cost not a benefit, and processes are not integrated across the organisation (Luftman 2017). The researcher identifies opportunities for alignment in the table below:

Table 27: Opportunities for alignment at Company A

Communication	Structure
• Develop a partnership between Business and IT, this will increase levels of trust, i.e., see IT as an enabler or partner, not just as a cost centre or to keep the systems working.	• Include the CIO in defining business strategies, even when strategies are influenced by Company B. The CIO's focus should be expanded to be more than cost reduction as the technical and architectural skill sits within IT. The CIO knows the competency and skill level of his staff, these could be exploited for strategic benefit, not just cost reduction exercises.
Culture	**Strategy**
• Create a culture which is open to change and two-way communication between Business and IT. It is vital for an open mind to change as this will ease the transition when process improvements are made and increase chances of improved alignment • Consider end-to end business processes, as opposed to an 'IT process' and 'Business Process'. This will ensure that both IT and Business are involved in each other's processes, therein creating a partnership and culture of communication and trust, both elements measured for alignment	• Consider the purpose of the IT architects, the gap for architects in Business, at the strategic level, and perhaps include enterprise architecture in the mandate of the Corporate Strategy Department to ensure that the holistic view is being considered at the correct level with support of a General Manager • Have a business sponsor at executive level to drive and support projects with a strategic focus

EA
• Understand the full-scale benefits of EA, what is required to create and EA office within Corporate Strategy department, and invest in this change • Measure EA regularly and make improvements to progress from level 2 to 3 and continuous improvements thereafter as alignment is not an end state • Have an executive sponsor drive the implementation of an EA implementation

The table above represents the researchers view for improving alignment between Business and IT, and that a clear focus on EA is required as EA, if done correctly has the power to strengthen alignment at Company A, therein improving business performance as companies with strong BITA alignment ultimately perform better (Tallon et.al, 2016; Zheng et al, 2018)

5.2.2. Secondary Objectives

- Determine the level of alignment maturity between Business and IT and Company A

The Alignment Maturity level at Company A is at a low maturity level 2, a 'Committed Process' (Luftman, 2000). This is evident based on the results as can be seen in table 10 which shows the Strategic Alignment Maturity level between Business and IT.

Organisations at a level 2 alignment maturity imply the level of alignment immaturity is acknowledged, and there is room for improvement across the 6 BITA criteria measured in the Luftman Alignment

survey, including Communication, Partnership, and Architecture. The maturity at level 2 implies that that in terms of Communication and Partnership/relationship, there is a limited understanding between business and IT, IT is a process enabler and not yet a partner, Governance processes are not well established, and architecture is well developed and integrated across the organisation (Luftman, 2000). Organisations at Level 4 or 5 have mature alignment across all alignment criteria, and Company A can, based on their finding, improve the alignment maturity between Business and IT.

- **Prove that structure, culture, strategy, and communication contribute towards improving BITA.** Only strategy and communication were proven to have a significant effect on BITA. These have been addressed in hypotheses testing. This objective therefore addressed.

- **Provide recommendations for improving EA maturity so that EA can enable better alignment between Business and IT**

After providing evidence that EA and BITA maturity are both low and immature, these are the recommendations for improvement:

- Identify areas of weakness:
  Since Structure was not identified as a factor contributing to BITA at company A as per H3, Company A may not realise the same benefits as identified in literature for a change to the CIO reporting line such as "moving the IT organisation up to the C-suite allows for more direct visibility of business initiatives, challenges and operations which leads to better alignment between business and IT" (Aljazzaf, Mithas, & Park, 2019, p.2.). A less drastic step would be for Company A's GM's to firstly understand the benefits of EA, try implementing quick wins, then lead the rest of the businesses by educating them about EA and supporting minor structural changes which would improve minor things. Since the benefits of EA understanding were largely understood by Specialist identified using judgement sampling, extending the understanding even further should start with Company A leadership so that change could be driven from top down.
  The researcher suggests conducting another EA maturity assessment at a later stage and to determine if there has been an improvement in maturity level since last.

- Apply an Architecture Framework: The benefits of an EA framework were addressed in section 2.4. The researcher suggests stricter application of TOGAF. However, to successfully implement an EA framework within Company A, it requires a culture conducive to its maintenance, i.e., more focus and understanding of EA within Leadership and non-specialists in the Business.

- A Business Architecture capability should be developed, and they should report into the Strategy department, not into IT. This recommendation is discussed in the next objective.

- **Determine what structural change, if any, is required to further improve BITA**

The moderation perspective specifies that the impact of an independent variables, i.e., structure, culture, strategy, and communication on a dependent variable, i.e., BITA is fundamentally dependent on the level or strength of the moderator, in this case EA is moderator. Therefore, the strength of EA is determined by its level of maturity, which is low at level 2. Because EA is immature as moderator it does not sufficiently moderate the other variable to enable BITA.

Enterprise Architecture has a focus on the strategic, tactical, and operational levels (Greefhorst & Proper, 2011). For the following levels stem from the guidance and steer provided at a Strategic level, EA is a strategic function, even though it has its foundation in IT (Greefhorst & Proper, 2011), so one would assume that a strategic department has architects overseeing the technological roadmap for the company. However, the corporate strategy mandate at Company A does not include enterprise architecture as part of its responsibilities. The Corporate Strategy department coordinates and manages the Business and Strategic Planning activities of Company A, which includes developing and implementing a digital and innovation roadmap. Blosh and Burke (2015) suggests that architects should be involved in the creation and implementation of the organisation's digital roadmap. This will ensure alignment between strategy, and IT's ability to support the delivery of that strategy.

Even though the CIO focus and reporting structure at Company A does not readily grant the strategic involvement that Strategic EA demands, Enterprise Architects should be involved in and have line of sight of strategy to understand how the business architecture, business, and IT can be utilised to support strategy. The current structure at Company A excludes the CIO and IT architects from having this holistic view as they are not exposed to strategic planning, therein working with a disadvantage as their roles are not strategically focussed, but rather focussed on IT and a more tactical and operation architecture view (Greefhorst & Proper, 2011). This places Company A at a disadvantage because there are no resources, correctly positioned within the organisation, with this holistic view required for a mature Enterprise Architecture (Blosh and Burke, 2015; Greefhorst & Proper, 2011; Kurnia, et al, 2020, Zhang et al, 2020). Even though H3 was rejected, a structural change is suggested as a requirement to obtain a mature EA Programme and improved BITA at Company A. Since it is understood that the CIO has a traditional, risk-based, financial focus, the recommendation is for company A to consider including Enterprise Architects as part of the Corporate Strategy office so that they can be directly involved in strategic decision making influencing the tactical and operational architecture levels which all ultimately influence BITA at Company A.

5.3. Limitations of research and recommendations for future research

The method deployed to determine the understanding and level of alignment at Company A was built on participants perception. The researcher did not execute any form of confirmatory testing to verify the responses i.e., no interviews. Perhaps more research can be done to include interviews to further validate survey responses with the same audience or a sample with similar business roles.

In addition, noting that the study has a cross-sectional timeline is important, especially considering the time during which the study was conducted. The organisation was undergoing a restructure and retrenchments at the time, therefore the perception of respondents regarding alignment between business and IT departments may change over time as the new structure and processes are implemented. A longitudinal approach could be beneficial to track responses and determine if there is a change in BITA and EA practices over a period.

A suggestion for further research could include a sample size more than 40, and perhaps conduct a study on more than one organisation, of similar sizes within the oil and gas industry with a known matured EA practice and apply the same research methods to determine if EA as a moderator of fit will be proven.

While this study did not attempt to test for improved Business Performance as a result of BITA, perhaps further studies adopting a longitudinal approach can attempt to determine if improved business performance is achieved as a result of an improved BITA maturity score, moderated by EA. Even though depicted on the Conceptual Model based on literature, improving the performance of Company A was not part of the scope of this research. Improved business performance is implied as a result of BITA in literature but was never intended to be tested as part of this study.

5.4. Conclusion

Business IT Alignment has been studied for decades and although much has been learnt about strategic alignment, it is still a challenge (Luftman, 2018; Coltman, et, al. 2015; Mavengere et al, 2020). The objective of this research was to identify opportunities for improving alignment between Business and IT divisions within Company A. The literature was synthesised, and Maes et al, (2000) definition of BITA was adopted.

Mixed methods techniques were employed to collect data. Only quantitative techniques were employed for data analysis which included descriptive statistics, reliability tests, correlation analysis, and conducting multiple regression testing to examine the relationship between Business IT Alignment and various potential predictors.

This study sought to determine how improved alignment can be achieved using the moderation approach. The research did not prove that EA was a moderating variable since the strength of EA is determined by its level of maturity, which is low at level 2. Because EA is immature as moderator it does not sufficiently moderate the other variables to enable BITA. Essentially, EA is too immature to bring value.

This research established that Company A is immature in the BITA at Level 2, where alignment is a committed process (Luftman, 2000) confirming that alignment between Business and IT is low at Company A. Therefore, this dissertation has set out what the researcher intended for, which was to establish how, or if Enterprise Architecture, supported by Communication, Culture, Structure and Strategy contributed to improving alignment between Business and IT at Company A.

The main objective of this study has thus been achieved, which was to Identify opportunities for improving alignment between Business and IT divisions within Company A.

References

Ahad, N. A., Yin, T. S., Othman, A. R., & Yaacob, C. R. (2011). Sensitivity of Normality Tests to Non-normal Data. *Sains Malaysiana*, *40*(6), 637-641. Retrieved from http://www.ukm.my/jsm/

Ajumobi, D. O., & Kyobe, M. (2017). Alignment of human competencies with mobile phone technology and business strategies by women-led SMEs in South Africa. *EJISDC*, *80*(8), 1-25. Retrieved from http://www.is.cityu.edu.hk/staff/isrobert/ejisdc/80-8.pdf

Aljazzaf, S., Mithas, S., & Park, Y. (2019). The Information Technology Reporting Structure and Firm Performance: A Configurational Approach. In *Twenty-fifth Americas Conference on Information Systems, Cancun, 2019* (pp. 1-10). Retrieved from https://aisel.aisnet.org/cgi/viewcontent.cgi?article=1101&context=amcis2019

Annum, G. (2016, July 14). *Purposive or judgmental sampling techniques*. Retrieved from http://campus.educadium.com/newmediart/file.php/1/giilmadstore/UgradResearch/ResMethgen/files/notes/purpjudg.pdf

Asthana, A. (2013, August 2). Testing for normality. Retrieved from http://www.slideshare.net/Ankitaasthana83/testing-for-normality

Baker, J., Jones, D. (2008). "A Theoretical Framework for Sustained Strategic Alignment and an Agenda for Research," Proceedings > Proceedings of JAIS Theory Development Workshop. *Sprouts: Working Papers on Information Systems*, 8(16). http://sprouts.aisnet.org/8-16

Banker, R. D., Hu, N., Luftman, J., & Pavlou, P. A. (2010). CIO Reporting Structure, Strategic Positioning, and Firm Performance: To Whom Should the CIO Report? *SSRN Electronic Journal*, *35*(2), 487-504. doi:10.2139/ssrn.1557874

Bergerona, F., Raymond, L., & Rivard, S. (2003). Ideal patterns of strategic alignment and business performance. *Information and Management*, *41*(2004), 1003-1020. Retrieved from www.sciencedirect.com

Bhattacherjee, A. (2012). *Social science research: Principles, methods, and practices* (2nd ed.). Florida: USF Tampa Library Open Access Collections.

Blosch, M., & Burke, B. (2015). *IT Score for Enterprise Architecture* (G00276848). Retrieved from Gartner website: https://www.gartner.com

Brannick, T., & Coghlan, D. (2007). In Défense of Being "Native": The Case for Insider Academic Research. *Organizational Research Methods*, *10*(1), 59-74. doi:10.1177/1094428106289253

Burke, B. (2012). *IT Score for Enterprise Architecture* (G00232906). Retrieved from Gartner website: http://gartner.com

Castro, S., & Jung, J. (2021). Towards Measuring Success of Enterprise Architecture Decisions: Survey among Practitioners and Outline of a Framework. *Enterprise Architecture Professional Journal*, 1-22. Retrieved from https://eapj.org/

Chan, Y. E., & Reich, B. H. (2007). IT alignment: what have we learned? *J Inf Technol*, *22*(4), 297-315. doi:10.1057/palgrave.jit.2000109

Cycyota, C. S., & Harrison, D. A. (2006). What (Not) to Expect When Surveying Executives. *Organizational Research Methods*, *9*(2), 133-160. doi:10.1177/1094428105280770

Dairo, M., Adekola, J., Apostolopoulos, C., & Tsaramirsis, G. (2021). undefined. *International Journal of Information Technology*, *13*(6), 2191-2197. https://doi.org/10.1007/s41870-021-00815-7

Fielding, N., Lee, R. M., & Blank, G. (2008). Chapter 11 Sampling methods for web and email surveys. In *The SAGE handbook of online research methods* (2nd ed., pp. 195-215). SAGE.

Halawi, L., McCarthy, R., & Farah, J. (2019). Where We Are with Enterprise Architecture. *Journal of Information Systems Applied Research*, *12*(3), 4-13. Retrieved from https://commons.erau.edu/publication/1234/

Hellerstein, J. M. (2008). *Quantitative Data Cleaning for Large Databases*. Retrieved from Berkeley website: http://db.cs.berkeley.edu/jmh/papers/cleaning-unece.pdf

Hout, E. V. (2012). *Measuring strategic business-IT alignment* (Master's thesis, Eindhoven University of Technology, Eindhoven, Netherlands). Retrieved from https://pdfs.semanticscholar.org/4c0c/b3578b7be5abb9380bc2a0b098bb276d7988.pdf

Introduction to the ADM. (2006). Retrieved from http://pubs.opengroup.org/architecture/togaf8-doc/arch/chap03.html

Islam, J., & Hu, H. (2012). A review of literature on contingency theory in managerial accounting. *AFRICAN JOURNAL OF BUSINESS MANAGEMENT*, *6*(15), 5159-5164. doi:10.5897/ajbm11.2764

Johnson, T. P., & Wislar, J. S. (2012). Response Rates and Nonresponse Errors in Surveys. *JAMA*, *307*(17), 1805-1806. doi:10.1001/jama.2012.3532

Jonathan, G. M. (2018, September). *Influence of Organizational Structure on Business-IT Alignment: What We Do (Not) Know* [Conference session]. 7th International Conference Perspectives in Business Informatics Research (BIR 2018 Doctoral Consortium), Stockholm, Sweden.

Kistasamy, C., Merwe, A. V., & Harpe, A. D. (2010). The Relationship between Service Oriented Architecture and Enterprise Architecture. *2010 14th IEEE International Enterprise Distributed Object Computing Conference Workshops*, 129-137. doi:10.1109/edocw.2010.12

Kothari, C. R. (2004). *Research Methodology: Methods and Techniques* (2nd ed.). Retrieved from https://books.google.co.za

Kurnia, S., Kotusev, S., & Dilnutt, R. (2020, May). *The Role of Engagement in Achieving Business-IT Alignment Through Practicing Enterprise Architecture*. Conference session presented at ECIS 2020, Marrakech. Retrieved fromhttps://www.researchgate.net/

Latinen, V. (2016). *Business and IT alignment in a global industrial organization* (Master's thesis). Retrieved from ProQuest Dissertations and Theses database.

Luftman, J. (2018). *IT-Business Alignment and the Evolving Role of the CIO and IT: 2017-18 Trends and Projections*. Retrieved from https://cdn.website-editor.net/66ce9ade50df4947aca6c0968f027283/files/uploaded/2016%2520CIO%2520IT%2520Trends.pdf

Luftman, J., Lyytinen, K., & Zvi, T. B. (2017). Enhancing the measurement of information technology (IT) business alignment and its influence on company performance. *Journal of Information Technology*, *32*(1), 26-46. doi:10.1057/jit.2015.23

Luftman, J. (2000). Assessing business-IT Alignment maturity. *Communications of AIS*, *4*(14), 1-52. Retrieved from http://aisel.aisnet.org/cgi/viewcontent.cgi?article=2538&context=cais

Luftman, J. (2003). Assessing It/Business Alignment. *Information Systems Management*, *20*(4), 9-15. doi:10.1201/1078/43647.20.4.20030901/77287.2

Madley-Dowd, P., Hughes, R., Tilling, K., & Heron, J. (2019). The proportion of missing data should not be used to guide decisions on multiple imputation. *Journal of Clinical Epidemiology*, *110*, 63-73. doi: 10.1016/j.jclinepi.2019.02.016

Maduenyi, S., Oke, A. O., Fadeyi, O., & Ajagbe, M. (2015). Impact of organisational structure on organisational performance. In *Social and Economic models for development track* (pp. 354-358). Ota Ogun State, Nigeria: Covenant University Canaanland.

Maes, R., Rijsenbrij, D., Truijens, O., & Goedvolk, H. (2000). Redefining business – IT alignment through a unified framework. In *Redefining business: IT alignment through a unified framework* (pp. 4-22). Retrieved from Http:// primavera.fee.uva.nl/

Marboah, J. P. (2011). *Strategic business and IT alignment- The role of the contemporary CIO and the effect of leadership characteristics on alignment barriers* (Master's thesis, Hanken school of economics, Helsinki, Finland). Retrieved from https://pdfs.semanticscholar.org/a23c/33147216dbe0636ad0545fc40e57bdafea76.pdf

Mavengere, N. B., Pekkola, S., & Stefanidis, A. (2020). *UK Academy for Information Systems Conference Proceedings*. Retrieved from https://aisel.aisnet.org/ukais2020/9/

Morton, S. M., Bandara, D. K., Robinson, E. M., & Atatoa Carr, P. (2012). In the 21st Century, what is an acceptable response rate? *Australian and New Zealand Journal of Public Health*, *36*(2), 106-108. doi:10.1111/j.1753-6405.2012.00854

Muhanguzi, S., & Kyobe, M. (2014). Aligning work practices, mobile technology, and strategy for performance improvement: The case of SMEs in Uganda. *The Electronic Journal on Information Systems in Developing Countries*, *60*(2), 1-22. Retrieved from www.is.cityu.edu.hk/staff/isrobert/ejisdc/60-2.pdf

Mumby, D. K., & Kuhn, T. R. (2018). Studying organisations critically. In *Organizational Communication: A Critical Introduction* (2nd ed.). Thousand Oaks, CA: SAGE Publications.

Onwuegbuzie, A. J., Dickinson, W. B., Leech, N. L., & Zoran, A. G. (2009). A Qualitative Framework for Collecting and Analysing Data in Focus Group Research. *International Journal of qualitative methods*, *8*(3), 1-21. Retrieved from https://doi.org/10.1177%2F160940690900800301

Onwuegbuzie, A. J., & Collins, K. M. (2007). A Typology of Mixed Methods Sampling Designs in Social Science Research. *The Qualitative Report*, *12*(2), 281-316. Retrieved from http://nsuworks.nova.edu/cgi/viewcontent.cgi?article=1638&context=tqr

Onwuegbuzie, A. J., & Leech, N. L. (2007). Sampling Designs in Qualitative Research: Making the Sampling Process More Public. *The qualitative report*, *12*(2), 238-254. Retrieved from http://nsuworks.nova.edu/tqr/vol12/iss2/7/?referer=www.clickfind.com.au

Papageorgiou, G., Grant, S. W., Takkenberg, J. J., & Mokhles, M. M. (2018). Statistical primer: How to deal with missing data in scientific research? †. *Interactive Cardiovascular and Thoracic Surgery*, *27*(2), 153-158. doi:10.1093/icvts/ivy102

Razali, M. N., & Yap, B. W. (2011). Power comparisons of Shapiro-Wilk, Kolmogorov-Smirnov, Lilliefors, and Anderson-Darling tests. *Journal of Statistical Modelling and Analytics*, *2*(1), 21-33. Retrieved from https://www.researchgate.net/publication/267205556_Power_Comparisons_of_Shapiro-Wilk_Kolmogorov-Smirnov_Lilliefors_and_Anderson-Darling_Tests

Regression analysis basics. (2014). Retrieved from http://resources.esri.com/help/9.3/arcgisdesktop/com/gp_toolref/spatial_statistics_toolbox/regression_analysis_basics.htm

Riempp, G., & Gieffers-Ankel, S. (2007). Application portfolio management: a decision-oriented view of enterprise architecture. *Information Systems and e-Business Management*, *5*(4), 359-378. doi:10.1007/s10257-007-0052-2

Russel, D., & Chuba, M. (2016). *The Top Challenges Facing I&O Leaders in2016* (G00300089). Retrieved from Gartner website: http://Gartner.com

Ryan, G. (2018). Introduction to positivism, interpretivism and critical theory. *Nurse Researcher*, *25*(4), 14-20. https://doi.org/10.7748/nr.2018.e1466

Santos, J. R. (1999). Cronbach's Alpha: A Tool for Assessing the Reliability of Scales. *Journal of extension*, *37*(2), 1-5. Retrieved from Retrieved from http://www.joe.org/joe/1999april/tt3.php?ref

Soiferman, L. K. (2010). *Compare and Contrast Inductive and Deductive Research Approaches* (ED542066). ERIC. https://eric.ed.gov/?id=ED542066

Saunders, M. (2009). *Understanding research philosophies and approaches* (January 2009). Retrieved from ResearchGate website: https://www.researchgate.net/profile/Mark_Saunders4/publication/309102603_Understanding_research_philosophies_and_approaches/links/5804eda208aee314f68e0ad8/Understanding-research-philosophies-and-approaches.pdf

Shamekh, F. R. (2008). *Business-IT Strategic Alignment concept in theory and practice* (Master's thesis, University of Goteborg, Goteborg, Sweden). Retrieved from https://gupea.ub.gu.se/handle/2077/10496

Taber, K. S. (2017). The Use of Cronbach's Alpha When Developing and Reporting Research Instruments in Science Education. *Research in Science Education*, *48*(6), 1273-1296. doi:10.1007/s11165-016-9602-2

Tallon, P., Queiroz, M., Coltman, T., & Sharma, R. (2016). Business Process and Information Technology Alignment: Construct Conceptualization, Empirical Illustration, and Directions for Future Research. *Journal of the Association for Information Systems*, *17*(9), 563-589. doi:10.17705/1jais.00438

Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. *Int. J. Medical Education*, *2*, 53-55. doi: 10.5116/ijme.4dfb.8dfd

Ursachi, G., Horodnic, I. A., & Zait, A. (2015). How Reliable are Measurement Scales? External Factors with Indirect Influence on Reliability Estimators. *Procedia Economics and Finance*, *20*, 679-686. doi:10.1016/s2212-5671(15)00123-9

Van den Broeck, J., Argeseanu Cunningham, S., Eeckels, R., & Herbst, K. (2005). Data Cleaning: Detecting, Diagnosing, and Editing Data Abnormalities. *PLoS Medicine*, *2*(10), e267. doi: 10.1371/journal.pmed.0020267

Venkatraman, N. (1989). The Concept of Fit in Strategy Research: Toward Verbal and Statistical Correspondence. *Academy of Management Review*, *14*(3), 423-444. doi:10.5465/amr.1989.4279078

Willcoxson, L., & Millett, B. (2000). The management of organisational culture. *Australian Journal of Management & Organisational Behaviour*, *3*(2), 91-99. Retrieved from https://eprints.usq.edu.au/14037/1/Willcoxson_Millett_AJMOB_v3n2_PV.pdf

Zaiontz, C. (2016). Dealing with Missing Data | Real Statistics Using Excel. Retrieved from http://www.real-statistics.com/descriptive-statistics/missing-data/

Zhang, M., Chen, H., & Luo, A. (2018). A Systematic Review of Business-IT Alignment Research with Enterprise Architecture. *IEEE Access*, *6*, 18933-18944. doi:10.1109/access.2018.2819185

Zhang, M., Honghui, C., Yi, M., & Aimin, L. (2020). An approach to measuring business-IT alignment maturity via DoDAF2.0. *Journal of Systems Engineering and Electronics*, *31*(1), 95-108. doi:10.21629/jsee.2020.01.11

Appendix

Appendix A- Alignment Maturity Survey introduction letter and survey

Letter of consent to participate in Academic Research
Alignment Maturity Survey

Dear colleague

I am currently completing my final year of a two-year master's in Information Systems program at the University of Cape Town (UCT). My research topic is titled *Improving alignment between Business and IT departments: towards an effective Enterprise Architecture and its role within the corporate organization.*

Based on your role and position within the company, you have been selected to participate in the **Alignment Maturity Survey.**

This survey is strongly based on the Luftman Alignment maturity assessment tool. The survey is intended to measure the degree of alignment or misalignment between the corporate and IT departments, i.e., determines how well the "technical and business organizations work together" (Luftman, 2003). The primary objective of the assessment is to identify specific recommendations for improving the alignment of IT and the Business.

This tool was selected for research purposes because it is holistic in that is measures alignment from six different dimensions/categories: Communications, Competency/value, Governance, Partnership, Technology, and Skills.

Each of the six criteria above has a set of attributes which allows a particular dimension to be rated on a maturity scale of 1-5. At the end of the assessment, it will be proven which level best describes the position of alignment at this organization.

Please note that your name will remain anonymous and will not be shared or published. Only the researcher and her supervisor will have access to the name of the participant. Names and job titles are required in order for participants to be contacted to participate in the in the interview phase. Not all survey respondents will be requested to participate in an interview.

Participation in this survey does not require personal contact with the researcher. An email link to the online survey will be sent to participants to request login to SurveyMonkey. It should not take longer than 15-20 minutes to complete.

<u>Please tick the boxes that apply</u>:

- I hereby consent to participate in this survey | Y | | N |
- I hereby consent to participate in the interview phase if required | Y | | N |

N.B: This research has been approved by the Commerce Faculty Ethics in Research Committee. If you select to be in this study, you may withdraw at any time. Should you have any questions regarding the research please feel free to contact the researcher on Latiefa.levy@engenoil.com

Name: _____

Position held in company: _____

Number of years of employment: _____

Signature: _____

Date: _____

Comm1 - How well does the Business Management understand the IT environment, i.e., capabilities, systems, services, processes?

1	Business Managers do not understand IT
2	Business Managers have a limited understanding of IT
3	Business Managers have a good understanding of IT
4	Business Managers understand the IT environment, and encourage and promote their staff to understand IT
5	Business Managers and staff have a comprehensive understanding of IT and its use across the business
6	I don't know

Comm2 - How well does IT Management (CIO, IS and IT Managers) understand the Business environment, i.e., processes, customers, competitors?

1	IT Management don't understand the business
2	IT Management have a limited understanding of the business
3	IT Management have a good understanding of the business
4	IT Management understand the business environment well, and encourage and promote all IT staff to obtain a good understanding of the business
5	IT Management and their IT Staff have a comprehensive understanding of the business environment
6	I don't know

Comm3 - What is the extent of information and knowledge sharing between the Business and IT

1	Knowledge sharing is Ad-hoc and broad
2	Knowledge sharing is semi structured, informal
3	Knowledge sharing is structured around key processes
4	There is formal knowledge sharing at all levels across the organisation
5	There is formal knowledge sharing which is extended to external partners (e.g., customers and suppliers)
6	I don't know

Comm4 - Which statement best describes the nature of the liaison, including transfer of knowledge between Business and IT?

1	Generally, IT and the Business don't liase with each other
2	Liaisons are not used to facilitate business relationship development
3	Liaisons occasionally facilitate business relationship development
4	Liaison's primary objective is to facilitate business relationship development
5	Liaisons facilitate business relationship development including with external partners (e.g., customers and suppliers)
6	I don't know

Comm5 - How often do Business-IT Steering Committee(s) meet?

1	We don't have formal/regular steering committees
2	We have committees which meet informally on an ad-hoc basis as required

3	We have formal committees which meet regularly (at least once a quarter) and have emerging effectiveness
4	We have formal, regular committee meetings with demonstrated effectiveness
5	We have formal, regular committee meetings with demonstrated effectiveness that include strategic business partners sharing decision making responsibilities
6	N/A - I don't know

Cul1 - The most common rationale for IT Investment/spending is to:

1	Reduce costs
2	Increase productivity and efficiency as the focus
3	Simplify business processes
4	Enable Business to achieve its strategy
5	Derive Business value from competitive advantage and profit
6	N/A - I don't know

Cul2 - How are project prioritization decisions made by Business and IT?

1	Reactive, operational, and informal based on whoever 'shouts the loudest'
2	Reactive, operational but formalised using a prioritization committee setup by IT with Business line representation
3	Reactive tactical prioritization process owned by Business line management; IT is consulted
4	Proactive formalised tactical prioritization involving both IT and Business line management
5	Proactive formalised strategically aligned prioritization involving both IT and senior Business management
6	N/A - Don't Know

Cul3 - What is the relationship/trust style between Business and IT like

1	There is a sense of conflict and mistrust
2	Primarily transactional, distanced/arm's length relationship
3	Trust and confidence are developing
4	Considered a valued service provider
5	Considered a valued partner, trusted services provider
6	N/A - I don't know

Cul4- What is the organisations attitude towards change

1	Resistant to change
2	Demotivated but accepting of change
3	Recognized need for change
4	Recognize and support need for change
5	Highly motivated, focused, ready to adapt
6	N/A - Don't Know

Cul5 - What is the Business perception of IT value

1	IT is perceived as a 'black hole' and merely a cost of doing business

2	IT is a basic Business process enabler
3	IT is seen as an asset; we can't operate without it
4	IT is a key enabler to achieve the business strategy
5	IT enables Business to adapt and change, responsively and effectively
6	N/A - I don't know

Struct 1 - Which statement best describes the Reporting/Organisation structure

1	CIO reports to CFO
2	CIO reports to COO
3	CIO reports to COO or CEO
4	CIO reports to CEO
5	N/A or I don't know

Struct 2- Do projects or programmes have a Business Sponsor/champion

1	don't usually have a sponsor
2	Often have a senior IT sponsor
3	Often have an IT and Business sponsor at the departmental level
4	Often have an IT and Business sponsor at corporate level
5	Often have Managing Director as the business sponsor (At the CEO level)
6	N/A - Don't know

Strat1 - How involved is IT during Business Strategic Planning

1	No involvement from IT
2	CIO references the business strategies and plans and develops IT strategies in isolation that do not require approval by Management Committee
3	CIO references the business strategies and plans when developing IT strategies and presents the IT plans to the Management Committee as part of the annual budgeting cycle
4	CIO is consulted by the Management Committee (MC) during business planning regarding technology impacts and investment required to enable strategic initiatives
5	CIO is a key role player in strategic business planning with all divisional heads and the board
6	N/A - don't know

Strat2 - How involved is the Business during IT Strategic Planning

1	No involvement from the Business
2	The Business references IT Strategies on an ad-hoc basis for specific projects and initiatives
3	The Management Committee reviews IT strategies developed by IT during the annual budgeting cycle
4	The Management Committee is consulted during the process of developing the IT strategy
5	The Management Committee includes IT as a key component of strategic business planning
6	N/A-Don't know

Strat3 Please indicate your use of architecture tools/artefacts	
1	It is used as a document repository to produce documentation and presentations
2	It is used to support the IT technology and help manage the current state systems
3	It is used to model the business and document the business processes
4	It is used for scenario planning to show the IT impact when decisions are made
5	It is also used by senior management in strategic business planning, incorporating not only IT but also business processes and capabilities
6	N/A-Don't know
BIA 1 - Are there formal post-project implementation assessments/reviews and benefits tracking following the delivery of an IT investment or project	
1	No assessments/reviews or benefits tracking done post implementation
2	Assessments/reviews are completed if there are issues with outcomes/results, benefits tracking not formally done
3	Assessments/reviews are formally completed, and benefits are tracked on high value projects/investments only
4	Assessments/reviews are formally completed, and benefits are tracked on most projects/investments
5	Assessments/reviews are completed, and benefits tracking takes place and informs performance measurement
6	I don't know
BIA 2 - Are formal business relationship management processes in place to improve Business-IT alignment?	
1	We don't manage our relationships
2	Informal, but not always followed by IT or/and the business
3	Informal, but effectiveness of process is not measured
4	Formal, and both IT and the business comply with them
5	Formal, measured, IT and the business comply with them, and we are continuously improving them
6	N/A - don't know
EA1	**Which statement/s best describes the activities associated with Enterprise Architecture**
	Develops a conceptual blueprint showing how business capabilities and technology capabilities are tied together with organisational capabilities to drive an on-going strategy or desired outcome
	Defines and describes an architecture of a system delivered in context of a specific solution and as such it may encompass description of an entire system or only its specific parts
	Provides hands on technical leadership for development teams, ensures best practice standards are applied, focuses on specific technologies
	Develops a representation of the business that provides a common model of the organization, its processes, key functions, and structures that support its strategic objectives
	N/A- Don't know
EA2	**Please indicate whether each of the following Architecture related deliverables has been created, delivered, approved and/or being used within the organization**

	Not created	Partially created	Created and delivered	Created, delivered, and approved	Created, delivered, approved, and being used	N/A- Don't know
Enterprise Capability Model						
Architectural Principles						
Architectural Standards						
Architectural Roadmaps						
Business Outcomes						
EA3	**Please select all statements related to Enterprise Architecture which you agree with**					
	EA has a positive impact on reducing IT service provision costs					
	EA has a positive impact on enabling organizational change					
	EA has a positive impact on the overall investment of the organization					
	EA has a positive impact on reducing project work effort					
	EA has a positive impact on optimizing business processes					
	EA has a positive impact on improving information quality and accessibility					
	EA enables innovation					
	EA has a positive impact on business strategy					
	EA enables reuse of assets					
	EA is the responsibility of the IT department					

Appendix B - EA Maturity Assessment consent form and questionnaire

Letter of consent to participate in Academic Research

Dear colleague

I am currently completing my final year of a two-year master's in Information Systems program at the University of Cape Town (UCT). My research topic is titled *Improving alignment between Business and IT departments: towards an effective Enterprise Architecture and its role within the corporate organization.*

Based on your role within the company, you have been selected to participate in the Gartner IT Score for Enterprise Architecture (EA) assessment.

The IT Score for Enterprise Architecture developed by Gartner assesses enterprise architecture maturity at five levels based on eight major dimensions of an EA program. This questionnaire aims to determine the level of EA that Company A is currently operating at.

Please note that your answers will remain anonymous and will not be shared or published.

What degree of involvement does each of the following stakeholders have in the EA program for your enterprise?	Not aware and not involved	Aware, not involved	Supports but not directly involved	Actively supports and participates	
Senior corporate management					
Business unit management					
Infrastructure managers					
Project/Program managers					
Application developers					
Operations management					
CIO / Director of IT					
To what degree does each of the following EA-related communication activities occur at Company A?	**Never**	**Rarely**	**Sometimes**	**Often**	**Always**
EA communication activities are formally planned rather than ad-hoc					
EA stakeholders have been specifically identified for communication activities					
EA communications are tailored to specific stakeholder needs					

Please indicate which best characterizes your use of tools by enterprise architecture within your enterprise?	Never	Sometimes	Always		
It is used as a document repository to produce documentation and presentations					
It is used to support the IT technology and help manage the current state systems					
It is used to model the business and document the business processes					
It is used for scenario planning to show the IT impact when decisions are made					
It is also used by senior management in strategic business planning, incorporating not only IT but also business processes and capabilities					
Please indicate whether each of the following statements relating to EA development is true for your enterprise.	**Yes**	**No**			
The value of the EA activity is clearly expressed in business language terms					
The EA development refresh process is linked to the budget cycle of the organization					
At least one cycle of the EA development process has been completed					
The EA development process is reviewed and improved periodically as required					
The EA discipline is actively used within the IT organization					
The EA discipline is actively used within the business					
Please indicate whether each of the following EA-related deliverables has been created, delivered, approved and/or being used in your enterprise.	**Not created**	**Partially created**	**Created and delivered**	**Created, delivered, and approved**	**Created, delivered, approved, and being used**
Enterprise Context					
Business Outcomes					
Enterprise Capability Model					
Architectural Development Plan					
Architectural Principles					
Architectural Standards					

Architectural Roadmaps					
What proportion of the stakeholders in your enterprise believe each of the following statements related to Enterprise Architecture?	**None**	**Few**	**Some**	**Most**	**All**
EA has a positive impact on reducing IT service provision costs					
EA has a positive impact on enabling organizational change					
EA has a positive impact on the overall investment of the organization					
EA has a positive impact on reducing project work effort					
EA has a positive impact on optimizing business processes					
EA has a positive impact on improving information quality and accessibility					
EA enables innovation					
EA has a positive impact on business strategy					
EA enables reuse of assets					
Please indicate the perception of the value of the EA discipline and deliverables for each of the following entities in your enterprise	**Unknown**	**No value**	**Limited value**	**Valuable**	**Very valuable**
Senior corporate management					
Business unit management					
Infrastructure managers					
Project/Program managers					
Application developers					
Operations management					
CIO / Director of IT					
IT organization as a whole					
Business as a whole					
To what extent do you agree with each of the following statements relating to EA digital strategy and innovation in your enterprise?	**Not at all**	**Minimally**	**Partially**	**Mostly**	**Completely**

My organization has a clear and well-developed digital business strategy					
The EA team is involved in developing digital innovation					
The EA team uses the architecture to identify opportunities for digital innovation					
The EA team is seen as an expert in digital technologies and how they can innovate the business model					
The EA team uses a rapid prototyping approach to developing digital innovation					
The EA team has the right skills to participate in, and lead digital innovation					
The EA team has the confidence and support of business executives to help drive digital innovation					

Appendix C- Ethics forms

UNIVERSITY OF CAPE TOWN
FACULTY OF COMMERCE
Igniting Knowledge and Opportunity

Ethics Approval Request for the Study entitled:

Improving alignment between Business and IT departments: towards an effective Enterprise Architecture and its role within the corporate organization.

Signed by:

	Full name and signature	Date
Principal Researcher/Student:	Latiefa Kariem	24/03/17

This application is approved by:

Supervisor	Kyobe m	30/3/17
Co- Supervisor		

Com Ethics_V4

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29th June 2021

Latiefa Kariem

Department of Information
Systems

University of Cape Town

Dear Latiefa Kariem

REF: REC 2017/03/30

IMPROVING ALIGNMENT BETWEEN BUSINESS AND IT DEPARTMENTS: TOWARDS AN EFFECTIVE ENTERPRISE ARCHITECTURE AND ITS ROLE WITHIN THE CORPORATE ORGANIZATION

We are pleased to inform you that your ethics application has been approved. Unless otherwise specified this ethical clearance is valid until 31 December 2021 and may be renewed upon application.

Please be aware that you need to notify the Ethics Committee immediately should any aspect of your study regarding the engagement with participants as approved in this application, change. This may include aspects such as changes to the research design, questionnaires, or choice of participants.

The ongoing ethical conduct throughout the duration of the study remains the responsibility of the principal investigator.

We wish you well for your research.