A MATURITY GRID-BASED METHOD FOR ASSESSING COMMUNICATION IN BUSINESS–IT ALIGNMENT

by

JACQUES JACOBUS COERTZE

2016

A MATURITY GRID-BASED METHOD FOR ASSESSING COMMUNICATION IN BUSINESS–IT ALIGNMENT

by

JACQUES JACOBUS COERTZE

THESIS

submitted in fulfilment
of the requirements
for the degree

DOCTOR OF PHILOSOPHY

in

INFORMATION TECHNOLOGY

in the

FACULTY OF ENGINEERING, THE BUILT ENVIRONMENT AND INFORMATION TECHNOLOGY

of the

NELSON MANDELA METROPOLITAN UNIVERSITY

Promoter: Prof. Rossouw von Solms

February, 2016

DECLARATION

I, Jacques Jacobus Coertze, by this declare that:

- this work is my own

- all sources used or referred to have been documented and recognised

- this thesis has not previously been submitted for a qualification at another university.

JJCoertze

———————————————

Jacques Jacobus Coertze

ABSTRACT

This thesis reports on the research undertaken to develop a method for organisations to assess human communication between their business and IT personnel as part of business–IT alignment. The research described in this thesis involves (i) a literature review in business–IT alignment and related fields, such as management studies and communication science; (ii) a Delphi study conducted among industry members, practitioners, and academics operating in the IT advisory, auditing and communication disciplines; and (iii) a case study of a public sector organisation in South Africa.

By adopting a system-theoretic perspective on communication, this thesis proposes that communication in business–IT alignment can be seen as coordinating behaviour and a series of learning and reflection events, consequently culminating in increased mutual understanding. Various conceptualisations of communication are explored and, together with several industry elicited factors that influence communication in business–IT alignment, are incorporated into a conceptual model informing the assessment method.

This research developed, applied, and tested a method whereby organisations can assess the quality of the human communication between their business and IT personnel as part of the business–IT alignment endeavour. The aim of this method is to trigger reflection on communication by considering communication philosophy and practices in business–IT alignment. The method, termed the 'Business-IT Communication Alignment Maturity Improvement Communication Alignment Maturity Improvement (CAMI) method', is based on a maturity grid-based approach, which stems originally from process improvement in software development and quality management.

This thesis is most closely aligned with the research performed by Maier, Eckert, and Clarkson (2004, 2006), who successfully applied the maturity grid-based approach to investigate, audit and assess communication within the engineering design process. The question addressed in this thesis is whether this approach can be successfully extrapolated to the business–IT alignment context and whether it would yield similar benefits. Furthermore, the issue of whether it would offer a practical method for use in organisations is also addressed.

Having applied the CAMI method at a public sector organisation, this thesis proposes that the maturity grid-based approach can indeed be extrapolated to

the business–IT alignment context, consequently offering a viable and practical method for assessing communication in organisations. In particular, the CAMI method allows organisations to capture both their current and their desired communication situations and to expose discrepancies between the perceptions held by their business and IT personnel. These results form a basis for action planning, strategizing, and, ultimately, interventions for improvement.

In conclusion, the thesis discusses further application and extension possibilities for the assessment method.

KEYWORDS

I dedicate this thesis to my father,

JEREMIA (JERRIE) COERTZE

to my mother,

ANTOINETTE COERTZE

and my loving grandparents,

CHRIS AND SUSAN BAKKES; KOBIE AND ANNA COERTZE

ACKNOWLEDGEMENTS

My sincerest gratitude goes to the following people and institutions:

CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACRONYMS

CMMs Capability Maturity Models

CAMI Communication Alignment Maturity Improvement

CEO Chief Executive Officer

CIO Chief Information Officer

DSRP Design Science Research Process

ERP Enterprise Resource Planning

GST General System's Theory

IT Information Technology

IS Information System

NRF National Research Foundation

NMMU Nelson Mandela Metropolitan University

MIS Management Information System(s)

QMMG Quality Management Maturity Grid

SAM Strategic Alignment Maturity

SANReN South African National Research Network

Part I

INTRODUCTION

INTRODUCTION

"Without open communication and mutually respected contributions to the development of IT and business strategies, full alignment will not happen and value will not be delivered."

— *IT Alignment: Who's In Change* (IT Governance Institute, 2005)

1.1 BACKGROUND INFORMATION

The role that information technology (IT) plays in business continues to be important in the changing business environment of today. Its proper use is therefore essential. This section highlights how significant the dependence on and investment in IT has become in the modern business (§ 1.1.1). It argues, however, that businesses can only obtain true business value from investment in IT if the IT is aligned with the business's goals, objectives, and practices. It also introduces the concept of business–IT alignment and the necessity for it in the modern organisation (§ 1.1.2). Further, it elaborates on how this concept should be properly addressed and continues by identifying communication as a central issue, as well as the challenges businesses experience in addressing it (§ 1.1.3). The section ends by highlighting some academic deficiencies, as identified in the current literature, and suggests that a significant real-world business problem exists (§ 1.1.4).

1.1.1 *Information and IT in the Modern Business*

Information and its use permeate all aspects of modern business (O'Brien & Robertson, 2009; R. Von Solms & Von Solms, 2006), making information a prerequisite if businesses are to survive and prosper. For example, information is critical for the supply chains, payments and various other activities that businesses have to perform nowadays (ISACA, 2012b, p. 13).

This has led to the realisation that information and its use is pervasive and critical in our modern business environments (Institute of Directors in Southern Africa, 2009b, p. 16), with information commonly being found in many forms

(S. Von Solms & Von Solms, 2008, p. 212). This realisation continues to drive information as one of the most valuable assets of modern business (R. Von Solms & Von Solms, 2006). It should therefore come as no surprise that businesses invest much time, money, and energy in capturing, producing, and sharing this information.

The computerised tools that allow for this capturing, producing and sharing of information, which are known as information systems, now make up most of the investments made by businesses (Ernst & Young, 2009). Whitman and Mattord (2012, p. 16) define an information system (IS) as an "organised combination of people, hardware, software, communication networks, processes, and data resources that collects, transforms and disseminates valuable information in a business". The IT of a business typically refers to these systems and the backbone on which they run (Dewett & Jones, 2001).

The upsurge in IT has had a great influence on modern business because today businesses capture, process, store and send almost all information digitally (Gallagher, 2010). Consequently, IT affects modern business in its entirety, from executive management down to the lowest levels (O'Brien & Robertson, 2009). IT thus plays a significant role throughout the information life cycle (ISACA, 2012b). For this reason, IT in a business has to be accessible, because if not information would be impossible to obtain.

Therefore, organisations today depend on and invest more in IT than ever before. Indeed, IT can account for as much as one-third of a business's capital spending (Nolan & McFarlan, 2005). However, merely spending money and acquiring IT is not enough to ensure a return on investment. As Feld and Stoddard (2004) explain: "Just because a builder can get a handsome set of hammers, nails, and planks; does not mean he can erect a quality house at reasonable cost." Instead, what matters is the way in which he uses those tools and material. Similarly, to achieve any reasonable return on investment from IT, businesses have to be concerned not just with the acquisition of IT but also with how they will use it and manage it to coincide with the business's objectives and goals. This is referred to as business–IT alignment (IT Governance Institute, 2005) and has become and continues to be a central concern of the IT management discipline (Chan & Reich, 2007).

1.1.2 *Business–IT Alignment*

Alignment has a long history in the Management Information System(s) (MIS) discipline. McKeen and Smith (2003) first raised the notion of business–IT alignment in the late 1970s. However, it was with Henderson and Venkatraman's (1993) introduction of their Strategic Alignment Model (SAM) that true interest in this domain started. Since then, a proliferation of studies and models has appeared in the academic and practitioner communities (for an overview, see Chan & Reich, 2007). Consequently, many differing conceptualisations of alignment have come to exist (Avison, Jones, Powell, & Wilson, 2004).

As its basic principle, Sauer and Yetton (1997) argue that alignment concerns the fact that organisations should manage IT in a way that mirrors their business management. Reich and Benbasat (1996) define alignment as the degree to which the IT strategy shares and supports the mission, objectives and plans contained in the business strategy. Meanwhile, Henderson and Venkatraman (1993) state that alignment is the degree of fit and integration among the business strategy, IT strategy, business infrastructure and IT infrastructure. McKeen and Smith (2003), however, argue that alignment exists when an organisation's goals and activities, and the information systems that support them, remain in harmony. Luftman (2000) supports this sentiment, promoting the idea that good alignment involves the application of appropriate IT by the organisation in given situations, and that these applications stay congruent with the business strategy, goals, and needs.

Whatever the definition, they all share a common theme; that is, that organisations can attain proper alignment if they ensure on-going integration or congruence between their business and the IT personnel (Avison et al., 2004). Abraham (2006) explains this using a rowing analogy: alignment occurs when everyone is rowing in the same direction[1]. Thus, in essence, alignment deals with the harmony that should continue to exist between business and IT in an organisation (McKeen & Smith, 2003). However, the alignment issue addresses not only how organisations should align their IT with the business, but also how they should align their business to coincide with IT (Luftman & Brier, 1999). Alignment therefore exhibits a binate nature that includes a variety of different aspects.

---

[1] This thesis considers alignment to be a continuous process rather than a state that needs to be achieved. Thus, the concept refers both to the striving for alignment, and the re-alignment of business and IT when necessary. In view hereof, this thesis does not view alignment as a mere state that needs to be achieved; but rather a continued effort in achieving and maintaining harmony among business and IT personnel.

Business–IT alignment involves not only having to address the plans or strategies of both business and IT but a variety of other factors as well (Luftman, 2003). These factors may include, among others, communication, competency, governance, partnership, technology and skills. Such factors are commonly seen to originate from two different, yet supportive, dimensions (Schlosser, Wagner, & Coltman, 2012). Reich and Benbasat (2000), combining the Horovitz duality with the notion of alignment, consider alignment to consist primarily of an intellectual and social dimension. That is, according to them, alignment concerns both (i) "having a set of high-quality inter-related IT and business plans" and (ii) "ensuring that business and IT personnel within an organisational unit understand and are committed to these plans." Hence, the intellectual dimension depends primarily on planning and strategising, whereas the social dimension involves communication and mutual understanding (Reich & Benbasat, 2000; Luftman & Kempaiah, 2007).

Both the academic and the practitioner communities (Luftman, 2000; Reich & Benbasat, 2000; B. Campbell, Kay, & Avison, 2005) highlight the fact that the intellectual and social dimensions are important for achieving alignment. However, while plans and strategies can easily be adapted and changed, achieving adequate communication and mutual understanding may prove more difficult since they are contingent on many of the social characteristics of an organisation (Coughlan, Lycett, & Macredie, 2005). These include, for example, the visibility of IT personnel, the history of business–IT relationships, the attitude of business staff towards IT, the shared domain knowledge, and leadership (B. Campbell et al., 2005).

Unfortunately, although researchers have given continued attention to the intellectual dimension, the social dimension has often been neglected (Reich & Benbasat, 1996, 2000; Coughlan et al., 2005). Nevertheless, the creation and maintenance of a social environment within an organisation that is conducive to alignment may be the most critical (Peppard & Ward, 1999; Taylor-Cummings, 1998).

1.1.3 *The Social Dimension and Communication*

Research into the social dimension "focus[es] on the people involved in the creation of alignment" (Reich & Benbasat, 1996). As such, a large portion of it deals with how people should or could collaborate and what role communication plays. This is especially evident in Martin, Gregor, and Hart (2005), when they define the social dimension as the "management support for IT, the processes

used in business planning for IT and the communication of plans between staff". Within this context, communication refers to "the exchange of ideas, knowledge, and information about plans between business and IT units" (Luftman, 2003).

Reich and Benbasat (2000), while exploring the factors that influence the social dimension of alignment, found strong support for communication. In fact, it came to be a central part of their research model. They posited that the communication between business and IT personnel, especially at the executive level, could positively affect the level of mutual understanding and alignment within an organisation. Moreover, they were not the only authors to report this.

Rockart, Earl, and Ross (1996) established that communication could greatly enhance alignment, since it ensured that business and IT potential were integrated effectively. In addition, Peppard and Ward (1999) discovered that organisations with business and IT units that saw themselves as part of an equal partnership based on a strong foundation of communication were highly aligned. Meanwhile, Raggad (1997) found that in order to enhance alignment, IT and business line managers needed to communicate and understand each other. Luftman and Brier (1999), while surveying over 500 executives from Fortune 100 US-based organisations, also found this to be true; the executives reported that clear communication was an absolute necessity for alignment to succeed. Consequently, they considered communication to be one of the top enablers of alignment. This later contributed to communication forming part of Luftman's (2000, 2003) alignment assessment model.

On this basis, one can certainly assume that communication is central in achieving alignment from a social perspective. However, if it fails or breaks down, it can also have an adversely negative effect. For example, Calhoun and Lederer (1990) found that a lack of communication of top management's objectives could account for the business function's dissatisfaction with strategic IT planning. Furthermore, Coughlan et al. (2005), when investigating the relationship between the retail business and IT in a major UK high street bank, found that key contributing problems appeared to revolve around the failure to adequately communicate. In particular, because of communication difficulties, business and IT personnel in the bank experienced a segregation culture where each held a "them and us" attitude. In addition, personnel and management lacked clarity and understanding of each other's roles and felt that information exchange between them was non-optimal. The conclusion, thus, was that communication could present a huge challenge to organisations in attempting to attain adequate alignment.

Given the discussion above, it would seem fruitful for organisations to explore the social relationship between their business and IT personnel as part of the alignment process (Coughlan et al., 2005), especially in view of the fact that it can either enhance alignment or cause major challenges and even hinder it. That said, organisations would also need to identify, analyse and assess the status and nature of communication in this relationship (Luftman, 2003), as these touch on many other organisational aspects that have an impact on IT and its alignment with the business, such as culture (Curry & Moore, 2003).

Unfortunately, few studies have looked explicitly at communication within the business–IT alignment context (Coughlan et al., 2005). Even fewer have specifically shared methods or approaches whereby organisations can analyse or assess it. This is alarming, since without such methods or approaches organisations are likely to continue experiencing communication problems when attempting to achieve proper alignment and may have no way of identifying, analysing, assessing or even remedying them.

1.1.4 *Previous Studies Investigating and Assessing Communication within Business–IT Alignment*

As discussed in the previous section, business–IT alignment – from a social perspective – is contingent on adequate communication between business and IT personnel. Thus, it would seem fruitful for organisations to analyse or assess communication within this context. Unfortunately, few studies in this discipline have to date explicitly shared methods or approaches whereby organisations can do so.

The Strategic Alignment Maturity (SAM) model (Luftman, 2000, 2003) is a popular approach whereby organisations can assess overall business–IT alignment maturity. While not dedicated to communication alone, it does feature communication as one of six criteria that may influence business–IT alignment maturity (see Figure 1.1).

On closer investigation, one finds that this model proposes that organisations assess communication based on six factors. These include an understanding of business by IT, an understanding of IT by business, inter/intra-organisational learning or education, protocol rigidity, knowledge sharing and liaison(s) effectiveness. Taken together, Luftman (2000, 2003) considers these to be indicative of the maturity of communication practices and maturity within the alignment process.

COMMUNICATIONS	**COMPETENCY / VALUE MEASUREMENTS**	**GOVERNANCE**
* Understanding of Business by IT	* IT Metrics	* Business Strategic Planning
* Understanding of IT by Business	* Business Metrics	* IT Strategic Planning
* Inter/Intra-Organizational Learning	* Balanced Metrics	* Reporting / Organization Structure
* Protocol Rigidity	* Service Level Agreements	* Budgetary Control
* Knowledge Sharing	* Benchmarking	* IT Investment Management
* Liaison(s) Effectiveness	* Formal Assessments	* Steering Committee(s)
	* Continuous Improvement	* Prioritization Process

BUSINESS-IT ALIGNMENT MATURITY

PARTNERSHIP	**SCOPE & ARCHITECTURE**	**SKILLS**
* Business Perception of IT Value	* Traditional Enabler/Driver, External	* Innovation, Enterpreneurship
* Role of IT in Strategic Business Planning	* Standards Articulation	* Cultural Locus of Power
* Shared Goals, Risk, Rewards/Penalties	* Architectural Integration	* Management Style
* IT Program Management	* Functional Organization	* Change Readiness
* Relationship / Trust Style	* Enterprise	* Career Crossover
* Business Sponsor / Champion	* Inter-Enterprise	* Education, Cross-Training
	* Architectural Transparency, Agility, Flexibility	* Social Environment
		* Hiring and Retaining

Figure 1.1. Strategic Alignment Maturity Model (Luftman, 2000, 2003)

Unfortunately, Sledgianowski, Luftman, and Reilly (2004, 2006), while validating the SAM model in later years, found that the factors listed above did not fully address all the variation they observed in organisational data for this criterion. Hence, they concluded that other factors might also influence it. They subsequently called for researchers to carry out work to examine the communication criterion further; in particular, for researchers to improve its properties and ensure that it adequately measured the relevant construct. The current study aims to address this, at least partially.

Another study investigated communication extensively in the business–IT alignment context (Coughlan et al., 2005). In contrast to a purely analytical perspective, it attempted to provide a more practical and structured way of categorising communication issues in organisations by means of a framework using thematic content analysis.

In their framework (see Figure 1.2), Coughlan et al. (2005) drew mainly on the classic model of communication, as made popular by Shannon and Weaver

([1964](#)). To this extent, they considered communication to include an information source, a transmitter, a channel, a receiver, and a destination. This classic model they in turn expanded to include four broad dimensions including participation and selection, interaction, communication activities, and techniques.
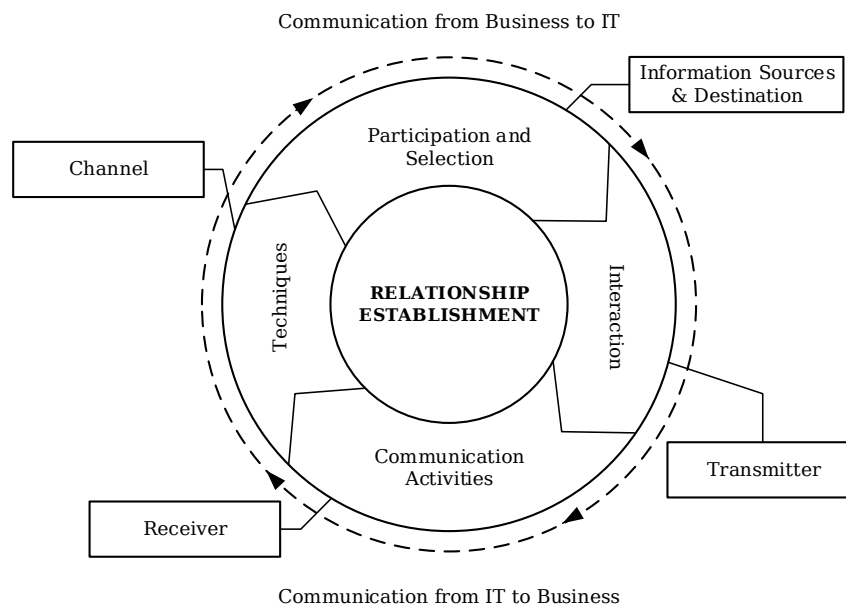
Figure 1.2. PICTURE Framework (Coughlan, Lycett, & Macredie, 2005)

Despite the development of their framework, Coughlan et al. (2005) stressed that it could not be used by others as a precise measurement tool for providing prescriptive advice. Instead, researchers or practitioners could use it as a guide to explore and identify a number of themes related to communication and its difficulties within the business–IT relationship. In addition, it could not be used as a pure assessment tool but rather acted as a road map for indicating where key problem areas may lie when building new assessment tools or improving existing ones that feature communication as an important component. The former, that is, building a new assessment tool, then coincides with the intent of this study.

As has been discussed, few studies have explicitly shared methods or approaches whereby organisations can analyse or assess communication. Two exceptions include the studies of Luftman (2000, 2003) and Coughlan et al. (2005). While both have been successful in meeting their own specific objectives, they have failed to address the assessment of communication fully within the business–IT alignment context. Consequently, it would seem necessary for a study to explore this concern. This then is the intention of this study, as it aims to develop such an assessment method.

As is clear from the arguments above, current works do not offer organisations either useful approaches or methods whereby they can assess the communication practices between their business and the IT personnel explicitly. This may pose significant difficulties for organisations, especially since achieving adequate communication and mutual understanding can be troublesome – even in everyday life.

Organisations are increasingly being expected to align IT investments with their business goals, objectives, and practices effectively. This includes having their business and IT personnel communicate, understand, and commit to such investments. However, academic literature is reluctant in providing organisations with enough methods, help, and tools to address this responsibility – at least from a social perspective. Thus, how can we expect organisations to align IT effectively or, in particular, achieve adequate communication between their business and IT personnel, if they lack the proper experience, approaches, and methods to do so?

1.2   PROBLEM STATEMENT

The above debate has identified a business problem concerning the way modern-day organisations have to ensure adequate communication between their business and IT personnel in attaining sound business–IT alignment. The aim of this section is to provide a clear statement about the problem this study addresses.

Accordingly, the problem that is identified relates to the current lack of approaches, methods and tools for enabling organisations to capture, assess and ultimately improve the communication practices between their business and IT personnel, as part of business–IT alignment. Without such aids, organisations are likely to continue to experience communication difficulties and may have no way of identifying, analysing, or remedying communication-related problems.

The problem statement can thus be stated as follows:

> *Communication between business staff and IT personnel is vital in achieving business–IT alignment; however, the lack of approaches, methods and tools for explicitly capturing, assessing, and ultimately improving it remains a burden for organisations.*

This section has specified the problem statement that this study addresses and tries to resolve. Given the vast scope of business–IT alignment, communication and its assessment, it now becomes necessary to describe the exact issue that this study explores.

1.3 DELINEATION

This study focuses on human communication between business and IT personnel across the internal reporting lines in an organisation, forming part of the social dimension of business–IT alignment. Thus, it examines communication issues relevant to business–IT alignment and proposes how to identify, assess, and possibly deal with them effectively.

Note that within this scope, external consultancy teams are excluded whom may upon request interface with an organisation's business and/or IT personnel[2]. Hence, communication between business consultants and internal business staff, and IT consultants and internal IT staff will neither be considered nor addressed. In similar vain, this study will also neither consider nor address machine-to-machine or human-to-machine communication. Instead, communication for the purpose of this research will be regarded as "the social and cognitive processes whereby ideas, knowledge, and, information is mutually exchanged between internal business and IT personnel". Consequently, the mechanistic, engineering, and mathematical processes of communication (i.e., data across a fibre optic cable) fall outside the scope of study.

Business–IT alignment concerns a wide expanse of concepts, factors, and issues that an organisation needs to address. Communication is but one of these issues (refer to § 1.1.3). While this study acknowledges, supported by Luftman (2003), that other factors and issues are also important to business–IT alignment, it neither considers nor addresses them. Thus, organisations can use the contribution made by this study to assess and improve the current communication situation(s) between their business and IT personnel. However, they are still required to address other issues and factors using other aids and tools.

The ultimate outcome of most assessments is the identification of problems and the instigation of interventions to remedy them (D. Jones, 2002). While this study's contribution does help organisations with respect to the former, it does not explicitly deal with the latter. Hence, it helps organisations to identify and assess communication issues and difficulties between their internal business and IT personnel. It does not explicitly recommend interventions to remedy them. Instead, organisations need to strategise and plan such interventions themselves on the basis of other literature and studies, for example the IT governance literature (Van Grembergen & De Haes, 2009). That said, it does detail the types

---

2 Although outside the scope of this thesis, external consultancy could be researched and introduced to the maturity grid-based assessment by future research (see § 8.6 for further discussion).

of intervention that might be required, thereby offering organisations at least a starting point for their discussions.

An assessment can be performed using a plethora of different methods and approaches (Hargie & Tourish, 2009). In addition, it may be performed in-house or by an external consultant. Moreover, it may take a few days to complete or even years. The current study aims to develop an assessment method that could be used in-house by an organisation, and that takes reasonably little effort, skill and time. Therefore, although better approaches or methods might exist, those selected by this study have been chosen for their viability in adhering to these requirements.

This section has described the scope and focus of this study. The research objectives that address the problem statement, according to this given delineation, follow in the next section.

1.4 RESEARCH OBJECTIVES

The primary objective of this study is:

> *To develop an assessment method to empower organisations in (self-) assessing and improving the communication practices between their business staff and IT personnel, as part of business–IT alignment.*

This method rests on a foundation provided by relevant works in the business–IT alignment, communication and assessment literature, as well as other areas of importance. Its understanding and use is supported by clear guidelines and software tools.

Secondary objectives include the following:

- *to determine the relationship between business–IT alignment and communication, and its implications for research and practice*

- *to explore modern theories, existing strategies and approaches whereby organisations could assess communication in business–IT alignment, and*

- *to articulate a method by which organisations can (self-) assess and elicit areas for improving their communication practices between their business and IT personnel.*

As previously stated, this study addresses a real-world business problem; namely, that organisations are struggling to achieve adequate human communication between their business and IT personnel. Therefore, they find it difficult

to attain proper business–IT alignment. This study, with the given objectives, provides a contribution to resolving this business problem.

1.5 RESEARCH DESIGN

This study deals with a specific real-world business problem as experienced by modern-day organisations. The following section describes the research design that ensures that the objectives do indeed contribute and assist in resolving this problem. Accordingly, it details the research paradigm (§ 1.5.1), process (§ 1.5.2), and methods (§ 1.5.3) applied in this study.

1.5.1 *Research Paradigm*

The main aim of this study is to contribute to resolving the business problem experienced by organisations when addressing communication as part of business–IT alignment. This contribution takes the form of an assessment method. The paradigm of design science is, therefore, ideally suited to this study as proposed by Peffers, Tuunanen, Rothenberger, and Chatterjee (2007), and supported by Hevner, March, Park, and Ram (2004). In particular, since Hevner et al. (2004) and March and Smith (1995) argue that methods (algorithms and practices) are valid artefacts to be produced by design science projects.

The design science paradigm shares its origins with Simon's seminal work *The sciences of the artificial* (Simon, 1996) and Cross's *Design science research: Developing a discipline* (Cross, 2001). Both authors maintain that design science attempts to create things that serve human purpose. Peffers et al. (2007) continue by stating that design science concerns itself with creating artefacts that solve organisational (real-world) problems.

Design science follows a specific research process in terms of which key steps lead a researcher's actions (Hevner et al., 2004; Peffers et al., 2006). These key steps are what distinguishes design science from other paradigms, and refer to artefact design and feasibility evaluation. Therefore, the design science paradigm comprises research performed by creation or design; in this case the creation or design of a method to assess communication in business–IT alignment.

Charles Eames (BrainyQuote, 2015c) states that design is "a plan for arranging elements in such a way as to best achieve a particular purpose". This corresponds with the management task in an organisation, which involves arranging elements in the best way possible in order to accomplish the organisational goals

and purposes (Hevner & Chatterjee, 2010). Hence, in agreement with Eames, design is fundamental to the management disciplines (Simon, 1996).

Managers are understandably concerned with questions such as "Why do some investments in business systems and organisational structures not result in an improvement in firm performance?" and "What investments will do so?" (Brotby, 2008). The first is a theory-based, causal-related question, while the second is a design-based, problem-solving question (Simon, 1996). Thus, two complementary yet distinct paradigms produce knowledge for the management disciplines; paradigms which include both the behavioural and the design sciences (Hevner & Chatterjee, 2010).

This study, in accordance with the premises of information systems (IS) research, is concerned with how IT intersects with organisations and how their management can ensure alignment between IT and the objectives, systems and processes of the business. It adheres to the premise of the design science paradigm by aiming to produce an artefact that organisations can use to change the communication practices that exist between their business and IT personnel into practices that are deemed preferable. Hence, it views design as entailing an explicit and intentional effort to improve the organisation with regard to a specific criterion.

However, this raises an issue pertaining to the artefact envisaged in this study. Traditionally, both the IS discipline and the design science paradigm have been concerned with designing and developing artefacts that use IT and are applied to organisations and society in general (Hevner et al., 2004). Unfortunately, the notion of an IT artefact is often ill defined and ambiguous in the modern literature (Alter, 2003). In addition, different authors may view IT from varying perspectives (Orlikowski & Iacono, 2006), not to mention the fact that this study also operates within the management and audit disciplines, thus adding a further perspective to consider. Accordingly, some clarification is required.

This study aims to produce an artefact to assist organisations in (self-) assessing and ultimately improving the communication practices between their business and IT personnel, as part of the business–IT alignment process. Hence, the focus is on producing a socio-technical artefact, which could result in interventions being made in the organisation's social system. Although this might seem contradictory to the tenets of the IS discipline and the design science paradigm, it is nevertheless valid (Orlikowski & Iacono, 2006; Gregor & Hevner, 2013). That is, since this study invokes IT "in context," it treats IT in particular as the context,

motivation, and background against which it examines the business–IT alignment process and its supportive requirement for adequate communication.

Thus, although other disciplines have already investigated and attempted to assess communication, the communication and alignment issues related to IT differ from those of other disciplines and functional areas (Van Grembergen & De Haes, 2009). Nevertheless, it might prove useful to 'exapt' known solutions and theories already in use by these disciplines and functional areas to the business–IT alignment discipline. This is something that this study aims to achieve.

In summary, this study operates according to the design science paradigm in attempting to develop a method whereby organisations can assess communication in the business–IT alignment process. Further, it operates in the domain where the IS/IT and management disciplines intersect, which is better known as management information system(s) (MIS). This study upholds rigour by following a specific, well-defined research process, which is outlined in the following section.

1.5.2 *Research Process*

Peffers et al. (2007) proposed a methodology, model and process for the design science paradigm. Their process follow the paradigm guidelines offered by various authors, including Hevner et al. (2004) and March and Smith (1995).

Using case analysis, Peffers et al. (2007) showed that their proposal matched those methods and processes of existing and successful design science projects. Accordingly, they argued that by using their proposal a researcher could uphold academic rigour and ensure scientific contribution. Consequently, in this study it was decided to base the research process on their proposal.

The design science research process (DSRP) model, as proposed by Peffers et al. (2006), includes six general steps:

1. problem identification and motivation

2. objectives for a solution

3. design and development

4. demonstration

5. evaluation and

6. communication.

This study fulfils these steps as follows (refer to § 1.4):

1. It consults works on information technology (IT), business–IT alignment, and the social aspects related thereto. Accordingly, it aims to determine the relationship between business–IT alignment and communication, and its implications for research and practice. In addition, it delineates and argues for the problem being addressed.

2. It consults the literature to explore modern theories and existing strategies and approaches by means of which organisations can assess communication in business–IT alignment. It pays specific attention to the different perspectives according to which one can assess communication, and the various techniques used in other disciplines to investigate communication-related problems.

3. It establishes a method to help organisations identify and (self-) assess the areas where their communication between their business staff and their IT personnel could be improved. Hence, it pays specific attention to different assessment approaches, the requirements for an assessment, the factors that need to be assessed and, ultimately, the way in which a viable method may be created.

4. It field-tests the method in a public sector organisation to demonstrate its feasibility and value.

5. It evaluates the method before, during, and after field-testing to ascertain the effectiveness and efficiency with which it contributes to resolving the business problem. This evaluation makes use of member validation, triangulation, and argumentation.

6. It communicates this method and the resultant findings both in this thesis and in scholarly publications.

In conclusion, this study makes use of the research process that Peffers et al. (2006) established within the design science paradigm. This research process was chosen since it matches the general principles, processes, and methodologies proposed by various design science authors.

1.5.3 *Research Methods*

The main contribution of this study takes the form of an artefact – an assessment method. Hargie and Tourish (2009) state that "at its most basic an assessment, or then audit, is an evaluation of a designated process". This usually entails gaining insight, analysing and assessing the status of the process (D. Jones, 2002), usually with the intent either to improve some underlying aspect of it or to validate that it is operating as expected.

In performing the assessment, a multitude of mechanisms can be used, and even combined, in different ways. Accordingly, a method refers to the specific mechanism or series of mechanisms that are adapted to perform the assessment; in other words, it refers to the practice(s) and processes that will be involved in performing the assessment. For example, the method may include interviews, observations, critical incident analysis, focus groups, checklists, diary studies, or maturity grids.

In this study, an assessment method refers to a means for identifying, analysing, and assessing the communication practices that take place between an organisation's business and its IT personnel as part of the business–IT alignment process. This method will be based upon a maturity grid-based approach which originates from the discipline of engineering design (Maier et al., 2006).

The study also uses various additional research methods in each of the research steps in the given process. These methods are as follows for each step:

1. A literature review on information technology (IT), business–IT alignment, communication, and the social aspects related thereto is performed.

2. A literature review is carried out on modern theories and existing strategies and approaches that may assist organisations to assess communication in business–IT alignment.

3. An eventual assessment method is developed, including different practices and processes. The individual factors and elements included are drawn from the aforementioned literature reviews, using argumentation and a Delphi study conducted among industry members, while the application and context of the assessment is modelled using modelling techniques.

4. A single-case (in-depth) case study of a public sector organisation in industry is performed to demonstrate the usage and application of the method.

5. Member validation is administered as part of the case study, in addition, triangulation is performed, and argumentation used in order to evaluate the validity, utility, quality, and efficacy of the method.

6. The findings are presented in this thesis and in scholarly publications.

In summary, this study follows the design science paradigm. In support of the paradigm, it uses a research process as proposed by Peffers et al. (2006). A diagram depicting this process, the implementation details, and the related research methods appears in Figure 1.3.

1.6 LAYOUT

This thesis consists of eight chapters. These chapters are briefly described in this section, while the layout of the chapters is illustrated in Figure 1.4.

Chapter 1 – Introduction

This chapter presents the problem definition, problem significance and motivation, and key concepts. In addition, it elaborates on the research questions and objectives and the scope of study, as well as offering an overview of the research approach and methods and discussing the structure of the thesis.

Chapter 2 – Business–IT Alignment

This chapter presents a review of the literature on business–IT alignment, which rests on three pillars: firstly, it explains the importance of information technology (IT) in the modern business world. Secondly, it introduced the requirement for IT to be properly governed and aligned with the business's goals, objectives, and processes and, thirdly, it highlights the social aspects related to business–IT alignment. The fact that communication between business and IT personnel is important in achieving proper business–IT alignment forms the primary argument of the chapter.

Chapter 3 – Business–IT Related Communication

This chapter presents a review of the literature on communication in business–IT alignment from a communication-theoretic perspective. It first gives an overview of the different ways in which one can

Figure 1.3. Research Process

Research Methods

- Literature Review **(Chapter 2)**
- Literature Review **(Chapter 3)**
- Method, Modelling, Argumentation & Delphi Study **(Chapter 4 & 5)**
- Field Test / Case Study, Member Validation Triangulation & Argumentation **(Chapter 6 & 7)**
- Thesis and Scholarly Publications

Implementation Details

- Works are consulted on information technology (IT) in the modern business world, business-IT alignment, and the social aspects related thereto.
- Works are consulted to explore communication in business-IT alignment from a theoretic perspective. It shares modern theories, and existing approaches whereby organisations could assess communication in business-IT alignment.
- A method is established to help organisations (self-) assess and elicit areas for improving their communication practices between their business staff and IT personnel.
- The method is field-tested at a public sector organisations to show its feasibility and value.
- The method is evaluated before, during and after field-testing to discover the effectiveness and efficiency with which it contributes to resolving business-IT communication problems.
- The method and resultant findings is communicated in this thesis and scholarly publications.

Design Science

- Problem Identification
- Objectives of a solution
- Design & Development
- Demonstration
- Evaluation
- Communication

Chapter 1
Introduction
Presents the problem definition, problem significance and motivation, and key concepts. In addition, it elaborates on the research questions and objectives and the scope of study, as well as offering an overview of the research approach and methods and discussing the structure of the thesis.

Chapter 2
Business-IT Alignment
Presents a review of the literature on business-IT alignment, which rests on three pillars: firstly, it explains the importance of information technology (IT) in the modern business world. Secondly, it introduced the requirement for IT to be properly governed and aligned with the business's goals, objectives, and processes and, thirdly, it highlights the social aspects related to business-IT alignment. The fact that communication between business and IT personnel is important in achieving proper business-IT alignment forms the primary argument of the chapter.

Chapter 3
Business-IT Related Communication
Presents a review of the literature on communication in business-IT alignment from a communication-theoretic perspective. It first gives an overview of the different ways in which one can conceptualise communication, and explores the unique characteristics of communication in business-IT alignment. Secondly, it also investigates potential problems that may be associated with communication and, thirdly, examines communication assessments as a likely approach or technique for identifying and analysing such problems

Chapter 4
Methodology
Provides a high-level overview of the methodology followed in this study to develop a method for assessing communication in business-IT alignment. To do so, it firstly discusses the philosophical assumptions and considerations, which influenced the choice of the research paradigm. Secondly, argues towards and examines the specific research paradigm selected for this study, namely design science and, thirdly, introduces the specific research process employed.

Chapter 5
Communication Alignment Maturity Improvement (CAMI) Method
Describes the design and development of the assessment method itself, termed the 'Communication Alignment Maturity Improvement (CAMI) method'. Firstly, it specifies the requirements for the assessment method. Secondly, introduces the chosen approach for development, namely a maturity grid, and, thirdly, describes how this approach was applied to develop the assessment method for communication in business-IT alignment. The CAMI method is a result of literature review, a Delphi study, modelling, and argumentation.

Chapter 6
Method Usage & Application
Explains the way in which an organisation would go about using the CAMI method and shares evidence of its application in a practical setting. This is done by firstly offering a process model, which graphically depicts the phases and steps involved when using the method to perform an assessment. Secondly, it demonstrates the use of both the method and the process model in a practical setting using a single-case (in-depth) case study of a public sector organisation.

Chapter 7
Method Evaluation
Presents and discusses the evaluation results and their interpretation as they apply to the CAMI method. In order to do so, it explains what the results are, what they imply, and how they relate back to the objectives stated in the introduction chapter, while simultaneously reflecting back on the research process that led to the development of the method, its theoretical underpinnings, and the results of its application in industry.

Chapter 8
Conclusion
Summarises the thesis, highlighting the main points of interest and the conclusions, and presents possibilities for further research.

Figure 1.4. Thesis Layout

conceptualise communication, and explores the unique characteristics of communication in business–IT alignment. Secondly, it also investigates potential problems that may be associated with communication and, thirdly, examines communication assessments as a likely approach or technique for identifying and analysing such problems.

Chapter 4 – Methodology

This chapter provides a high-level overview of the methodology applied in this study to develop a method for assessing communication in business–IT alignment. To do so, it firstly discusses the philosophical assumptions and considerations that influenced the choice of the research paradigm for this study. Secondly, argues for and examines the specific research paradigm selected, namely, design science, and thirdly, introduces the specific research process employed.

Chapter 5 – Communication Alignment Maturity Improvement (CAMI) Method

This chapter describes the design and development of the assessment method itself, termed the 'Communication Alignment Maturity Improvement (CAMI) method'. Firstly, it specifies the requirements for the assessment method. Secondly, introduces the chosen approach for development, namely a maturity grid, and, thirdly, describes how this approach was applied to develop the assessment method for communication in business–IT alignment. The CAMI method is a result of literature review, a Delphi study, modelling, and argumentation.

Chapter 6 – Method Usage and Application

In this chapter, the way in which an organisation would go about using the CAMI method is explained and evidence of its application in a practical setting is shared. This is done by firstly offering a process model, which graphically depicts the phases and steps involved when using the method to perform an assessment. Secondly, it demonstrates the use of both the method and the process model in a practical setting using a single-case (in-depth) case study of a public sector organisation.

Chapter 7 – Method Evaluation

Chapter 7 presents and discusses the evaluation results and their interpretation as they apply to the CAMI method. In order to do so, it explains what the results are, what they imply, and how they relate back to the objectives stated in the introduction chapter, while simultaneously reflecting back on the research process that led to the development of the method, its theoretical underpinnings, and the results of its application in industry.

Chapter 8 – Conclusion

This final chapter summarises the thesis, highlighting the main points of interest and the conclusions, and presents possibilities for further research.

1.7 SUMMARY

This chapter briefly introduced an important topic in the context of this research, information technology (IT), and highlighted the importance of it in contemporary business organisations. It showed that the dependence of modern businesses on IT is increasing rapidly and argued that today IT is integral to their success. However, it also highlighted the fact that true business value can only be obtained from IT if it is aligned with the business's goals, objectives, and processes. This is better known as business–IT alignment.

The chapter continued by discussing business–IT alignment, its concepts, and requirements and argued that communication is a central issue for businesses in addressing the social dimension of business–IT alignment effectively. Unfortunately, research has shown that there is at present a lack of approaches, methods, and tools to assist organisations in this regard.

In fact, as noted, few studies have explicitly looked at communication within the business–IT alignment context (Coughlan et al., 2005), with even fewer specifically sharing methods or approaches by means of which organisations can analyse or assess it. This is cause for concern, since without such methods or approaches organisations are likely to continue experiencing communication problems while trying to achieve proper alignment and may have no way of identifying, analysing and assessing them, not to mention remedying them!

These arguments form the basis for this study and support its main objective; that is, to develop an assessment method to help organisations identify and (self-) assess areas in which the communication practices between their business

staff and IT personnel could be improved. Accordingly, the study pays specific attention to a number of different assessment approaches, the requirements for an assessment, the factors that need to be assessed and, ultimately, how a viable method could be created.

The chapter also stipulated that the research design used in this study would follow the design science guidelines (Hevner et al., 2004; March & Smith, 1995; Gregor & Hevner, 2013) and methodology (Peffers et al., 2007). The chapter concluded with a brief delineation of the chapters of this thesis.

Part II

LITERATURE REVIEW

BUSINESS–IT ALIGNMENT

"Just because a builder can acquire a handsome set of hammers, nails, and planks does not mean he can erect a quality house at reasonable cost"

— *Getting IT Right*, Feld and Stoddard (2004)

As the importance of information has grown in modern-day business, so too has the need for and investments in technologies to create, store, transmit, and maintain it. However, many organisations have found that these investments only return business value if they are aligned with the business's strategies, objectives and goals. Unfortunately, achieving this alignment is crucial and remains a troublesome issue for organisations worldwide. This problem is further compounded by the fact that communication is critical during alignment but is often difficult to achieve between personnel residing in the business and IT functions of an organisation. Accordingly, this chapter positions and emphasises the importance of communication in the context of business–IT alignment. To do so, it gives an overview of this context as well as the key concepts involved, and explores the role communication plays.

2.1 INTRODUCTION

Organisations nowadays are profoundly dependent on information to drive their business processes. In the modern business environment, business processes, supply chains, and payment options all require correct information to be ready at short notice. Information is, thus, one of the most critical and valuable resources an organisation can possess (Ernst & Young, 2009). As S. Von Solms and Von Solms (2008) states, "information is the lifeblood that keeps modern business operational". Given that information plays such a crucial role in modern organisations' operations, it is natural that great significance is placed on and investments made in the technology that uses, stores, processes and transmit this information. This technology is better known as information technology (IT).

In modern business it is impossible for the importance of information and IT to be ignored (Rees, 2010), especially since IT and business have now become inextricably interwoven (BrainyQuote, 2015b). Yet many organisations have found that IT cannot offer competitive advantages in itself (Feld & Stoddard, 2004);

rather corporate value can only be obtained through the proper use and management of IT, in alignment with the business's objectives (IT Governance Institute, 2005). Given this, both alignment and the value added by IT are core principles of modern IT governance.

IT governance is an integral part of the duties performed by the executive management in modern organisations (ISACA, 2012b) and addresses the definition and implementation of processes, structures and relational mechanisms in these organisations. These should enable both business people and IT people to carry out their responsibilities in support of business–IT alignment and the creation of business value from IT-enabled business investments (Van Grembergen & De Haes, 2009, p. 17). On this basis, whether subset or outcome, business–IT alignment is seen as critical. Unfortunately, it has been an issue for organisations worldwide since the start of computerised business systems (Yayla & Hu, 2009). Some have even suggested it is a major challenge they face in successfully utilising IT (Luftman & Derksen, 2012).

Business–IT alignment concerns the way business and IT personnel in an organisation can work together in harmony to achieve maximum results from IT (ISACA, 2012b). Not only does it entail having properly aligned business and IT plans and adequate IT governance, but it also involves several social aspects as well (Reich & Benbasat, 2000). In this regard, communication is seen as being particularly important, especially since business staff and IT personnel need to communicate daily to share information, exchange ideas and commit to each other's goals and objectives (Coughlan et al., 2005).

While the alignment literature has paid significant attention to the planning and integration of business and IT plans, the same cannot be said for the social requirements of alignment. Yet, as the IT Governance Institute (2005) argues, "without open communication and mutually respected contributions to the development of IT and business strategies, full alignment will not happen and value will not be delivered". Therefore, organisations have subsequently realised that they require help not only with their planning and strategising practices, but also with communication.

The primary aim of this chapter is to position communication in the business–IT alignment context and emphasise its importance. In doing so, it has two objectives: Firstly, to give an overview of the business–IT alignment context and the key concepts involved by specifically introducing the reader to its multifaceted, adaptive, and complex nature. Secondly, to explore the role communication plays within this context by investigating the extant literature on the topic.

These and related issues will be discussed further in this chapter as follows: Firstly, the importance of information and information technology and their application in modern organisations will be discussed (§ 2.2). Secondly, the discipline involved in obtaining business value from IT and aligning the technology with the business's goals, objectives and processes, in other words, business–IT alignment, is introduced and key concepts are explained (§ 2.3). Finally, a discussion on the social aspects involved, in particular communication, will follow (§ 2.4). These issues will be summarised and conclusions drawn at the end of the chapter (§ 2.5).

Collectively, this and the subsequent chapter sets the foundation on which a method for assessing communication in business–IT alignment will be developed in later chapters (see Figure 2.1).

**Business-IT Alignment
(Chapter 2)**

*Information and IT in Modern Business
Business-IT Alignment
Communication: A Critical Social Antecedent*

**Business-IT Related Communication
(Chapter 3)**

*Conceptualisations of Communication
Characterising Communication in Business-IT Alignment
Business-IT Related Communication Breakdown
Communication Assessment*

**A Method for Assessing Communication
in Business-IT Alignment**
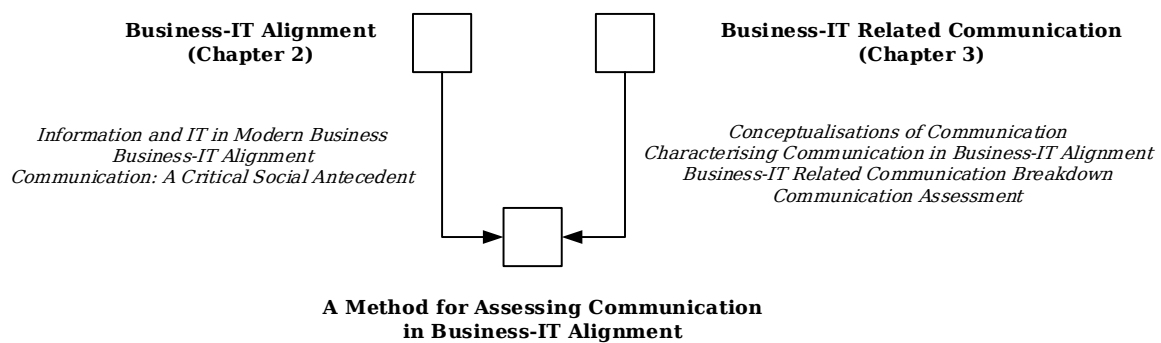
Figure 2.1. Structure of Literature Review

2.2   INFORMATION AND IT IN MODERN BUSINESS

Information and its use permeate all aspects of modern business, because modern organisations need information to survive and prosper. Therefore, the ability of organisations to endure is directly dependent on their business processes, which in turn have grown to be highly dependent on information (ISACA, 2012a). Not only is information entrenched in these processes but it is also regarded as critical for the supply chains, payments and various other activities that organisations must perform in their day-to-day operations.

Although information is essential to the day-to-day operation of a business, its application can also be seen in the strategic decisions that are made daily by both managers and staff members (O'Brien & Robertson, 2009). Managers consume information in tremendous volumes from various sources during their daily duties and require it to be correct, consistent, and accessible. If this cannot

be assured, the judgements they make may be erroneous and could have dire consequences (S. Von Solms & Von Solms, 2008).

This has consequently led to the realisation that information and its use have become pervasive in our modern business environments (Institute of Directors in Southern Africa, 2009b). This pervasiveness has resulted from the fact that nowadays it is common to find information in the organisation take many forms (S. Von Solms & Von Solms, 2008). This pervasive use of information has driven, and continues to drive, information as one of the most valuable business assets of our time (ISO/IEC 27002, 2005). It should therefore come as no surprise that large investments in the form of time, money, and energy are made to capture, generate, and distribute information.

Computer-based systems that drive information, which are known as information systems (IS), make up a large proportion of the investments organisations make (Ernst & Young, 2009). An information system is an organised combination of people, hardware, software, communication networks, processes and data resources that collects, transforms and disseminates valuable information in an organisation (Whitman & Mattord, 2012). These information systems and the architecture on which they operate are commonly referred to as the information technology (IT) of an organisation. The advent of IT has had a profound influence on modern business, as almost all information in modern businesses is today created, stored, transmitted, and maintained in digital form.

IT affects all aspects of modern business from executive management right down to the operational levels. From the time that information is created to the moment that it is destroyed, IT plays a significant role. Consequently, without the driving force of IT in an organisation, information might not be accessible or might become impossible to obtain. IT has therefore become a major contributor to the competitiveness of modern business (ISACA, 2012b).

Accordingly, taking the above into account, information, and the technology that drives it, is essential for obtaining and maintaining a competitive advantage, as well as ensuring the well-being of a modern business. This is supported by Brotby (2009), who states, "[i]n many organisations today, information and IT is the business". Consequently, the dependence on information and IT for the well-being of modern organisations should be recognised and investments made accordingly.

However, dependence on and investment in IT do not automatically guarantee business prosperity; it is only through its proper use and management, in alignment with the business's objectives, that corporate value can be obtained

(IT Governance Institute, 2005). The importance of aligning business and IT and in turn ensuring their proper use and management cannot therefore be understated and organisations should be mindful of their duties and obligations in this regard.

2.3 BUSINESS–IT ALIGNMENT

As the dependence on information and IT has increased in our modern organisations, so too has the need to ensure proper alignment between IT investments and business objectives. Today, organisations are widely implementing large-scale information systems (IS) such as enterprise resource planning (ERP) and supply chain management. The success of these systems depends heavily on a high level of coordination and collaboration between the business and the IT functions.

Organisations should therefore realise that their ability to attain and sustain any business value from such systems is directly dependent on their ability to use and manage them properly, and align them with the business's objectives. As Feld and Stoddard (2004) state, "just because a builder can get a handsome set of hammers, nails, and planks does not mean he can erect a quality house at reasonable cost". One thing is certain, however, achieving this alignment does not happen by accident; it requires leadership, engagement, informed processes, and inputs.

Unfortunately, many companies today are still poorly aligned in this regard. This has led to disastrous failures, including cancelled or redundant projects, systems that do not meet the needs of the business, dissatisfied customers and high IS costs. Not surprisingly, alignment remains a pervasive problem and, indeed a challenge. As Grant (2010) states, "[a]lignment is like a mirage in the desert; just as you approach the target, it disappears into a bowl of sun-baked sand".

This section aims to explore this pervasive problem in more detail. Firstly, it will investigate what it entails (§ 2.3.1). Secondly, it will present different perspectives or dimensions in terms of which this problem can be explored (§ 2.3.2). In addition, it will share, finally, the various antecedents and elements that play a role in this problem (§ 2.3.3). This is important because communication will be highlighted and, later, explored as one such antecedent.

2.3.1 *What is Business–IT Alignment?*

For over three decades, practitioners, academics, consultants and research organisations have identified "attaining alignment between IT and business" as a pervasive problem and, as such, have performed extensive research in this domain. McKeen and Smith (2003) first raised the notion of business–IT alignment in the late 1970s. However, it was with Henderson and Venkatraman's (1993) introduction of their Strategic Alignment Model (SAM) that the true interest in this domain started. Since then, a proliferation of studies and models has appeared in the academic and practitioner communities (Chan & Reich, 2007). Consequently, many differing conceptualisations of alignment have come to exist (Avison et al., 2004).

There are many synonyms for the term 'alignment', including integration, linkage, fit, harmony, bridge or fusion. As its basic principle, Sauer and Yetton (1997) argue that alignment relates to the way organisations should manage IT in order to mirror their business management. Reich and Benbasat (1996) define alignment as the degree to which IT strategy shares and supports the mission, objectives and plans contained in the business strategy. Meanwhile, Henderson and Venkatraman (1993) state that alignment is the degree of fit and integration among the business strategy, IT strategy, business infrastructure and IT infrastructure. McKeen and Smith (2003), however, argue that alignment exists when an organisation's goals, activities and the information systems that support them remain in harmony, a sentiment Luftman (2000) supports, stating that good alignment involves the organisation applying appropriate IT in given situations, and that these actions remain congruent with the business strategy, goals, and needs.

Irrespective of the specific definition, the views of these authors share a common theme; that is, they deal with the harmony that should exist between the business and the IT in an organisation (McKeen & Smith, 2003). This involves two primary questions: *How is the business aligned with IT?* and *How is IT aligned with the business?* Thus, alignment focuses on the way in which business and IT are aligned with each other. As Abraham (2006) explains using a rowing analogy, alignment ensures everyone is rowing in the same direction. This can be seen as being similar to the practitioner definition that B. Campbell et al. (2005) received, which states that alignment is the business and IT working together to reach a common goal.

In early studies, business and IT working together meant linking the business plan and the IT plans. Another perspective involved ensuring congruence be-

tween the business strategy and the IT strategy. Still another required examining the fit between business needs and information system priorities. However, over time, these conceptualisations have been enlarged and now research recognises many points of alignment between business and IT.

Today, business–IT alignment is seen as an adaptive process rather than an event. It requires an ongoing effort of continuous adaptation and change, involving strategic planning, goal realignment and the implementation of best practices in supporting and shaping business strategies. To this extent, it involves a variety of factors that need to be understood and addressed successfully. These include, among others, communication, competency, governance, partnership, technology and skills (Luftman, 2003).

In view of the above, it may be concluded that business–IT alignment is an adaptive, multifaceted, complex process. Not only does it entail aligning the business with IT, but also IT with the business. Furthermore, in achieving this alignment, the plans or strategies of both business and IT, as well as a variety of other factors, including for example communication, have to be addressed. To understand these factors more fully, it is important to investigate the underlying perspectives or dimensions of this process, since these perspectives or dimensions will offer distinct, yet differing, lenses through which to view business–IT alignment.

2.3.2 *Dimensions of Business–IT Alignment*

Business–IT alignment is widely considered to consist of two dimensions, namely, the intellectual dimension and the social dimension (Reich & Benbasat, 2000). These dimensions, although distinct, are complementary rather than contradictory. They both emphasise different aspects of Business–IT alignment; for example, the intellectual dimension places more emphasis on the planning and strategising procedures employed by business and IT, whereas the social dimension concerns aspects such as communication and shared understanding among the people involved in the alignment process. Consequently, to explore business–IT alignment fully, these dimensions (and in some cases even others) should be studied together to offer a comprehensive overview of the alignment process (Chan & Reich, 2007).

Although this thesis is concerned solely with the social dimension of alignment, it remains fruitful to examine the other complementary dimensions, since they do at times overlap and share certain commonalities. Accordingly, this sec-

tion aims to explore the dimensions of business–IT alignment in more detail, by firstly; investigating the intellectual dimension, and drawing attention to the strategies, structures and planning methodologies employed by business and IT units in modern organisations (§ 2.3.2.1). Secondly, it introduces the social dimension, looking beyond the plans and focusing on the people and other aspects involved in creating them (§ 2.3.2.2). Finally, given that some authors suggest even more dimensions, a number of these are also briefly highlighted (§ 2.3.2.3).

2.3.2.1 *Intellectual Dimension*

Sambamurthy and Zmud (1999) define the intellectual dimension of alignment as focusing on the strategies, structure and planning methodologies in organisations. In essence, this refers to the way in which organisations can draft the business strategy and plans, and the IT strategy and plans, such that they complement each other (Chan & Reich, 2007). Not surprisingly, in order for organisations to address this perspective successfully, a high-quality set of interrelated IT and business plans must exist (Reich & Benbasat, 2000). However, as indicated above, alignment involves much more than mere plans. Therefore, another dimension, namely, the social dimension also exists.

2.3.2.2 *Social Dimension*

A complementary dimension of alignment involves the social dimension. This dimension moves beyond the business and the IT plans to focus on the people involved in creating them (Reich & Benbasat, 2000). These people are not exclusively those members of staff who are directly involved with the needs of business and IT (Kashanchi & Toland, 2008) but also involve management support for IT, as well as the processes used in business planning for IT and the communication of plans (Martin et al., 2005). Schlosser et al. (2012) argue that this dimension is less about the plans and methodologies of an organisation, instead being more about the relationships and cognitive links between the personnel residing in business and IT. Consequently, it encompasses relationships and mutual understanding, but also cultural issues and informal structures. Chan and Reich (2007) support this, defining this dimension as being about mutual understanding between business and IT, and the commitment to plans, objectives and mission.

The model proposed by Reich and Benbasat (2000) and presented here in Figure 2.2, identifies four factors that influence this dimension:
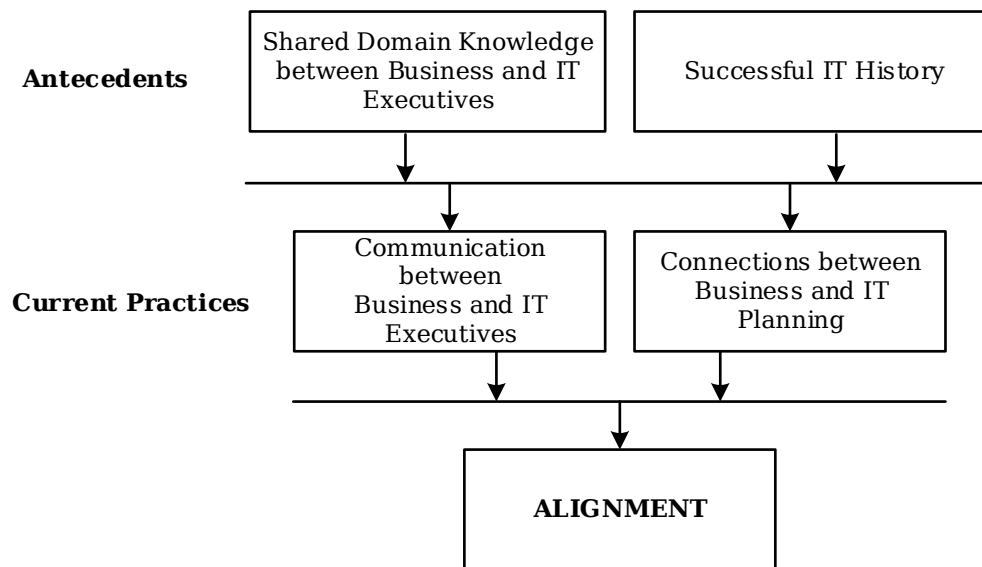
Figure 2.2. Factors Influencing the Social Dimension of Alignment (Reich & Benbasat, 2000)

1. *Shared domain knowledge between business and IT executives* – the better IT and business executives understand and participate in each other's key processes the better the alignment will be.

2. *Successful IT history* – the more successful the previous IT implementation, the more trust business executives will have in IT and the more motivated they will be to communicate with the IT department, which will lead to better alignment.

3. *Communication between business and IT executives* – the communication between business and IT executives can positively influence the level of mutual understanding and alignment.

4. *Connections between business and IT planning processes* – the more IT executives are involved in business planning the more likely they will be to understand and support the business objectives, thus leading to better alignment.

Reich and Benbasat (2000) found that all the above factors influence short-term social alignment (shared understanding of existing objectives), but sharing domain knowledge between business and IT executives leads to a longer-term social alignment.

In summary, if one abstracts this information, this dimension is essentially about socially organised human behaviour, which exists "beyond" a single actor.

Consequently, it is less about actual artefacts (the intellectual dimension) and individual human actors and more about the socially constructed environment of the business and IT domains. Thus, soft factors like mutual trust and respect, communication and culture serve as core elements of this dimension.

2.3.2.3 *Other Dimensions*

Alignment, it is said, consists primarily of two dimensions and one needs to investigate both if a comprehensive perspective is to be gained. However, some authors suggest even more dimensions.

Chan and Reich (2007), in their literature review of business–IT alignment, distinguish between five alignment dimensions:

1. strategic and intellectual

2. structural

3. informal structure

4. social

5. cultural.

Accordingly, although they recognise the intellectual and social dimensions, they also add a few others. In particular, they stipulate that a structural dimension also exists, which is concerned with the fit between the business and the IT structures. This involves the location of decision-making rights, reporting relationships, the centralisation versus decentralisation of IT, and IT personnel deployment. In addition, they also identify an informal dimension concerned with the relationships between the business and the IT domains. Lastly, they identify a cultural dimension that deals with the cultural fit between business and IT. This includes, for example, planning, and communication styles.

Schlosser et al. (2012), however, argue that Chan and Reich's (2007) five dimensions might be too expansive, in particular because a look at the artefacts behind these dimensions reveals that most are not selective and often overlap, depending on the research involved. Accordingly, Schlosser et al. (2012) propose that the dimensions should be reconsidered. This ultimately culminated in them arguing that only one additional dimension exists beyond the intellectual and social dimensions – the human dimension.

According to their definition, the human dimension is concerned with the distinct attributes of individual persons, thus it encompasses skills, knowledge,

leadership and behaviour. Schlosser et al. (2012) argued that to ensure alignment, it is important that IT employees have the 'right' skills and knowledge to solve business problems. Similarly, business staff needs to be skilled in order to use the information systems that are in place effectively. Furthermore, cross-domain knowledge is deemed helpful to enable effective communication and put business employees in a position to understand those opportunities that arise from current and future information systems.

This tripartite division of Schlosser et al. (2012) is supported by the work of Ross, Beath, and Goodhue (1996), who also distinguished between a human, relational and technology asset in the IT domain. Surprisingly, this also conforms to Hevner et al.'s (2004) definition of an information system (IS), namely, that an IS consists of people (comprising roles, people's capabilities and characteristics), organisation (encompassing strategies, structures, processes, and culture) and technology (containing infrastructure, applications, communications architecture, and development capabilities).

What is clear from this discussion is that there is no widely accepted or comprehensive conceptualisation of the alignment dimensions. While some suggest as many as five dimensions, others propose two or three. However, even in this maelstrom of different conceptualisations, there is a certain commonality, namely, that an intellectual dimension and a social dimension exist. Whether the human dimension should be separate from the social dimension, as Schlosser et al. (2012) propose, is questionable. In essence, both deal with the people involved in alignment. Whatever the case, one thing is certain: while the intellectual dimension has received considerable attention over the years, the social dimension has been left largely unexplored. Nevertheless, in this regard, many authors acknowledge that plans can be created but may be misunderstood owing to a lack of mutual understanding, communication-related problems, and a shortage of skills among others.

2.3.3   *Antecedents to Business–IT Alignment*

The two previous sections have elaborated on the multifaceted and complex nature of business–IT alignment, and the different dimensions or perspective for investigating it. Having established this, this section now explores the various factors or antecedents (within these dimensions) that influence this alignment. Accordingly, in order for an organisation to achieve proper alignment between

its business and its IT domains, all these factors will have to be carefully investigated and deliberated (Luftman & Brier, 1999).

To this extent, this section draws attention to the influential background antecedents such as corporate culture, shared knowledge and prior experience with IT (§ 2.3.3.1). It also highlights the foreground, that is, visible behaviours that influence alignment (§ 2.3.3.2).

2.3.3.1 *Background Antecedents*

Alignment is contingent on many aspects of an organisation. Some of these aspects relate to background antecedents; that is, aspects that shape the context within which alignment is being sought. These include, among others, shared domain knowledge, past IT implementation and other aspects that originate outside the IT domain.

Reich and Benbasat (2000) (see Figure 2.2) found that shared domain knowledge and past IT implementation success influenced the context of alignment. In particular, they found that the better IT and business executives understood and participated in each other's key processes, the better alignment became. Similarly, the more successful the previous IT implementations were, the more trust business executives had in IT. This culminated in them being more motivated to communicate with the IT domain, which led to improvements in alignment; that is, since both parties started to participate in the business, and IT planning processes.

In another study, Chan, Sabherwal, and Thatcher (2006) examined antecedents to alignment directly under the control of IT management. Surprisingly, they found similar evidence to Reich and Benbasat (2000) in that their study also identified shared domain knowledge and past IT success as influencing the context of alignment. However, they also uncovered several other antecedents, with some even originating outside the IT domain. In particular, they found that the sophistication of the planning processes employed by both the business and the IT executives when establishing the business and IT strategies had an influence on alignment. They also discovered that external factors such as organisational size and environmental uncertainty had a distinct influence on alignment. For example, small and large-sized organisations performed better on alignment, whereas medium-sized organisations generally struggled. Similarly, organisations operating in a highly uncertain environment generally performed better on alignment than those in an environment that changed little. Both of these

external factors were seen to affect the foreground behaviour of employees, that is, communication, culture and others.

Meanwhile, in earlier research, Brown and Magill (1994) found that the corporate vision, strategic IT role, satisfaction with management of technology, satisfaction with the use of technology and the locus of control for system approvals all had an influence on alignment. The strategic role played by IT was an interesting finding, since this matches several other authors' modern-day arguments (Nolan & McFarlan, 2005; Weiss & Thorogood, 2006). In particular, Weiss, Thorogood, and Clark (2007) propose that the necessity for alignment might differ depending on how IT is used in an organisation. For example, if an organisation is utilising IT purely to maintain the production line, alignment might not be particularly necessary. However, if an organisation is utilising IT to gain a competitive or strategic advantage, alignment will be crucial.

2.3.3.2 *Foreground Antecedents*

Several influential background antecedents influence the context within which alignment takes place in an organisation. Some of these may originate within the IT domain, while others could result from the organisation itself and its past. Whatever the case, although these set the context for alignment there are also foreground antecedents, that is visible behaviours, that influence alignment. These include, among other things, leadership, relationships, coordination, and communication.

Baker (2004) proposed that successful alignment is contingent on strong leadership. By asking executives to indicate whether their organisation's management style was autocratic, collaborative, or indecisive, he found that most firms led by collaborative managers indicated that their organisation's IT was well aligned with business strategy. Meanwhile, managers in firms with autocratic or indecisive leadership reported a lower level of alignment.

Feeny, Edwards, and Simpson (1992) found that the relationship between the chief executive officer (CEO) and the chief information officer (CIO) was critically important in achieving alignment. In successful CEO–CIO relationships, the CEO tended to have had a career background in marketing or general management; yet had also worked closely with IT in the past and attended IT awareness-raising seminars. Perhaps more importantly, he perceived IT as critical to the organisation. Meanwhile, the CIO had spent a career in IT and had contributed beyond IT. In particular, he perceived the role IT should and could play within the organisation and help the CEO in executing the vision and strategies of the

business from an IT perspective. These results have also been confirmed, and at times even argued, in modern-day alignment literature (Hunter, 2010; A. Johnson & Lederer, 2006). Hunter (2010), for example, argues that the CIO plays a critical role in bridging the gap between IT and business; therefore, he is vital to the alignment process.

Lederer and Mendelow (1989) found that top management participation played a significant role in improving alignment. For example, alignment improved when CEOs encouraged business participation in IT planning, the establishment of an IT plan, and IT management's participation in business planning. This was later supported by Reich and Benbasat (2000), who proposed that CEOs could improve alignment if they enhanced the connection between business and IT planning in an organisation.

Some authors maintain that documenting the business plan facilitates alignment. Both Lederer and Mendelow (1989) and Reich and Benbasat (2000) argue that organisations cannot attain alignment unless a high quality business plan exists. However, such plans are contingent on the existence of clearly defined business goals and a shared business vision. To this extent, Van Grembergen and De Haes (2009) and *COBIT 5* (ISACA, 2012b) propose that an initial step towards alignment involves establishing the business goals. Only then can the supporting IT goals and plans be prepared. Surprisingly, Cragg, King, and Hussin (2002) found that alignment depended more on the establishment of a business plan than an IT plan; whereas two-thirds of their sample had a written business plan, only a quarter had formalised their IT strategy, nevertheless, many had achieved a high degree of alignment.

Notwithstanding Cragg et al.'s (2002) findings, Lederer and Mendelow (1989) found that both a business plan and an IT plan should be constituted. However, they found that these plans would only benefit alignment if they were coordinated. Consequently, emphasis was placed on planning processes and sophistication. In particular, Chan et al. (2006) found that the more sophisticated the planning process, the greater the likelihood of the involvement of personnel from different areas of expertise. This, in turn, led to improved shared knowledge and ultimately alignment.

While these studies focused primarily on individual foreground antecedents, Luftman and Brier (1999) attempted to establish a comprehensive list of antecedents that acted as both enablers and inhibitors for alignment. Their findings suggested that:

1. factors that IT executives could influence directly were project priority setting, IT knowledge of the business and IT leadership

2. factors under business control were IT involvement in strategy development and senior executive support for IT

3. both business and IT had to foster a close working relationship, therefore, communication, collaboration and interaction were critical.

In the same year, Teo and Ang (1999) investigated the antecedents for alignment. Although their focus was slightly different from Luftman and Brier (1999), in that they focused on the alignment of business and IT plans, their identified antecedents were similar. Interestingly, both Teo and Ang (1999) and Luftman and Brier (1999) found that communication was a critical foreground antecedent. In fact, Luftman and Brier (1999) listed it as one of the top antecedents in their study. Although Teo and Ang (1999) prioritised it lower, they nonetheless did emphasise its importance. Since then other authors have also highlighted the importance of communication (Reich & Benbasat, 2000; B. Campbell et al., 2005; Coughlan et al., 2005; Sledgianowski et al., 2004).

In their respective studies, both Reich and Benbasat (2000) and B. Campbell et al. (2005) proposed communication as a key antecedent to alignment. They associated communication with understanding, and argued that it in turn increased the locus of comprehension. Therefore, they argued that it would be wise for organisations to invest time and effort in addressing communication between their business and IT personnel. Sledgianowski et al. (2004) later supported this, since they noted that communication should be a fundamental and regularly occurring task of all managers and employees. In fact, they went so far as to state that communication should be pervasive throughout the organisation.

In summary, several background and foreground antecedents influence alignment. For an organisation to achieve proper alignment between its business and IT domains, all these antecedents need to be carefully investigated and deliberated (Luftman & Brier, 1999). That said, some antecedents might be more important than others. Given the above findings, communication would seem to be an indispensable cog in the machine for achieving alignment, especially in view of the fact that the effective exchange of ideas and a clear understanding of what it takes to ensure successful strategies are high on the list of enablers and inhibitors of alignment (Luftman & Brier, 1999). Given this, it would seem fruitful, and even necessary, for organisations, researchers and practitioners to examine

these antecedents carefully (Coughlan et al., 2005). This then corresponds with the intent of this study.

2.4 COMMUNICATION: A CRITICAL ANTECEDENT OF BUSINESS–IT ALIGNMENT

Having presented an overview of business–IT alignment, its different dimensions, and a variety of background and foreground antecedents, it has become evident that communication is critical to achieving proper alignment. In fact, it is considered to be among the top three antecedents of alignment. Accordingly, and in view of the fact that this antecedent is the primary interest of the study, this section now examines the extant alignment literature on this antecedent in more detail.

It is self-evident that business–IT alignment requires the business and IT personnel to collaborate at all levels of an organisation; that is, to understand and fully commit to the business and IT missions, objectives, and plans. Understandably, this necessitates proper and clear communication. In this context, communication typically refers to the effective exchange of ideas, knowledge and information between personnel residing in the business and IT domains of an organisation (Luftman & Kempaiah, 2007). As such, it entails a variety of social and cognitive processes which enable these personnel to understand the business and IT strategies, plans, the business and IT environments, risks and priorities, and how to achieve them (Luftman, 2000).

Communication has long been associated with business–IT alignment. In early research, Calhoun and Lederer (1990) found that a lack of communication of top management's objectives could account for the business function's dissatisfaction with strategic information systems planning. Meanwhile, Rockart et al. (1996) established that communication could greatly enhance alignment, since it ensured that business and IT potential were integrated effectively. Raggad (1997) found that, in order to enhance alignment, IT and business line managers needed to communicate and understand each other. Peppard and Ward (1999) also found that organisations with business and IT units that saw themselves as part of an equal partnership based on a strong foundation of communication were highly aligned. However, these were not the only authors to report communication's importance in achieving alignment.

The turn of the century also saw several studies highlighting the importance of communication. For example, Reich and Benbasat (2000) found that shared

domain knowledge and communication between IT and business managers positively influenced alignment. This was confirmed by Luftman and Brier (1999), while surveying over 500 executives from Fortune 100 US-based organisations, who found that the executives reported that clear communication was an absolute necessity for alignment to succeed. Consequently, they considered communication to be one of the top enablers of alignment. This later contributed to communication forming part of Luftman's (2000, 2003) alignment assessment model.

More recent studies have further emphasised this importance. Brodbeck, Rigoni, and Hoppen (2009), while collecting maturity data from 259 executives from 72 enterprises located in industrial centres in the south of Brazil, found communication to have the biggest influence on business–IT alignment among five other antecedents. This was later supported by another study conducted in China (L. Chen, 2010). L. Chen (2010) collected data from 130 business and IT executives from 22 companies in China, 11 of which were multinationals operating in China, and found communication to have the biggest influence on business–IT alignment.

Thus, it is clear from the above, regardless of the degree of formality, communication is critical in achieving business–IT alignment; particularly because it helps organisations ensure that IT resources are prioritised according to business needs. In addition, IT-based business solutions enable their users to create real value for the business. Accordingly, it would seem critical for organisations to identify, analyse and assess the status and nature of communication between the personnel that form part of their business and IT functions (Luftman, 2003).

Unfortunately, few alignment studies have explicitly looked at communication and its influence within the business–IT alignment context (Coughlan et al., 2005), not to mention the methods or approaches for analysing or assessing it. This is alarming, since without such methods or approaches, organisations might have little means to address one of the most influential antecedents of alignment adequately.

2.5 CONCLUSION

The primary aim of this chapter was to position and emphasise the importance of communication within the business–IT alignment context. To do so, it firstly introduced the concept of business–IT alignment and, secondly, its related re-

quirement of communication between business and IT personnel in order to facilitate information flow and mutual understanding.

The importance of information in relation to the success of modern organisations generally and IT as an enabler was discussed. Subsequently, the chapter emphasised that organisations are investing profoundly in IT to obtain competitive advantages; however, competitive advantages and true business value can only be obtained if the IT is aligned with the business's goals, objectives, and processes and vice versa.

Consequently, individual theories, past empirical research studies and findings from practice pertaining to business–IT alignment were introduced. Based on these, it became clear that business–IT alignment is a multifaceted and complex construct. Accordingly, as indicated in this chapter, the construct may be interpreted and investigated from various perspectives, each in turn being influenced by a variety of factors.

Based upon these previous works and findings, the chapter concluded by emphasising that communication (as a social construct) is critical in achieving business–IT alignment. In fact, it stipulated that communication between business and IT personnel for the sake of information sharing and information flow is vital, particularly in view of the fact that they are constantly required to exchange ideas, knowledge, and information to understand and fully commit to the business and IT missions, objectives and plans. It was therefore argued that organisations should be mindful of the role communication plays in alignment and should ensure that they address is adequately.

The next chapter will provide a detailed overview of the way in which communication generally can be approached, interpreted and ultimately assessed. In particular, it will investigate different perspectives on communication, various problems that may arise when different parties communicate and, finally, the way assessments may be conducted to identify and remedy these problems. This knowledge, coupled with the information pertaining to business–IT alignment, will paint the backdrop against which the method for assessing communication in business–IT alignment will be developed in later chapters.

BUSINESS–IT RELATED COMMUNICATION

"The single biggest problem in communication is the illusion that it has taken place."

— *George Bernard Shaw* (cited in Caroselli, 2000)

Communication is a critical antecedent to achieving adequate business–IT alignment. However, communication means different things to different people. Some give more attention to the information transmitted, others to how people interact, who is conversing with whom, and the context of the communication. Consequently, if one wants to explore communication within the business–IT alignment context, it is necessary to first explore and understand what such communication entails, especially because this may reveal the problems that organisations are likely to encounter during the communicative process and how they may be assessed. Accordingly, this chapter explores communication in business–IT alignment from a communication-theoretic perspective. To do so, it gives an overview of the different ways in which communication can be conceptualised, and explores the unique characteristics of communication in business–IT alignment. In addition, it investigates problems that are likely to be associated with such communication, and examines communication assessments as a possible approach or technique for identifying and analysing such problems.

3.1 INTRODUCTION

By its nature, communication plays a pivotal role in both the success and failure of modern-day organisations (Jordan et al., 2006). In the business environment of today, employees constantly have to exchange information quickly between each other to offer evaluation, direction and even control (Juiz, 2011). This is true for almost every business process, from the most basic verbal exchange between an employee and a manager to the most complex network involving hundreds or even thousands of people (Maier et al., 2004).

The previous chapter alluded to the fact that business–IT alignment is not a solitary activity; instead it is a social interactive process depending on the active collaboration and interaction of both business and IT personnel (IT Governance Institute, 2005). As such, it is a communication intensive activity, requiring both

business and IT personnel to communicate adequately in order to provide context for projects, raise awareness, elicit needs, and bind all business activities and IT tasks together (Luftman, 2003). However, much like everyday life, achieving this communication can be both challenging and troublesome (Coughlan et al., 2005).

Organisations today continue to experience misalignment between their business and IT visions and values, project expectations and scope, goals and risks, understanding and cultures, strategies, structures and processes (Luftman, Ben-Zvi, Dwivedi, & Rigoni, 2010). Communication underlies many of these issues (Coughlan et al., 2005; Cybulski & Lukaitis, 2005). It is therefore important for organisations to understand how communication works in the business–IT alignment process and where it could break down (Luftman, 2000; Reich & Benbasat, 2000). Most importantly, they need to know how to identify, assess and ultimately remedy communication-related problems (Maier et al., 2004). Hence, a method to assess communication in business–IT alignment might prove helpful.

Communication can best be compared to love. Both are everyday phenomena occurring at a moment's notice, yet they remain abstract and multifaceted, particularly because they are influenced by a plethora of internal and external factors (Eckert, Maier, & McMahon, 2004). This presents a challenge: if these concepts are so complex, and there are so many things that can be brought to bear on them, how can they possibly be assessed? In attempting to arrive at a solution, one first needs to investigate and understand how people conceptualise them (Maier, Eckert, & Clarkson, 2005). Only once this is understood can the conditions needed for success or failure be determined.

Consequently, before creating a method for assessing communication, it is necessary to explore the different ways in which communication may be conceptualised within the context of the method (Maier et al., 2004); particularly because this will allude to the individual factors and aspects that the method needs to assess. This is important, since different conceptualisations might affect the creation of the method itself and thus produce dissimilar results.

Accordingly, the primary aim of this chapter is to explore communication in business–IT alignment in more detail from a communication-theoretic perspective. In doing so, four objectives are identified: firstly, to give an overview of the different approaches whereby communication can be conceptualised within the business–IT alignment context; secondly, to explore the unique characteristics of communication in business–IT alignment; thirdly, to investigate problems that are likely to be associated with this communication; and, fourthly, to examine

communication assessments as a possible approach or technique for identifying and analysing such problems.

These and related issues will be discussed further in this chapter as follows: Firstly, the chapter explores the complementary but distinct ways in which the academic literature conceptualises communication (§ 3.2). In particular, emphasis is placed on a systemic perspective, which models communication as a multifaceted concept that is influenced and affected by many internal and external factors. Secondly, following the systemic perspective, it explores the unique context and characteristics of communication in business–IT alignment (§ 3.3). Thirdly, it reviews existing research addressing business–IT related communication to draw attention to potential communicative problem areas, points where a breakdown in communication could occur, and the difficulties organisations could face during the alignment process (§ 3.4). Finally, it brings these ideas together by discussing why it is important these communication-related problems be identified and remedied, and examines communication assessments as a possible approach or technique whereby this could be achieved (§ 3.5). These issues will be summarised and conclusions drawn at the end of the chapter (§ 3.6).

Together, this and the previous chapter set the foundation on which a method for assessing communication in business–IT alignment will be developed in later chapters (see Figure 2.1).

3.2 CONCEPTUALISING COMMUNICATION

Communication is probably the single most important factor that governs the success of the human race (Jordan et al., 2006). It is one of the oldest fields of human inquiry, reaching back to the rhetoric of Aristotle (W. Roberts, 1924). Communication has been researched in a variety of disciplines, ranging from mathematics (Shannon & Weaver, 1964) to sociology (Budd, 1972) and beyond (Griffin, 2012). Yet despite this, there is no single theory to which all scholars refer.

Communication means different things to different people. Several years ago, Dance (1970) suggested that there were as many as fifteen discrete meanings of communication. A few years later, Merten (1977) identified 160 different definitions. Some definitions give more attention to the information transmitted, while others focus on how people interact, who is conversing with whom, the context of communication, and whether the individual is giving appropriate and consistent weightings to different aspects of communication (Eckert et al., 2004).

Consequently, communication can be conceptualised in several ways: as the transfer of information, as interaction between two or more individuals and even as something that occurs within a specific context and situation (Maier et al., 2005). These different conceptualisations are complementary rather than contradictory, each emphasising different aspects of communication. Consequently, to explore communication fully, a combination of different perspectives has to be employed (Fiske, 1990, p. 4).

This section explores these conceptualisations in more detail by providing a literature review on the subject of the conceptualisations of communication. Three distinct conceptualisations will be shared here; namely, an information-centred perspective focusing on the information to be transmitted (§ 3.2.1); an interaction-centred perspective concentrating on the way communicators interact (§ 3.2.2); and a situation-centred perspective emphasising the specific context in which communication takes place (§ 3.2.3). After having discussed these three perspectives, a systemic perspective will be proposed that integrates all these into a single unit of interpretation (§ 3.2.4). This single unit of interpretation is the lens through which the remainder of the thesis will be approached and the assessment method will be developed.

3.2.1   *Information-Centred Theories (The Information Transmission Perspective)*

One way to conceptualise communication is to view it as the transmission of information. This view has its intellectual antecedents in a mechanistic worldview, which holds as its basic premise that the universe can best be understood as a mechanical system (Malik, 2003); that is, as a system composed of individual components that are not more than the sum of its parts. As a representation of this way of viewing communication, the theory presented by Shannon (1948) will serve as an illustration.

In his work, *A mathematical theory of communication*, Shannon reduced communication to a set of basic constituents. He postulated that communication could be thought of as a basic system composed of five elements (see Figure 3.1), namely, a source, a transmitter, a channel, a receiver and a destination. First, the information source (sender) converts the originating information into a message. A transmitter then translates this message into signals and transmits it along lines or channels to the receiver. The receiver then converts the signals into a message again, which the destination (information recipient) then decodes and

interprets. Meanwhile, noise could distort the originating information at any time, thus leading to miscommunication.

Communication System
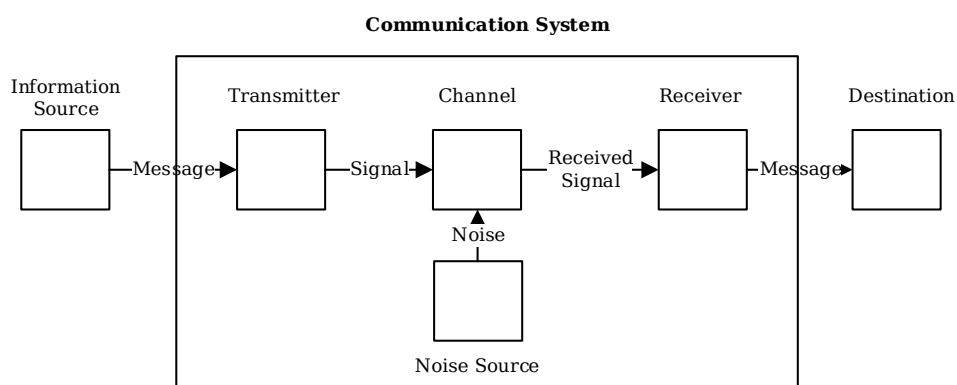
Figure 3.1. Communication System (Shannon, 1948)

Shannon's theory essentially reduces communication to a linear, unidirectional, and mechanistic process. It is seen as a one-way process, where the focus rests on the information source (sender) and the transmitted message (I. Ang, 1996). According to this view, communication is seen solely as an act of transmitting information from the sender to the receiver, where the challenge lies in the transmission of information rather than in the understanding of the recipient (Maier et al., 2005). This is similar to the 'conduit metaphor' (Reddy, 1979), where the sender is seen as putting a message and its meaning in a tube and squeezing them out as one at the other end.

The important thing to realise is that both Shannon's (1948) theory and Reddy's (1979) 'conduit metaphor' were never intended to model human-to-human communication. Shannon's theory was developed specifically to illustrate the importance of noise reduction in electrical data transmission. However, in collaboration with Weaver, who was convinced of the general applicability of the theory, he did later attempt to generalise the theory (Shannon & Weaver, 1964). Nevertheless, the problem remained that the theory, like Reddy's metaphor, ignored the individual cognitive processes of the sender and the receiver and their interaction (Maier et al., 2005).

In terms of this perspective, the information contained in a message appears to exist in and of itself. It exists apart from the people who are thinking about it, talking about it and using it (Jordan et al., 2006). Therefore, matters such as social context, the assumptions made by the sender and the receiver, their experiences and so on are disregarded (Maier et al., 2005). Moreover, there would seem to be an implicit causality assumption insofar as the connection between the sender and the receiver is linear. The sender has an effect on the receiver through the

message and an action is followed by a reaction (I. Ang, 1996). Thus, in terms of this view, communication and its outcome is seen as being predictable (Lazarsfeld, Berelson, & Gaudet, 1944, p. 273). In real life, however, this is seldom the case.

In summary, this perspective may work well for fidelity and message transmission in technical or electrical communication. However, it works less well for sociologists, or others concerned with the cognitive and social nature of communication – as this thesis is with business–IT alignment. This is not to imply that it does not have validity, but merely that it only captures a reductionist view of the larger communicative process. Therefore, further complementary perspectives would also need to be studied.

3.2.2   *Interaction-Centred Theories (The Interaction Perspective)*

While the information-centred theories model and perceive communication in essence as the passing on of information, others view it as the construction of new knowledge through the interaction of the communication partners (Eckert et al., 2004). That is, the interaction between the sender and the receiver (Taylor, Cooren, Giroux, & Robinchaud, 1996). Therefore, communication is seen as more than just transferring information; it is an emergent property of the interaction between many (at least two) individuals (Maier et al., 2005). As a representation of this way of viewing communication, the co-orientation theory presented by Taylor et al. (1996) will serve as an illustration.

Taylor et al.'s theory of co-orientation contends that communication is in fact an interactive process of co-constructive meaning-making among people. Unlike the transmission theories, it emphasises that information does not have meaning in and of itself, but rather that people give it meaning (Jordan et al., 2006). Therefore, communication comes to exist not in a vacuum, but rather through the negotiation, adaptation and adoption (interaction) that takes place among people (Robbins & Judge, 2013). However, this neither is the only theory nor are these the first authors to emphasise this.

Delia (1977) contends that an essential determining factor in the communication process is the cognitive complexity of the communication partners, which becomes visible in the interaction process. During the interaction process, communicators have to interpret received information. However, underlying this interpretation, or the act of making sense, are cognitive schemes and categories which develop because of interactions between the individuals and the chal-

lenges in their environment (Eckert et al., 2004). Therefore, information and its meaning cannot be transferred as an isolated unit, but rather is created by the people themselves; that is, by their experiences, viewpoints, operational language and relations to each other (McCann, 1993). Advocates of the speech–act theory have long realised this (J. Austin, 1962; Searle, 1969).

By prescribing to this perspective, communication is seen not as being linear and unidirectional; instead it is seen as forming a circuit among the people, interacting and being co-operative (Le Ray, 2007). That is, each communicator affects the other and thereby alters the shared meaning of the information together (see Figure 3.2). Thus, the focus shifts from solely the sender and the message to consider the active role of the receiver as well. As Luhmann (1995) states, although individuals are necessarily involved in bringing about communication, it cannot be understood as the product of any particular person alone. Rather, it should be seen as the unique combination of relations between them. Consequently, cooperation and coordination become critically important (Taylor et al., 1996).
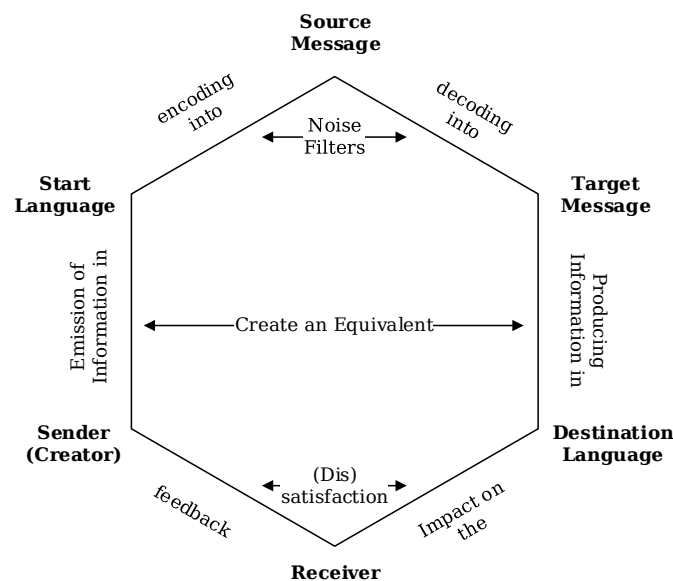
Figure 3.2. Communication Circuit (Le Ray, 2007)

To conclude, the interaction perspective sheds light on the co-operative nature of communication and the active roles of both the sender and the receiver. However, it refrains from addressing the context within which the communication occurs. Within a given context information being communicated might evoke more than one reaction (McCann, 1993), particularly because the meaning of that information might vary. Therefore, although it is important to study the transfer of information and the interaction between the communicators, the

context within which this occurs should also be considered (Eckert et al., 2004; Maier et al., 2005).

3.2.3 *Situation-Centred Theories (The Context and Situation Perspective)*

A transmission-centred perspective focuses on the transfer of information (Shannon, 1948), while an interaction-centred perspective focuses on the cooperation and collaboration among individuals during communication (Taylor et al., 1996; Le Ray, 2007). Both perspectives perceive communication as occurring relatively independently of a specific context (Eckert et al., 2004). This is in sharp contrast to the context and situation perspective, which takes as antecedent the fact that various context variables affect communication (Griffin, 2012; McCann, 1993). In representing this way of viewing communication, contextual theories will serve as an illustration.

Contextual theories, such as ethnography, emphasise that the situation within which communication occurs will have a direct influence both on the information transmission and the interaction process (Hymes & Gumperz, 1972). Consequently, the situation not only embodies the perceived environment but also the wider context, including things such as the organisation, the nature of the team (within which communication takes place), and the social background and culture of the team members (Eckert et al., 2004). For example, communication between a business and an IT unit would differ from communication among business units (i.e., production and human resources), as would the experience and social backgrounds of each member of these units (Peppard & Ward, 2004; Pozza, 2014). Therefore, the context and situation combine to offer a unique backdrop against which communication occurs.

While few would disagree that the communication context and the situation are important, the difficulty often arises as to how these affect communication directly; that is, how an individual can assess or measure them. The context might embody several hundred factors, originating from a variety of places (see Figure 3.3), rendering their dissemination a possibly futile effort. Nevertheless, some authors have reported that the perception and understanding of even a few context variables might positively influence communicative behaviour (Suchman, 1987; Clancey, 1997). Therefore, although problematic, considering communication from this perspective might still prove beneficial.

It is therefore apparent that the context and situation in which communication occurs plays an important role. However, it should not be investigated in

SOCIETAL AND CULTURAL PRESSURES

LEGAL AND REGULATORY RULES

ORGANIZATIONAL AND MANAGEMENT BEHAVIOUR

TEAM AND GROUP BEHAVIOUR

INDIVIDUAL BEHAVIOUR

Political pressures

Legal liability

Fault reporting practices

Cooperation

Bias

Educational level

Communication

Decision making

Work patterns

CONTEXT / SITUATION

Motor skills

Anthropometrics

Perception of responsibility

Rank and chain of command

Legal limitations on behaviour

Rules and regulations

Economic pressures

Perception Attention Thought Memory

Coordination   Reinforcement

Culture   Hierarchy of authority   Goal setting

Constraints on system design and work practices

Demands by members of society outside the system

Figure 3.3. Factors Affecting the Communication Context (Moray, 2000)

isolation (Eckert et al., 2004). If studied in isolation only a small fraction of the communicative process will be understood. The same is also true if taking a purely transmission or interaction perspective. Consequently, the information, interaction and situation perspectives should all be studied together as a system (Maier et al., 2005). Only then will the true richness of communication be fully captured.

3.2.4 *System-Theoretic Theory (The Systemic Perspective)*

The three aforementioned perspectives (information, interaction, and context) complement each other. Although one perspective might be more prevalent in a certain situation than another, each is always present. Thus, a perspective is needed that integrates all of them into a whole – a 'system' (Eckert et al., 2004; Maier et al., 2005). This is afforded by the systemic perspective of communication, which has its origins in general systems theory and sociological systems theory (Luhmann, 1995).

General systems theory (GST) is the interdisciplinary study of 'systems' in general (Gopinath, 2008). Its goal is to discover patterns and elucidating principles that can be discerned from, and applied to, all types of system at all nesting

levels in all fields of research (Skyttner, 2005). It was originally proposed by Bertalanffy (1968).

Bertalanffy, in introducing GST, argues that 'systems' (in this case, communication) are not mechanical. They cannot be broken down into their individual components so that each component can be analysed as an independent entity. Similarly, their components cannot be added linearly to describe the totality of the 'system'. On the contrary, he posits that a 'system' is characterised by the interactions of its components and the non-linearity of those interactions. Hence, he reasons, unlike those taking a mechanical view of the universe and specifically of communication (i.e., Shannon's theory), a systems view is necessary; that is, a view that considers the totality of the 'system' as opposed to its individual components.

Luhmann (1995), finding inspiration in GST, is a vocal proponent of taking a systems view to communication. He posits that communication constitutes social systems such as societies, organisations, and interactions. If communication stops, these systems cease to exist. Thus, the continued existence of a system is dependent on the continuation of communication. As Luhmann (1986, p. 174) writes:

> *"Social systems use communications as their particular mode of autopoietic reproduction. Their elements are communications, which are recursively produced and reproduced by a network of communications."*

Consequently, according to Luhmann (1995), communication itself is a self-organising social process and system. On that basis, he considers communication to be a combination of three individual components, namely: (i) information, (ii) utterance, and (iii) understanding. However, he is not the only author to emphasise the systemic nature of communication.

Eckert et al. (2004) propose a systemic perspective on communication, which concurrently incorporates the concepts of information, interaction and situation. These authors contend that communication can be seen as a 'social' system (see Figure 3.4), in which at least two participants are involved. Each of these can be both senders and receivers. At the same time, these participants are seen as interacting cognitive systems distinct from but also influenced by their emotions and their environment.

According to their proposed perspective, Eckert et al. posit that communication is at the same time a social, cognitive and emotional act. It is social because different people are interacting with each other in a social and political context.
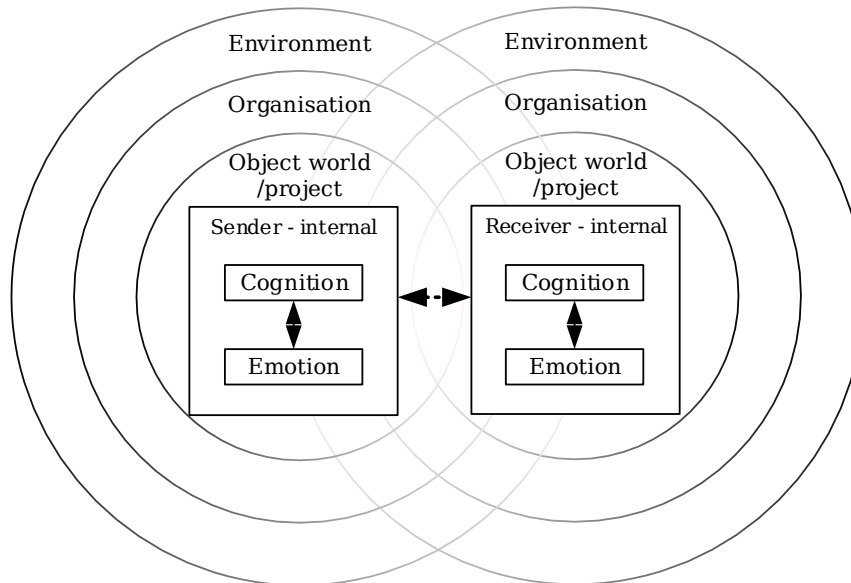
Figure 3.4. Systemic View of Communication (Eckert, Maier, & McMahon, 2004)

Communication is cognitive since what people say and how people make sense of what they perceive depend on their mental models and prior realm of semantic, syntactic, and pragmatic knowledge. As far as the emotional aspect is concerned, communication also depends on how we feel about the people we communicate with and about the content of the message, we are trying to convey. Not surprisingly, trust, amicability and the willingness of someone to hear the thoughts of another person with good will are often central to any communicative act.

When communication is viewed from a systemic perspective, several factors are seen to influence it beyond an individual (sender or receiver). Aspects such as the immediate team, the organisation, and even the environment will all have an effect (see the outer layers of Figure 3.4). For example, the choices a communicator makes will be influenced strongly by the norms and values of his/her immediate team, particularly because the individual members of the team will have different educational backgrounds. Thus, they will have their own object worlds or mental models.

Meanwhile, organisational features such as size, the organisational set-up, policies and leadership style will also influence the communication process. Then there is also the aspect of environment – the society as a whole, the communicator's immediate community, the groups s/he belongs to, and the individuals s/he interacts with will all effect communication. Consequently, all these aspects (or layers) influence communicative behaviour (Eckert et al., 2004).

Taking all the above into consideration, there are different ways in which to conceptualise communication (Dance, 1970; Merten, 1977). While an information, interaction or situation-centred perspective might be taken, such perspectives should not be studied in isolation (Maier et al., 2005) because they will only offer a narrow view of the larger communicative act. Hence, to allow for a more comprehensive view of communication, a systemic perspective should be taken (Eckert et al., 2004; Luhmann, 1986).

Such a perspective holds several benefits; namely, it acknowledges that communication is a 'social' system where two or more communicators are exchanging information; it recognises that each communicator acts based on their own mental models and emotions; and it recognises that several contextual factors influence both the communicative process at large and the communicators themselves. Thus, it integrates the information, interaction and situation-centred perspectives into a comprehensive system by means of which communication can be studied, interpreted or analysed (Maier et al., 2005). Moreover, it considers the totality of the system while still allowing the individual components to be investigated.

3.3 CHARACTERISING COMMUNICATION IN BUSINESS−IT ALIGNMENT

The previous section presented an overview of various complementary, yet distinct, perspectives whereby communication may be interpreted and approached. There was a specific focus on system-theoretic modelling, and the fact that communication should be conceptualised from a systemic perspective. In the context of this thesis, business−IT alignment is considered a social system and communication is seen as being an integral part of the alignment process (see Chapter 2). Accordingly, it would seem most appropriate, and even necessary, to use a systemic perspective to investigate and assess communication within business−IT alignment, particularly in view of the fact that it would allow for a comprehensive treatment of several aspects of communication, such as the information, interaction, and situation.

Adhering to the systemic perspective of communication, this section of the literature review is now concerned with characterising communication specifically within the business−IT alignment context. To do so, it firstly defines communication within this context (§ 3.3.1), secondly, it discusses the typical parties involved and the purposes for this communication (§ 3.3.2) and, thirdly, it inves-

tigate those personal and contextual factors that influence this communication
(§ 3.3.3).

3.3.1 *Defining Business–IT Related Communication*

As the previous chapter described, business–IT alignment involves having the
business and IT-related personnel of an organisation working together to reach
a common goal (B. Campbell et al., 2005). Naturally, this requires collaboration
at all levels of an organisation, especially since it would require information
to be actively communicated and made sense of, and to understand and fully
commit to the business and IT missions, objectives and plans (Luftman, 2003).
Consequently, alignment does not develop passively, but rather through active
social interaction and communication (Coughlan et al., 2005).

Luftman and Kempaiah (2007) state that communication in business–IT align-
ment can best be described as a social and cognitive process whereby ideas,
knowledge and information are mutually exchanged between business and IT
personnel. As such, it does not refer to the mechanistic, engineering, or mathe-
matical processes of communication. Instead, it focuses on the social processes
contributing to mutual understanding (Reich & Benbasat, 2000; Sledgianowski
et al., 2006).

Consequently, the success of communication in business–IT alignment is mea-
sured not just by the fact that it has taken place alone; rather it is measured on
whether it has enabled both business and IT personnel to understand the busi-
ness strategies, plans, business and IT environments, risks and priorities, and
how to address them (Luftman, 2003).

3.3.2 *Parties Involved and Purposes*

During the alignment process a variety of different communicator (sender and
receiver) configurations can be observed (IT Governance Institute, 2005). Person-
nel in one business unit may have to communicate with another or one IT unit
with another. However, more often a business unit may have to communicate
with an IT unit or vice versa. These exchanges can occur in three directions
(Maier et al., 2004), including top down (e.g., from a business manager to an IT
staff member), bottom up (e.g., from an IT staff member to a business manager)
or in between (e.g., between IT staff or between business staff). In addition, they
may be formal or informal, taking the form of verbal commands, written poli-

cies or documents (Jordan et al., 2006). Meanwhile, they could occur at the same time (synchronously) or at different times (asynchronously).

These communicative acts could occur for a variety of purposes (Juiz, 2011). It may be to delegate, report on, raise awareness of or handle a problem pertaining to an IT artefact. It could also concern a process or a relationship (between individuals or teams, or between people and artefacts, rules, representations and so forth) (De Haes & Van Grembergen, 2005). It could be to describe the state that something is now in, or how and why something has to be the way it is (making sense), or how something might or should develop (framing the future).

For example, IT personnel frequently need more information to progress with an IT project. Consequently, information requests between business and IT units occur regularly. IT projects also operate within given business constraints. Therefore, discussions to ensure that these constraints are correctly understood and interpreted occur. Meanwhile, business and IT personnel might communicate to discuss new ideas or avenues where IT could contribute to the business. Similarly, they could interact to resolve conflicts, discuss IT project concerns or offer justifications for decisions taken. These last-mentioned purposes are especially important, given that IT projects can so easily fail in modern-day businesses.

3.3.3 *Influences on Business–IT Related Communication*

There are various reasons why business and IT personnel have to communicate with each other. However, they do not communicate in a vacuum; instead several contextual factors could affect their communication (Eckert et al., 2004).

Factors that affect communication may pertain to the environment, such as legislation, IT best practices, and standards. Typical examples of these include *ISO/IEC 38500* (2008), *ISO/IEC 27002* (2005), and the *COBIT 5: Framework* (ISACA, 2012b). The organisational sphere will also influence the communication, such influences include the culture among the business and IT personnel (Silvius, de Waal, & Smit, 2009) and the role IT plays in the organisation (Nolan & McFarlan, 2005). In addition, they may include the procedures involved in business and IT strategic planning among others (Reich & Benbasat, 2000). Then there is also the team or function in which each communicator resides. The degree of knowledge sharing both in the team and between the team and others could influence the communication (Luftman, 2003). Similarly, the degree of cooperation, mutual understanding and even team identity offer a unique backdrop against which the communication will occur (Coughlan et al., 2005).

These factors all unite to form a unique context within which communication occurs during the business–IT alignment process. That said, they could just as easily influence any other process within the organisational sphere. What makes communication in business–IT alignment truly unique are the characteristics of the communicators themselves (Coertze & Von Solms, 2013b, 2015b), that is, the business and IT personnel communicating with each other.

Business and IT personnel often have different mental models and understandings of the organisational environment (Deloitte, 2006). Moreover, they frequently have differing appreciations of the importance, uses and needs of IT (Leonard, 2008) and their success criteria and 'operational languages' may differ widely (Schwaninger, 2001). They therefore often operate according to differing cognitive systems. Consider, for example, the senior business managers in an organisation. These managers are responsible for the overall well-being of the organisation (Institute of Directors in Southern Africa, 2009a), therefore most of their focus is on risks, business value and stakeholders. Consequently, their operational language is usually primarily business-oriented, particularly given that their educational background often resides in accounting, business administration, law and finance (Posthumus, Von Solms, & King, 2010). It should therefore come as no surprise that they approach business decisions, operations and, ultimately, communication from a more holistic and integrated viewpoint (Millar, 2009). However, this is in sharp contrast to the usual IT personnel.

IT personnel are concerned with service delivery (Van Bon, 2011). Most of their focus is on keeping IT running without interruption daily. To this extent, they are responsible for the upkeep and maintenance of the IT infrastructure and architecture (Marchand, 2007). Consequently, their operational language naturally resides in technology-oriented jargon. This is further compounded by the fact that their educational background often resides in software development, networking and other technical disciplines (Hunter, 2010). Furthermore, their operational outlook is often limited to their immediate surroundings and those business units they serve. This results in them having a narrow viewpoint, where a holistic appreciation of the organisation's larger business may be lacking (Millar, 2009).

Taking the above into account, communication within the business–IT alignment context has many unique characteristics. While some characteristics might be universally applicable, the interaction between business and IT personnel and its several challenges are specific to this context. This includes aspects such as differing educational backgrounds, viewpoints and 'operational languages' (Millar,

2009; Donnelly, 2010). All of these make for a complex and volatile communication environment, where the likelihood of conflict, misalignment and ultimately miscommunication arising is astronomical (Luftman, 2003). Not surprisingly, several studies in business–IT alignment have highlighted the frequency and multiple causes with which communication breakdown occurs between business and IT personnel (Coughlan et al., 2005; Cybulski & Lukaitis, 2005).

3.4 BUSINESS–IT RELATED COMMUNICATION BREAKDOWN

The unique characteristics of communication in business–IT alignment discussed in the previous section carry their own problems and difficulties. In many alignment situations, it is difficult to identify communication problems as such or find their root causes, because they are so closely interwoven with other procedural issues (Coughlan et al., 2005). Even if a communication problem is detected, organisations often struggle to see where it comes from. Sometimes it is the effect of factors such as management structures or corporate culture, at other times the problem is purely personal (Maier et al., 2005). To this extent, communication breakdown can have multiple causes.

This section aims to discuss some typical causes of business–IT related communication breakdown. Although the discussion is not exhaustive, it does provide the reader with a tentative scheme of likely problems that might be experienced during the alignment process. For more detail, the reader should refer to the relevant authors of alignment and communication texts referenced throughout this section.

At present, few business–IT alignment studies have specifically investigated the causes of communication breakdown in the alignment process. An exception to this is Coughlan et al. (2005), whose study took a communication-based view on the concept of alignment to investigate the relationship between the retail business and IT in a major UK high street bank. The authors undertook semi-structured interviews with 29 individuals on mid-high management level to identify likely causes for communication breakdown in the business–IT relationship.

Using thematic content analysis of the transcribed interview material, Coughlan et al. (2005) identified nine broad causes of communication breakdown during the alignment process. These themes included:

1. a lack of business–IT experience among the business and IT personnel

2. an organisational structure that segregated the business and IT units

3. an IT division that was isolated, which led to a lack of co-operation

4. a corporate culture that promoted a 'them-and-us' attitude

5. a lack of clarity and understanding of business and IT personnel's roles

6. a lack of overview and understanding among the business and IT personnel

7. a lack of information exchange, owing to a shortage of communication channels

8. IT personnel lacking contact with the 'customer', and

9. meetings lacking the correct attendees and offering limited interactivity.

While these broad causes of communication breakdown are specific to the case of the UK bank, other authors have taken a more general approach. In particular, Cybulski and Lukaitis (2005) conducted two focus groups with 16 senior business and IT executives to talk about communication and understanding issues surrounding the alignment of business and IT. The focus group members represented a variety of substantial and long-standing companies in Australia, in which activities ranged from software development and management consulting, through health care, banking and finance, to logistics and business intelligence.

Following a hermeneutic study of the transcripts of the two focus groups, several common causes for communication and understanding-related problems were identified. Business and IT members lacking understanding of their counterparts' operations was seen as a primary cause. Another cause related to a lack of trust. If the business function(s) did not trust their IT counterparts, the communicative and alignment processes were placed under severe strain. A difference in 'operating language' among business and IT personnel was also found to lead to communication breakdown. Business personnel operate according to a business-oriented perspective; while IT personnel, on the other hand, primarily follow a technology-oriented perspective. If they did not reconcile their different perspectives during the communicative act, then the likelihood for misunderstanding and misinterpretation existed.

Millar (2009) and Coertze and Von Solms (2015b) have argued and found support for the latter finding by Cybulski and Lukaitis (2005). These authors have argued that a common cause for communication breakdown in business–IT alignment relates to the necessity for business and IT personnel to 'translate'

their 'operational language' when communicating. In cybernetics this is better known as 'transduction' (Styhre, 2010). Transduction denotes that when two differing 'systems' (i.e., business and IT personnel) interact, they must translate the information being exchanged among them into a language that is understood by the receiving 'system' (Beer, 1984).

The difficulty in transduction rests on the fact that each 'system' has to have enough background and understanding of each other's mental models and context of operations to do so (McCann, 1993). In other words, they must understand where each is coming from. While easy to achieve within a single team or function, it becomes difficult when different departments interact; increasingly so when these departments operate differently, have different operating procedures and differing 'operational languages'. Yet, this is often the case when it comes to business and IT units.

Coertze and Von Solms (2015b) also share a more general cause for communication breakdown during the alignment process. This relates to information distortion. During the alignment process, information is often passed on via several other people before it reaches the ultimate recipient (Juiz, 2011); for example, from a business manager to IT manager to IT staff member. The originator of the information might not know the eventual receivers' needs, tasks, and background. In addition, each individual along the communicative chain has to interpret and forward the information along but, given that each individual has his/her own mental model, the original meaning and intent of the information might be lost. As Nichols (cited in Rollinson, 2008), for example, indicates, the clarity and understanding of an instruction may have decreased by as much as 80% by the time that information has progressed down or up through the organisational hierarchy. Consequently, business and IT personnel might not receive the information they need to know, or might receive it voided of important aspects.

It can be concluded from this section that there are a myriad reasons why communication could break down during the business–IT alignment process. Sometimes it is the effect of contextual factors such as management structures or corporate culture, at other times the problem is purely personal. In particular, it might be a lack of understanding or a disposition to the differing 'operational languages' among personnel. The concern here is the recurrent nature of these causes and the fact that communication is so critical to the alignment process. If communication is this important and it can so easily break down, then it would seem fruitful, and even necessary, for organisations to invest time and effort

in identifying, analysing and, ultimately, remedying the communication break-
downs. At present, however, no known approaches or techniques exist to do so
in the business–IT alignment discipline. This is in sharp contrast to other disci-
plines, such as engineering design, where so-called communication assessments
have been developed (Maier et al., 2004, 2006).

3.5 COMMUNICATION ASSESSMENT

The literature review until now has highlighted the fact that communication is
a critical antecedent to the business–IT alignment process. However, it has also
shown that it can easily fail or break down for a variety of reasons. Consequently,
many organisations could benefit from a careful assessment of the communica-
tion practices they employ in achieving adequate business–IT alignment. Given
this, this section aims to discuss communication assessments in more detail.

In the health and accounting disciplines, assessments are commonplace (Gold-
haber & Krivonos, 1977). For example, a physician assesses a patient's health to
ascertain the information necessary to make a diagnosis. Similarly, an accoun-
tant assesses an organisation's finances to ensure accuracy and obtain informa-
tion pertaining to profitability. In this context, an 'assessment' is an evaluation
of a designated process (Maier et al., 2006). Thus, a means to gain insight, to
analyse and assess the patient's health or an organisation's finances (D. Jones,
2002).

While uncommon, similar communication assessments do exist (Hargie &
Tourish, 2009). The concept of assessing communication in an organisation is
not a new one. The use of the phrase 'communication assessment' was first
introduced by Odiorne (1954). Since then, a number of communication assess-
ments have come to exist for organisational communication (Hargie & Tourish,
2009; Booth, 1986; Emmanuel, 1995). A notable assessment is the communica-
tion audit developed by the *International Communication Association* (Goldhaber
& Krivonos, 1977).

A communication assessment is a means of analysing and assessing current
communication patterns in an organisation (Hargie & Tourish, 2009). The aim
of such an assessment is to produce a clearer understanding of how well com-
munication works and the degree to which it satisfies an organisation's needs
(Eckert et al., 2004). Essentially, it provides an organisation with advance infor-
mation, which may prevent major communication breakdowns that limit overall
organisational effectiveness (Goldhaber & Krivonos, 1977). As such, it informs

the organisation of symptoms of discontent. It can also act as a means to find the root cause of communication problems (Maier et al., 2004).

Typical questions that need answering during a communication assessment include the following (Maier et al., 2006):

- What is the current ('as-is') communication situation in the organisation?

- What is the desired ('to-be') communication situation in the organisation?

- What factors are influencing these situations and how do they interrelate?

- How could these interrelating factors be influenced to improve the communication situation?

A multitude of methods can be used and combined in different ways to answer these questions. Authors such as Hargie and Tourish (2009), D. Jones (2002) and many other (Porter & Roberts, 1976; Price, 1972) have described a variety of instruments, techniques, tools and methods for assessing or auditing communication in organisations. Some of these methods include participant observation, interviews, questionnaires, critical incident analysis, experiments and focus group sessions (Hargie & Tourish, 2009). More recently, the engineering design discipline has employed a maturity grid-based approach (Maier et al., 2006).

While a communication assessment can evidently be performed, there are inherent challenges. The first challenge pertains to the complex and abstract nature of communication itself. An assessment requires criteria against which a process or an outcome is compared, yet because communication processes are highly complex the relationship between 'input-and-output variables' cannot be predefined or predicted to function as a universally applicable, lasting standard (Hargie & Tourish, 2009). Added to this, communication involves people and people have different preferences. What works for one person might not be appropriate for his or her colleagues.

There are, however, means for overcoming this. For example, if one conceives a communication assessment as a (instantaneous) assessment based on an individual's perception, given a certain situation, one might be able to find a way of assessing communication (Maier et al., 2006). In other words, communication is not measured against a universally applicable and unchangeable standard; instead, the perceptions of several individuals are compared and an inter-subjective valid assessment is derived – as established collectively by the individuals themselves.

The second challenge communication assessments face pertains to whether communication can be controlled. The mechanistic transmission theories (see

§ 3.2.1) seem to emphasise the fact that communication processes can be controlled, for example by increasing the bandwidth of a channel. However, when viewing communication from a systemic perspective (see § 3.2.4), such control might not be possible.

While a systemic perspective on communication might propose that one cannot control communication, it is still possible (Eckert et al., 2004). The contextual factors influencing communication could be steered to a moderate extent. In addition, the cognitive and emotional systems of the individuals involved in the communicative act could be altered by raising awareness and engaging the individuals in an ongoing learning process (Maier et al., 2006).

It is clear from the above that although communication assessments are less well known they do offer a useful tool for organisations to analyse their communication processes. They are not without their challenges, however. Nevertheless, if they are correctly developed and approached many of these challenges can be overcome. Unfortunately, while general organisational communication assessments (Goldhaber & Krivonos, 1977) and some discipline-specific assessments (Maier et al., 2006) do exist; none exist currently that cater specifically for the unique context and characteristics of business–IT alignment. In view of this, the fact that communication is critical to business–IT alignment and that it can easily break down, it would seem necessary for a communication assessment to be developed specifically for the business–IT alignment context. This then coincides with the intent of this study.

3.6 CONCLUSION

The primary aim of this chapter was to explore communication in business–IT alignment from a communication-theoretic perspective. To do so, it firstly gave an overview of the different ways in which communication may be conceptualised and, secondly, explored the unique characteristics of communication in business–IT alignment. Thirdly, it investigated problems that are likely to be associated with this communication and, lastly, examined communication assessments as a possible approach or technique whereby such problems could be identified and analysed.

This chapter reviewed different perspectives on communication to describe how one can investigate, assess, and, ultimately, remedy communicative events. In particular, it explored the information-centred, interaction, situational and systemic perspectives.

Information transmission theories and models predominantly focus on the sender of a message's intended meaning and how this meaning is imparted to a receiver. A popular model within this perspective is Shannon's (1948) theory. However, while very applicable to electronic communication; its feasibility for investigating human-to-human communication may be questionable.

Meanwhile, interaction-centred theories focus on the relationships and behaviour that occur between the sender and receiver. That is, the way in which they interact. This usually involves looking at the signs, symbols, and gestures used by the communicators when attempting to express meaning.

Situational theories and models focus rather on the communication context, which influences both the information transmission and interaction. These theories not only consider the directly perceivable environment but also the wider context, such as the organisation, the nature of the team within which communication takes place, and the social background of the team members.

A systemic perspective, based on GST (Bertalanffy, 1968) and sociological systems theory (Luhmann, 1986), integrates the three aforementioned information, interaction, and situational perspectives. By adopting this perspective, it is possible to understand better the various individual factors and elements that define a communicative event; particularly because the information, interaction, and situation are considered in terms of the larger system in which they operate, as opposed to a narrower view. Consequently, the focus shifts to co-ordination and mutual understanding between the communicators (Taylor et al., 1996) – a view adopted in this thesis.

Adopting a systemic perspective on communication has several implications for this thesis. It implies that one may consider the alignment process to be a 'social system' of which communication forms part. It also implies that this process is influenced by both internal and external factors and constraints. However, the external factors only partially account for the behaviour and practices displayed by the business and IT personnel (or the individual communicators), since they operate according to their own cognitive and emotional systems. Accordingly, the priority becomes how one can influence the internal factors relating to the communicators to improve their personal behaviour, given that the external factors and constraints can only be managed to a moderate extent.

By adopting the systemic perspective, the chapter next explored and discussed the unique characteristics pertaining to the business–IT alignment context. It showed that while some characteristics are universally applicable to all processes in organisations, the interrelationship among business and IT personnel during

the alignment process affords an exclusive backdrop, and that this presents several specific challenges. If these challenges are not adequately addressed then naturally communication breakdowns could come to exist.

Consequently, given that business–IT related communication is important and can easily break down, the chapter argued that it would seem necessary for organisations to invest time and effort into identifying, analysing and, ultimately, remedying communication breakdowns. However, as highlighted in this chapter, at present no known approaches or techniques are available for the business–IT alignment discipline. This is in sharp contrast to other disciplines such as engineering design (Maier et al., 2004, 2006; Eckert et al., 2004).

On this basis, the chapter concluded by sharing evidence to show that a communication assessment could be one approach for analysing business–IT related communication. In fact, it showed that such assessments have become commonplace in other disciplines such as organisational communication (Hargie & Tourish, 2009). Unfortunately, currently no assessments exist that cater specifically for the unique context and characteristics of business–IT alignment. Thus, this thesis proposes to devise such a communication assessment for business–IT alignment in the form of an assessment method.

The next chapter marks the start of the third part of this thesis, namely, the design and development of the assessment method. It will provide a high-level overview of the methodology followed in this study and will discuss, in particular, the philosophical considerations that influenced the choice of the research paradigm and the methodologies, as well as the specific research process and research methods employed.

Part III

DESIGN AND DEVELOPMENT

METHODOLOGY

"Every discourse, even a poetic or oracular sentence, carries with it a system of rules for producing analogous things and thus an outline of methodology."

— *Jacques Derrida* (BrainyQuote, 2015e)

The literature review outlined in chapters 2 and 3 has found that communication among business and IT personnel is critically important during the business–IT alignment process; however, it can easily break down if not adequately addressed. Therefore, it would seem necessary for organisations to invest time and effort into identifying, analysing and, ultimately, remedying business–IT related communication breakdowns. Unfortunately, owing to a lack of approaches, methods and tools, such a process remains a burden for organisations. Accordingly, the literature review identified a relevant business problem, which warrants solving. This thesis therefore proposes to devise a method for assessing communication in business–IT alignment. In view of this, this chapter provides a high-level overview of the methodology followed in this study to devise the proposed assessment method.

4.1 INTRODUCTION

The literature review outlined in chapters 2 and 3 identified a business problem relating to the way modern-day organisations have to ensure adequate communication among their business and IT personnel in order to attain sound business–IT alignment. The problem is that there is a lack of approaches, methods and tools by means of which organisations may capture, assess and ultimately improve the communication practices between these personnel (Coughlan et al., 2005). Without such aids, they are likely to continue experiencing communication difficulties and may have no way of identifying, analysing or remedying their communication-related problems (B. Campbell et al., 2005; Cybulski & Lukaitis, 2005).

The previous chapter alluded to the fact that a communication assessment (Odiorne, 1954) could offer an approach whereby modern-day organisations may analyse their business–IT related communication practices (see § 3.5). In fact, such assessments have become commonplace in other disciplines such as

organisational communication (Hargie & Tourish, 2009) and engineering design (Maier et al., 2004; Eckert et al., 2004). Unfortunately, no assessment currently exists that caters specifically for the unique context and characteristics of business–IT alignment. Thus, a proposal was made to devise a method for assessing communication in business–IT alignment. Such a method would take the form of a communication assessment.

Before developing the method to assess communication in business–IT alignment, it is necessary to explore the philosophical and methodological assumptions and considerations held by the author of this thesis; in particular since this will help to explain the reason why a certain research paradigm and process was selected and specific research methods were employed (Gaffikin, 2008). This is important, since different philosophical and methodological assumptions may produce dissimilar outcomes (Saunders, Lewis, & Thornhill, 2007).

Accordingly, the primary aim of this chapter is to provide a high-level overview of the methodology followed in this study in order to devise the proposed assessment method. To do so, three objectives are formulated: firstly, to discuss the philosophical assumptions and considerations that influenced the choice of the research paradigm; secondly, to argue for and examine the specific research paradigm selected for this study, namely, design science; and thirdly, to introduce the specific research process employed[1].

These and related issues will be discussed in more detail in this chapter as follows: Firstly, the chapter outlines the philosophical assumptions held by the author of this thesis that led to the choice of research paradigm (§ 4.2). Secondly, it argues for and examines the specific research paradigm selected for this thesis, namely design science (§ 4.3). Finally, it outlines the actual research process employed (§ 4.4). These issues will be summarised and conclusions drawn at the end of the chapter (§ 4.5).

Note that this chapter lays the philosophical and methodological foundation on which a method for assessing communication in business–IT alignment will be developed in later chapters.

4.2 RESEARCH PHILOSOPHY

Graziano and Raulin (2000) state that 'research' is a systematic search for information. Essentially, it is a process of inquiry. Yet, this process does not occur

---

[1] The research methods, techniques, and procedures used in the research process are discussed in the chapters to which those methods, techniques, and procedures apply. Hence, they do not feature in this chapter.

within a vacuum (Saunders et al., 2007) but, instead, is influenced and affected by the researcher's own worldview or philosophy (Sobh & Perry, 2006). This, in turn, will influence both the choice of research paradigm and, ultimately, the research methods employed (Gaffikin, 2008). Consequently, Crotty (2003) indicates that it is important for all researchers, prior to starting the process of inquiry, to delineate their philosophical assumptions. This then coincides with the aim of this section, which attempts to outline the specific philosophical view held by the author of this thesis.

From a philosophical point of view, it may be argued that two main philosophical paradigms exist, namely, (logical) positivism and phenomenalism, also called phenomenology (Easterby-Smith, Thorpe, & Lowe, 1991). These philosophical paradigms are best viewed as two extremes of a continuum (see Figure 4.1). From the positivist extreme, reality is viewed as a concrete structure, whereas from the phenomenological extreme, it is viewed as a projection of the human imagination (Collis & Hussey, 2009).

Positivism (Quantitative)		*Approach to social sciences*			Phenomenology (Qualitative)
Reality as a concrete structure	Reality as a concrete process	Reality as a contextual field of information	Reality as a realm of symbolic discourse	Reality as a social construction	Reality as a projection of human imagination
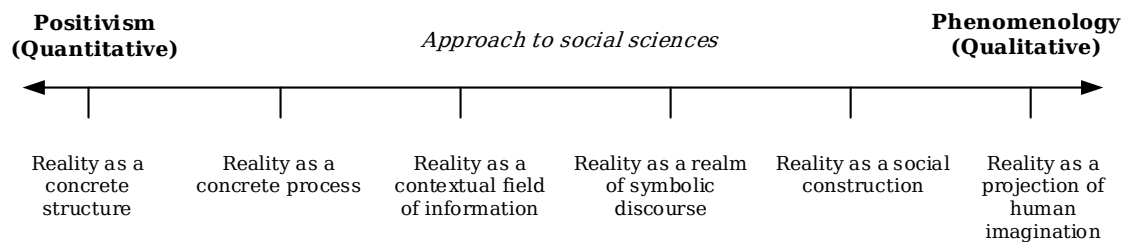
Figure 4.1. Typology of Assumptions on a Continuum of Paradigms (G. Morgan & Smircich, 1980)

Positivism originated in the natural sciences and stresses the belief that social reality is singular, objective and unaffected by the investigation of it (Collis & Hussey, 2009). Those holding this philosophical view generally hold that only observable and measurable phenomena are valid knowledge (Myers, 1997). As such, they aim to test theories deductively and gain quantitative, or 'objective', data (Creswell, 2007). This is, however, in sharp contrast to phenomenalism.

Whereas positivism considers social reality as objective and external to the researcher, phenomenalism interprets reality as a social construction and, essentially, as a projection of human imagination (G. Morgan & Smircich, 1980). Therefore, the latter views reality as inherently subjective and tied to the researcher's own observations and interpretations (Collis & Hussey, 2009). As D. Johnson (1975) states, phenomenalism emphasises theory grounded in empirical observations, which take account of the subjects' meaning and interpretational systems to explain by understanding. Consequently, those practising phenomenalism ac-

knowledge the subjective nature of the human doing the research and do not aim to remain external to the research phenomena but instead try to immerse themselves within it (Myers, 1997). As such, the focus shifts from measurable results to interpretation; and ultimately from quantitative to qualitative data collection (Creswell, 2007).

While positivism and phenomenalism are popular philosophical paradigms, Collis and Hussey (2009) explain that few researchers today operate purely according to either one. Instead, many combine elements of both to take a broader and often complementary view of the research phenomenon. As such, several intermediary philosophical paradigms have come to exist, which operate between the extremes of positivism and phenomenalism (G. Morgan & Smircich, 1980); that is, they are neither overly positivist nor phenomenological in nature (see Figure 4.1).

Creswell (2007) shares several examples of such paradigms, which combine elements of both positivism and phenomenalism. These include, among others:

- *Post-positivism.* This is mainly a scientific approach and the researcher will likely view inquiry as a series of logically related steps. This research usually espouses rigorous methods of data collection and analysis. Post-positivist approaches strongly resemble quantitative research.

- *Constructivism (interpretivism).* In this form of research, subjective meaning is formed through interaction with others. Rather than starting with a theory (as in post-positivism), inquirers typically generate or inductively develop a theory or pattern of meaning. These researchers often address processes of interaction among individuals. Subsequently, their own interpretations shape their findings.

- *Advocacy/participatory.* This research typically contains an action agenda that might change the lives of participants. Action research as a methodology is probably the best-known example of work in this paradigm.

- *Pragmatism.* This philosophy began in the United States around 1870. Instead of focusing on reality itself, pragmatism contends that most philosophical topics (such as the nature of knowledge, language, concepts, meaning, belief, and science) are all best viewed for their practical uses and successes. In other words, researchers practising pragmatism focus less on the specific methods employed and rather draw attention to the outcomes of research. To this extent, pragmatic researchers are not limited to using sin-

gle research methods, but instead often employ multiple methods in order to answer the research question(s) in the best way possible.

From the above paradigms and philosophies, it should be clear that research can be approached from a variety of different philosophical assumptions (G. Morgan & Smircich, 1980). Some of these have strong empirical grounding (e.g., post-positivism), while others may be more interpretive (Creswell, 2007). It is even possible for researchers to use elements from different paradigms. As Collis and Hussey (2009) explain, most researchers today prescribe to an intermediary paradigm that is neither strictly positivist nor phenomenological in nature. This is also true for this study.

This study aims to develop a method whereby organisations can assess the communication practices that take place among their business and IT personnel, as part of business–IT alignment. Accordingly, the study intermittently subscribes to a view where reality is derived from the transmission of information, thus leaning toward the positivist paradigm (G. Morgan & Smircich, 1980), as noted in Figure 4.1. However, the study also accepts the view that the world is a social construction, sustained through a process of human action and interaction. The latter approach is predominantly phenomenological (G. Morgan & Smircich, 1980) and is particularly evident when this study addresses the perceptions and expectations of business and IT personnel pertaining to communication between them. Thus, the research philosophy held by this study may best be defined as 'pragmatism' (Burrell & Morgan, 1979; P. Johnson & Duberley, 2000).

In holding a 'pragmatic' viewpoint, this study prescribes to neither a strict positivist nor a strict phenomenological viewpoint (Creswell, 2007). Instead, it focuses on the practical use, output, and success of the method being developed to assess communication in business–IT alignment. To this extent, the study employs a research paradigm and research methods not for their quantitative or qualitative nature, but rather in that they are appropriate for the specific context and the outcome sought (Dalsgaard, 2014; Hovorka, 2009). That is, the study applies the research paradigm and methods that were chose because they are suitable for use in information systems (IS) research and because they cater for the development or design of an assessment method.

4.3   RESEARCH PARADIGM

The research philosophy held by the author of this study, as discussed in the previous section, carries its own implications for the selection of the research

paradigm. In particular, the philosophy of 'pragmatism' dictates that a research paradigm be selected for its suitability in accommodating the unique context of the study and facilitating the development or design of an assessment method (Dalsgaard, 2014).

The main aim of this study is to contribute to resolving the business problems experienced by organisations when addressing the communication aspect of business–IT alignment. This contribution takes the form of an assessment method. In view of this, the study operates at the intersection of information systems (IS), information technology (IT) and the management disciplines, better known as management information systems (MIS).

Hevner et al. (2004) state that only one of two paradigms can be used for such research, namely, behavioural science or design science. Since this study attempts to develop, or design, a socio-technical artefact, the paradigm of design science is, according to Peffers et al. (2007) and supported by Hevner et al. (2004), ideally suited to it. This argument finds further support from both Hevner et al. (2004) and March and Smith (1995) who argue that methods (algorithms and practices) are valid artefacts[2] to be produced by design science projects. Moreover, design science, as conceptualised by Simon (1996), also supports a pragmatic research philosophy – as is used in this study.

Given the argument for the design science paradigm, this section now aims to explore it in more detail. In particular, it will firstly offer a brief overview of the design science paradigm (§4.3.1). Secondly, given that the paradigm dictates the creation of an artefact, it will explore what such an artefact is and explain how it applies to this study (§4.3.2). Thirdly, it will argue for and elaborate on a method as a valid artefact (§4.3.3) and, finally, it will give evidence for the way such a said method could make a scientific contribution (§4.3.4). The last two points are particularly important since this study aims to design and develop an assessment method for business–IT alignment.

4.3.1 *Design Science Paradigm*

The design science paradigm shares its origins with Simon's seminal work *The sciences of the artificial* (Simon, 1996) and Cross's *Design science research: Developing a discipline* (Cross, 2001). Both authors maintain that design science attempts to

---

2 Design science uses the term 'artefact' to describe something that is artificial, or constructed by humans, as opposed to something that occurs naturally. Such artefacts must improve upon existing solutions to a problem or perhaps provide a first solution to an important problem (see §4.3.4).

create things that serve human purpose. Peffers et al. (2007) continue by stating that design science concerns itself with creating artefacts that solve organisational (real-world) problems.

Design science follows a specific research process in which key steps lead the researcher's actions (Hevner et al., 2004; Peffers et al., 2006). What distinguish design science from other paradigms are the key steps in the research process, namely, those of artefact design and feasibility evaluation. Therefore, the design science paradigm comprises research performed by creation, or design – in this case, the creation or design of an assessment method for communication in business–IT alignment.

BrainyQuote (2015c) states that design is "a plan for arranging elements in such a way as to best achieve a particular purpose". This corresponds with the task of management in an organisation, which is to best arrange elements to accomplish the organisational goals and purposes (Hevner & Chatterjee, 2010). Hence, in agreement with Eames, design is fundamental to the management disciplines (Simon, 1996).

Managers are understandably concerned with questions such as "Why do some investments in business systems and organisational structures not result in an improvement in firm performance?" and "What investments will do so?" (Brotby, 2008). The former is a theory-based, cause-related question. The latter is a design-based, problem-solving question (Simon, 1996). Thus, two complementary, yet distinct, paradigms produce knowledge for the management disciplines. These include the behavioural sciences and the design sciences (Hevner & Chatterjee, 2010).

This study, in accordance with information systems (IS), is concerned with how information technology (IT) intersects with organisations and how their management can ensure alignment between it and the business objectives, systems and processes. Therefore, it operates on the premise of the design science paradigm by aiming to produce an artefact that organisations can use to change the communication practices that currently exist between their business and IT personnel into preferred practices. Hence, it views design as involving an explicit and intentional effort to improve the organisation on a specific criterion.

4.3.2 *IT Artefacts in Design Science*

Traditionally, the information systems (IS) discipline and design science paradigm have been concerned with designing and developing artefacts that use IT and

are applied to organisations and society in general (Hevner et al., 2004). Unfortunately, the notion of an IT artefact often remains ill-defined and ambiguous in the modern literature (Alter, 2003). Added to this, different authors may view IT from varying perspectives (Orlikowski & Iacono, 2006). Moreover, this study also operates within the management and audit disciplines, adding a further perspective to consider. Thus, some clarification is required.

This study aims to produce an artefact to assist organisations in (self-) assessing and ultimately improving the communication practices that occur between their business and IT personnel as part of the business–IT alignment process. Hence, the focus is on producing a socio-technical artefact, which could result in interventions being made in the organisation's social system.

Although this might seem contradictory to the IS discipline and design science paradigm, it is still valid (Orlikowski & Iacono, 2006; Gregor & Hevner, 2013) because this study invokes IT "in context". In particular, the study treats IT as the context, the motivation, and the background against which it examines the business–IT alignment process and its supportive requirement for adequate communication.

Therefore, while other disciplines have already investigated and attempted to assess communication, the communication and alignment issues related to IT differ from those of other disciplines and functional areas (Van Grembergen & De Haes, 2009). Nevertheless, it might prove useful to 'exapt'[3] known solutions and theories already in use by these disciplines and functional areas to the business–IT alignment discipline (Gregor & Hevner, 2013). This is something this study aims to achieve when developing the assessment method (see § 4.3.4).

4.3.3 *Methods as Valid IT Artefacts*

The previous section has explained that this study aims to produce a socio-technical artefact that organisations can use to (self-) assess and ultimately improve the communication practices between their business and IT personnel. This artefact will take the form of a method.

March and Smith (1995), in a widely cited paper, propose that methods are among four different types of socio-technical artefact that a design science research project could produce. Other artefacts include constructs (vocabulary and

---

3 The term 'exapt', in biological evolution, refers to the adaptation of a trait for a purpose other than its original purpose. The classic example, featured in Gould and Vrba (1982), is the exaptation of bird feathers to the purposes of flight from the original purported purposes of bodily temperature regulation.

symbols), models (abstractions and representations) and instantiations (implemented and prototype systems).

A method, as defined by March and Smith (1995), is a set of steps (an algorithm or guidelines) that can be used to perform a specific task. As Tomhave (2005) similarly states, methods are targeted constructs that define specific practices, procedures and rules for the implementation or execution of a specific task or function. Such methods are typically based on a set of underlying constructs (elements) and a representation (model) of the solution space. Although they may not be explicitly articulated, representations of tasks and results are intrinsic to methods. Methods can also be tied to particular models in that the steps take parts of the model as input. Furthermore, methods are often used to translate from one model or representation to another in the course of solving a problem.

These definition(s) and characteristics have distinct implications for this study. Firstly, this implies that the assessment method being developed will consist of a set of steps for assessing communication among business and IT personnel, as part of business–IT alignment. Secondly, this method will have to be based on a set of underlying elements; that is, factors that influence business–IT related communication will need to be identified and incorporated into the assessment process. Thirdly, the method will also need to be built on a model that is representative of business–IT alignment and communicative contexts.

Taking the above into account, a method would seem to be a valid socio-technical artefact to be produced by a design science project (Hevner et al., 2004; March & Smith, 1995), especially because design science research stresses problem solving (Simon, 1996). However, a method's development or design does have distinct implications; in particular, it warrants that both underlying elements and a representation (model) of the solution space be prepared (March & Smith, 1995). If these aspects are successfully addressed and a method developed that facilitates a more effective (or even only) way of achieving a result (in this case, assessing communication within business–IT alignment), that method would make a valuable contribution (Hevner & Chatterjee, 2010).

4.3.4 *Types of Contribution*

It has been established that methods can be classified as valid socio-technical artefacts to be produced by design science projects (Hevner et al., 2004; March & Smith, 1995). That said, such methods or, any of the other valid socio-technical

artefacts, could offer differing contributions to the academic and practitioner communities.

Gregor and Hevner (2013) propose that design science projects could make one of four contributions. To support this, they have developed a contribution framework (see Figure 4.2). This comprises a 2 x 2 matrix consisting of four quadrants, namely, invention, routine design, improvement, and exaptation. What differentiate these quadrants are the maturity of the problem context (x-axis), and the current maturity of artefacts that exist as potential starting points for solutions to the research question (y-axis).
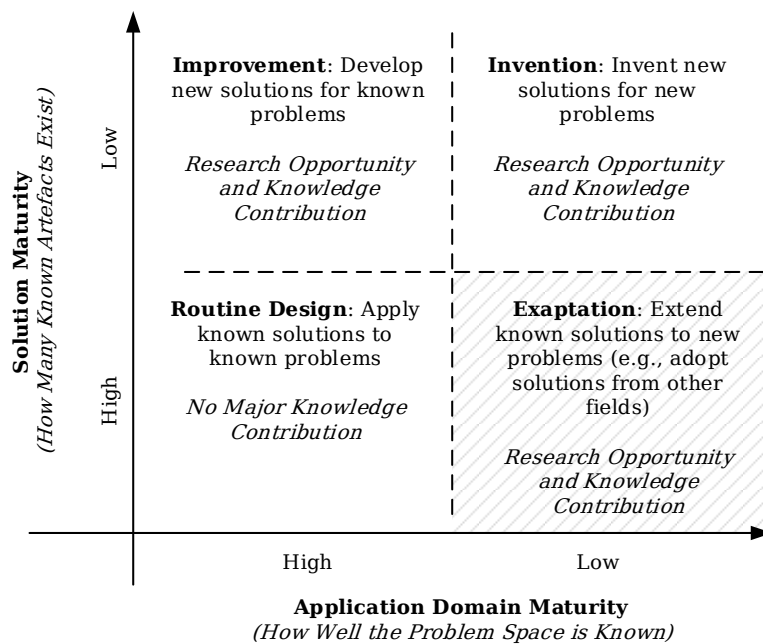
Figure 4.2. Design Science Research Contribution Framework (Gregor & Hevner, 2013)

The *invention* quadrant is reserved for artefacts that can be described as rare and that make a radical breakthrough. They are new solutions for new problems. Inventions are rare and research in this quadrant is typically associated with little understanding of the problem context and no effective artefacts being available as solutions.

The *routine design* quadrant caters for the use of existing artefacts that to address a known opportunity or question. Gregor and Hevner (2013), supported by Simon (1996), state that routine design by itself would seldom be considered as a research contribution, since such designs rarely require research methods to solve the given problem. Instead, for knowledge contributions to be considered significant research contributions, they have to be judged as significant with re-

spect to the current state of knowledge in the research area (and be considered interesting).

The goal of design science research in the *improvement* quadrant is to create better solutions in the form of more effective and efficient products, processes, services, technologies or ideas. Within this quadrant, researchers will typically draw from a deep understanding of the problem environment to build innovative artefacts as solutions to important problems. The challenge, however, lies in demonstrating that the improved solution(s) genuinely advances existing knowledge.

The final quadrant, *exaptation*, refers to design science research where artefacts required in a specific field are not available or are suboptimal, although effective artefacts exist in related problem areas that may be adapted or, more accurately, 'exapted' to the new problem context. In this quadrant are contributions where design knowledge that already exists in one field may be extended or refined so that it can be used in some new application area. Gregor and Hevner (2013), however, warn that a key requirement of this quadrant is that the researcher needs to demonstrate that the extension of the existing artefact(s) into the new field is non-trivial and interesting. That is, the new field must present some particular challenges that were not present in the originating field in which the technique or artefact has already been applied.

Taking Gregor and Hevner's (2013) framework into account, the method being developed in this study can best be placed within the *exaptation* quadrant (see shaded-area in Figure 4.2). No known methods exist currently within the business–IT alignment discipline that allow organisations to (self-) assess and ultimately improve the communication practices between their business and IT personnel. However, as chapter 3 concluded, methods do exist to achieve similar assessments within other disciplines. For example, a maturity grid-based assessment approach has been developed in the engineering design discipline to address communication issues (Maier et al., 2004, 2006). Other methods such as communication diaries and interviews have also been established in the organisational communication discipline (Hargie & Tourish, 2009).

The intention of this study, is thus to 'exapt' a known artefact to the business–IT alignment discipline – in particular, the maturity grid-based assessment approach that has been mentioned. This would seem to be viable since although the engineering design discipline does share some commonality with business–IT alignment, the communication and alignment issues related to IT are different.

In addition, both the context of communication and the unique characteristics of the individual communicators are also likely to be dissimilar (see Chapter 3).

Taking all the above into consideration, this research project, in adhering to the author's 'pragmatic' philosophy, will be conducted according to the design science research paradigm; that is, since it is suitable for the unique context of this research and accommodates the development or design of a socio-technical artefact – in this case, a method. In operating on the premise of design science (Hevner & Chatterjee, 2010), this research aims to produce an assessment method, which organisations will be able to use to assess and change the communication practices that currently exist between their business and IT personnel into preferred practices.

While a method such as that envisaged in this research is not a valid research contribution in the natural sciences, it is appropriate for a design science project (March & Smith, 1995). This is further supported by the fact that this research aims to 'exapt' a known artefact from another discipline to business–IT alignment. In doing so, Gregor and Hevner (2013) propose that a research contribution may be made; however, this contribution would still be dependent on the successful execution of a suitable, robust and rigorous research process (Hevner & Chatterjee, 2010).

4.4 RESEARCH PROCESS

The previous sections presented an outline of the philosophical assumptions held by the author of this thesis. Accordingly, it became evident a research paradigm had to be chosen for its suitability in the business–IT alignment context thus facilitating the development and design of an assessment method. Subsequently, the design science paradigm was chosen. This paradigm offers characteristics that support a research contribution to be made by this study (Gregor & Hevner, 2013), although, such a contribution would still be dependent on the successful application and execution of an appropriate research process (Hevner & Chatterjee, 2010). In light of this, this section now examines the specific research process that this study adopted and implemented.

In the literature on the design science paradigm, several research processes have been proposed over the years. Initial research processes, such as that proposed by Nunamaker and Chen (1990), closely matched the system development process. Here the research process was seen as consisting of five stages: conceptual design, constructing the architecture of the system, analysing the design,

prototyping, and evaluation. While these processes catered for technical arte-facts, such as the construction of data warehouses and computation algorithms, they did not accommodate artefacts that tended to be socio-technical. There-fore, Vaishnavi and Kuechler (2007a, 2007b) later proposed a process that was specifically geared to design science research. In particular, they explicated the knowledge generated in design efforts and applied the cycle directly to design science. Their research process consisted of awareness of the problem, sugges-tion, development, evaluation, and conclusion.

Given the widespread availability and use of differing research processes in design science research, Peffers et al. (2006) found that a commonly accepted pro-cess for carrying out design science research was lacking in academia. Without such a framework, they posited that researchers, readers, and reviewers would struggle to recognise and evaluate design science research. Consequently, Peffers et al. (2006) proposed and developed a design science research process (DSRP), which was later incorporate into a methodology (Peffers et al., 2007).

Unlike the prior research processes, theirs was specifically built on the expec-tations and guidelines of leading design science authors (Hevner et al., 2004; March & Smith, 1995). Moreover, by using case analysis they also showed that their proposal matched those methods and processes of existing and success-ful design science projects. Therefore, they argued that by using their proposal a researcher could uphold sufficient academic rigour and ensure scientific con-tribution (Peffers et al., 2007). In addition, they would also be adhering to the foundation and guidelines of design science research, as stipulated by Hevner et al. (2004). Given these facts, this study opts to use their proposal as the overarch-ing research process in developing the assessment method as the main research contribution.

Since this study will make use of Peffers et al.'s (2006) research process, this section now aims to explore it in more detail. In particular, it will firstly offer a brief overview of the research process itself (§ 4.4.1) and, secondly, explain how it has been adopted and applied in this study (§ 4.4.2).

4.4.1 *Design Science Research Process (DSRP)*

Peffers et al. (2006) propose that the design science research process (DSRP) com-prises six steps (see Figure 4.3). These steps include:

1. problem identification and motivation

2. definition of the objectives for a solution

3. design and development

4. demonstration

5. evaluation, and

6. communication.

During the first step, *problem identification and motivation*, researchers are tasked with defining the specific research problem their research is addressing and justifying the value of a solution. According to Peffers et al. (2006), justifying the value of a solution accomplishes two things. Firstly, it motivates the researcher and the audience of the research to pursue the solution and to accept the results and, secondly, it helps to understand the reasoning associated with the researcher's understanding of the problem. Resources required for this activity include knowledge of the state of the problem and the importance of its solution. Both are typically addressed through literature reviews or empirical findings from case studies.

The second step, *definition of the objectives for a solution*, involves inferring the objectives of a solution from the problem definition and knowledge of what is possible and feasible. These objectives could take different forms, but most often are quantitative or qualitative in nature. That is, they are expressed in either how a desirable solution would be better than current ones or how a new artefact is expected to support solutions to problems not hitherto addressed. Peffers et al. (2006) state that the resources required for this typically include knowledge of the state of problems and current solutions, if any, and their efficacy. This also relates closely to Gregor and Hevner's (2013) contribution framework, discussed earlier (see § 4.3.4).

The third step, *design and development*, signifies the most critical aspects of any design science project; that is, the actual creation of the artefact(s). As mentioned earlier, such artefacts could be in the form of constructs, models, methods or instantiations (March & Smith, 1995). According to Peffers et al. (2006) this activity includes determining the artefact's desired functionality and its architecture and then creating the actual artefact. Often theories, modelling, and argumentation accompany this step.

Next, the process might vary from a single act of *demonstration* to prove that the idea works to a more formal *evaluation* of the developed artefact. In some cases, both of these steps are included.
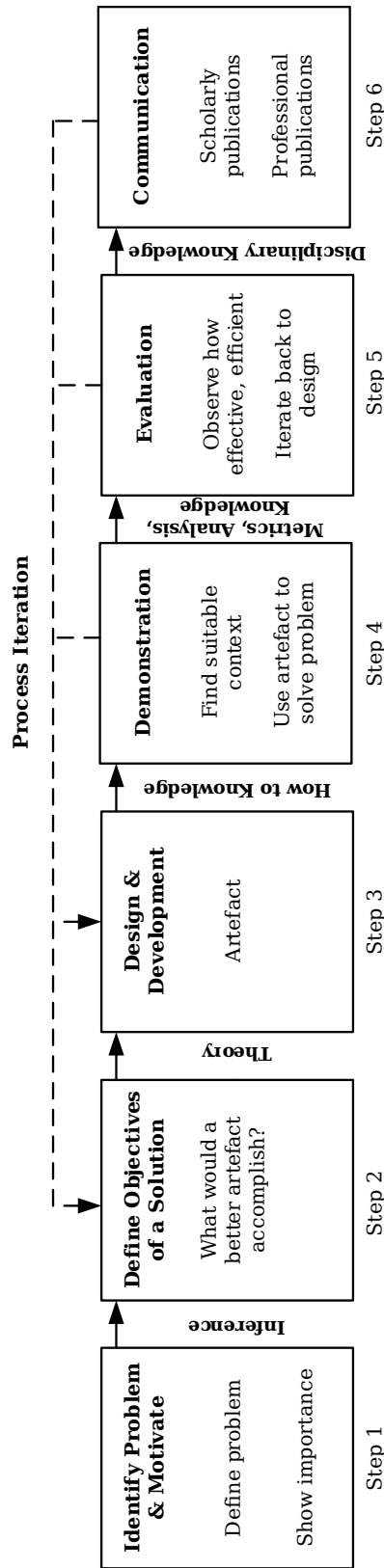
Figure 4.3. Design Science Research Process Model (Peffers et al., 2006)

If warranted, the fourth step, *demonstration*, requires that researchers demonstrate the use of the artefact in solving one or more instances of the problem. According to Peffers et al. (2006), this could involve the use of experimentation, simulation, case study, proof or other appropriate activities.

The fifth step, *evaluation*, involves observing and measuring how well the artefact supports a solution to the problem. Often this entails comparing the *objectives of a solution* (step 2) with the actual observed results from the use of the artefact in the *demonstration* (step 4). A variety of different methods could be employed to achieve this, depending on the nature of the artefact. In case of a technical artefact, relevant metrics and analysis techniques could be employed; for socio-technical artefacts, argumentation and triangulation are more typical.

It is important to note, however, that at the end of these activities, the researcher may decide to iterate back to step three to try to improve the effectiveness of the artefact. Otherwise, s/he may continue on to *communication* and leave further improvement to subsequent projects. As Peffers et al. (2006) indicate, the nature of the research may dictate whether such iteration is feasible or not. In case of proof-of-concept research, such iterations might be unwarranted if the demonstration and/or evaluation showed enough promise (Hevner, 2007).

Irrespective of iteration, once the researcher is satisfied with the artefact and its utility, quality and efficacy, it has to be communicated. This final step, *communication*, is strongly supported by Archer (cited in Cross, 2001) and Hevner et al. (2004). In particular, design science projects must contribute to the body of academic and practitioner knowledge. Therefore, the problem and its importance, the artefact, its utility and novelty, the rigour of its design, and its effectiveness to researchers and other relevant audiences must be communicated appropriately. Typical means to achieve this include the writing up of a thesis, scholarly publications, and patents (if applicable).

To conclude, several research processes exist that could be adopted and used to perform design science research (Hevner & Chatterjee, 2010). This study opts to use Peffers et al.'s (2006) design science research process (DSRP), since it was built on the expectations and guidelines of leading design science authors; moreover by use of case analysis it was shown to match the methods and processes of existing and successful design science projects. The process suggests that a design science project, such as this study, will need to address six steps successfully if a valid contribution is to be made. Having said that, Hevner and Chatterjee (2010) nevertheless warn that these steps are only valuable if they can be applied appropriately to the specific design situation and problem context of a research

project. Consequently, they caution researchers to take care when adopting and applying this process.

4.4.2 *Application of the Design Science Research Process (DSRP)*

The previous section delineated the design science research process (DSRP), as proposed by Peffers et al. (2006). As stated earlier, this study opts to use this process in developing a method for assessing communication in business–IT alignment, owing to its theoretical foundation and widespread applicability. In light of this, and the fact that the process is only valuable in its appropriate application, this section now explains how this study adopted it.

This study fulfilled the steps of the design science research process (DSRP) as follows (see Figure 4.4):

1. *Problem identification and motivation (step 1).* To identify a relevant business (real-world) problem and substantiate its resolution, this study conducted a literature review. Accordingly, the study consulted relevant works on information technology (IT), business–IT alignment, and the social aspects related thereto (see chapters 2 and 3).

2. *Objective of the solution (step 2).* During the literature review, the study consulted works to explore modern theories, existing strategies and approaches whereby organisations can assess communication in business–IT alignment (see Chapter 3). It paid specific attention to the different perspectives for assessing communication, and the various techniques used in other disciplines to investigate communication-related problems.

3. *Design and development (step 3).* The artefact that this study developed is a method to help organisations (self-) assess and identify areas for improving the communication practices that exist between their business staff and their IT personnel (see Chapter 5). This method has been called the 'Communication Alignment Maturity Improvement (CAMI) method'. In developing the method, specific attention was paid to different assessment approaches, the requirements for an assessment, what factors need to be assessed and, ultimately, how a viable method could be created.

4. *Demonstration (step 4).* To demonstrate the use of the method, this study field-tested the method in a public sector organisation (see Chapter 6). This organisation was selected using convenience sampling.
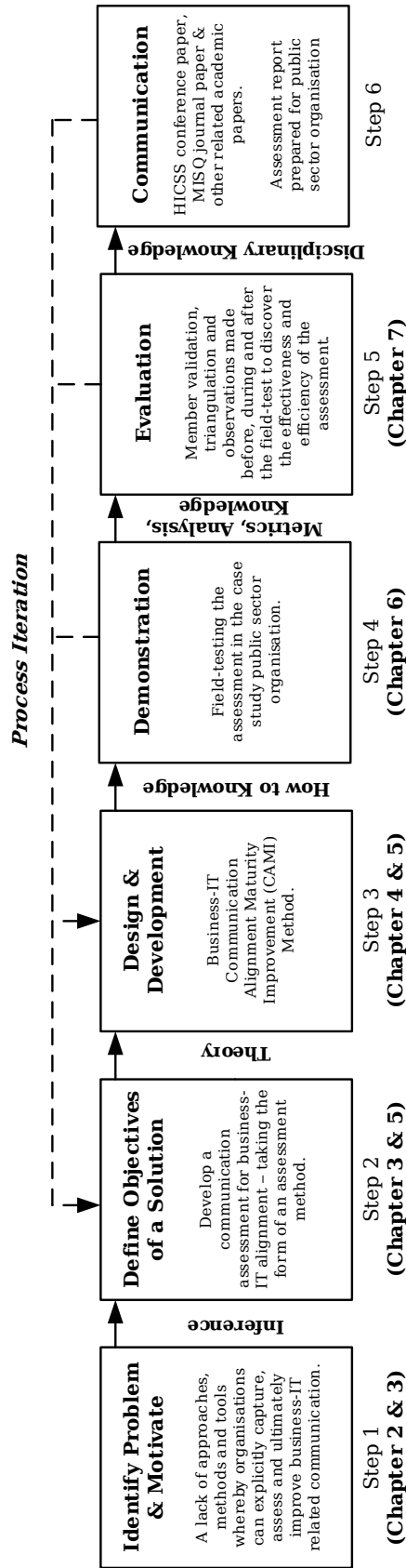
Figure 4.4. DSR Process for this Study

5. *Evaluation (step 5).* The study evaluated the method before, during and after field-testing to discover the effectiveness and efficiency with which it contributed to resolving the business problem (see Chapter 7). The study used member validation, triangulation, and observations for this purpose.

6. *Communication (step 6).* The study communicated the initial literature findings and arguments in a conference paper (Coertze & Von Solms, 2015b). In addition, the method, its construction, and demonstration were captured in a journal paper, which was submitted to the *MIS Quarterly* journal (Coertze & Von Solms, 2015a). The assessment report generated during field-testing was also communicated to the public sector organisation. This thesis will also be available electronically on the authoring institution's website.

In conclusion, this study makes use of the research process that Peffers et al. (2006) established in the design science discipline, since it is widely applicable and matches the general principles, processes, and methodologies proposed by various leading design science authors (Hevner et al., 2004; March & Smith, 1995). While the design science paradigm already facilitates a contribution to be made by this study (Gregor & Hevner, 2013), this would be dependent on the successful execution of the research process. As this section has shown, all the necessary steps (six in total) of Peffers et al.'s (2006) design science research process (DSRP) have been adequately planned and addressed. Consequently, this study should uphold sufficient academic rigour and ensure a scientific contribution (Peffers et al., 2007).

4.5 CONCLUSION

The primary aim of this chapter was to provide a high-level overview of the methodology that was followed in this study to devise the assessment method. To do so, it firstly discussed the philosophical assumptions and considerations that influenced the choice of the research paradigm. Secondly, it argued for and examined the specific research paradigm selected for this study, namely, design science and, thirdly, introduced the specific research process employed.

This chapter reviewed different philosophical paradigms and, in so doing, it became clear that research could be approached from two differing viewpoints – (logical) positivism and phenomenology. While both are popular, Collis and Hussey (2009) explain that few researchers today operate purely according to either one. Instead, elements of both are combined to take a broader and often

complementary view of the research phenomenon. Some of these intermediary paradigms have a strong empirical grounding (i.e., post-positivism), while others might be more interpretive (Creswell, 2007). This is also true of this study.

Given the aim of this study, it intermittently subscribes to the view that reality is derived from the transmission of information. Hence, it leans toward the positivist paradigm (G. Morgan & Smircich, 1980), as noted in Figure 4.1. However, the study also accepts the view that the world is a social construction sustained through a process of human action and interaction. The latter approach is phenomenological (G. Morgan & Smircich, 1980) and is particularly evident when this study addresses the perceptions and expectations of business and IT personnel pertaining to the communication that takes place among them. Thus, the research philosophy held by this study could best be defined as 'pragmatism' (Burrell & Morgan, 1979; P. Johnson & Duberley, 2000).

In holding a 'pragmatic' viewpoint, the chapter delineated that this study prescribes to neither a strict positivist nor a strict phenomenological viewpoint (Creswell, 2007). Instead, it focuses on the practical use and success of the method being developed to assess communication in business–IT alignment. To this extent, the chapter explained that the study employs a research paradigm and research methods that are appropriate for the specific context and the outcome sought (Dalsgaard, 2014; Hovorka, 2009). That is, it employs the selected research paradigm and methods because they are suitable for use in information systems (IS) research and cater for the development or design of an assessment method.

The chapter next examined the research paradigm. Hevner et al. (2004) state that only one of two extant research paradigms, that is, behavioural science or design science, can be used in information systems (IS) research,. Since this study attempts to develop, or design a socio-technical artefact, the paradigm of design science was ideally suited, according to Peffers et al. (2007) and supported by Hevner et al. (2004). This argument is further support in that both Hevner et al. (2004) and March and Smith (1995) argue that methods (algorithms and practices) are valid artefacts to be produced by design science projects. Moreover, design science, as conceptualised by Simon (1996), also supports a pragmatic research philosophy – as is used in this study.

In adopting the design science paradigm, the chapter identified several research processes that could be adopted and used in this study. However, an argument was made for Peffers et al.'s (2006) design science research process (DSRP), since it is built on the expectations and guidelines of leading design science authors. Moreover, case analysis has shown that it matches the methods and

processes of existing and successful design science projects. The process chosen suggests that a design science project, such as this study, needs to address six steps successfully if a valid contribution is to be made. These steps include the problem identification and motivation; definition of the objectives for a solution; design and development; demonstration; evaluation; and communication.

Hevner and Chatterjee (2010) warn that these steps are only valuable if they can be applied appropriately to the specific design situation and problem context of a research project. Consequently, this chapter concluded by providing evidence to suggest that all the steps in Peffers et al.'s (2006) design science research process (DSRP) were adequately planned and addressed in the current. Consequently, this study maintains sufficient academic rigour and ensures a scientific contribution (Peffers et al., 2007).

Having provided a high-level overview of the methodology followed in this study, the next chapter will turn to the design and development of the actual artefact. That is, the development of the assessment method for business–IT alignment, which in this research has been called the 'Communication Alignment Maturity Improvement (CAMI) method'. In particular, the following chapter will discuss the construction process, and the underlying theories and elements that contributed to it.

COMMUNICATION ALIGNMENT MATURITY IMPROVEMENT (CAMI) METHOD

"Design is the method of putting form and content together. Design, just as art, has multiple definitions; there is no single definition. Design can be art. Design can be aesthetics. Design is so simple, that's why it is so complicated."

— *Paul Rand* (BrainyQuote, 2015f)

Based upon the literature review, this thesis has so far highlighted the importance of communication among business and IT personnel in achieving sound business–IT alignment. Furthermore, it has identified a related business (real-world) problem and reported on the need for a tool, strategy, or method to be developed for assessing such communication. Accordingly, the thesis has proposed the development of an assessment method based on the 'exaptation' of a maturity grid-based approach from the engineering discipline. The previous chapter explained this in detail, and shared the specific research approach adopted for this development. Having discussed the research approach, this chapter now describes the design and development of the method itself, termed the 'Communication Alignment Maturity Improvement (CAMI) method'. To do so, it firstly specifies the requirements for the assessment method, secondly introduces the approach chosen for the development, namely, a maturity grid, and, finally, describes how this approach was applied to develop the method for assessing communication in business–IT alignment

5.1 INTRODUCTION

Collaboration between the personnel residing in the business and the IT functions of an organisation is of the utmost importance in achieving what is now known as business–IT alignment (Cybulski & Lukaitis, 2005). Such personnel constantly need to exchange ideas, knowledge and information among themselves in order to understand and fully commit to both the business's and IT's missions, objectives and plans. This necessitates clear and appropriate communication among everyone involved (Luftman, 2003). Unfortunately, although seemingly straightforward, this can be difficult to achieve (Coughlan et al., 2005), especially since the relationship between business (all non-IT personnel) and IT personnel in modern organisations can be highly divisive.

Several alignment-related models have denoted communication as a critical success factor for business–IT alignment (Chan & Reich, 2007; Luftman, 2003; Reich & Benbasat, 2000). Yet, despite this, few studies to date have explicitly investigated or proposed how organisations can best capture, analyse and assess communication and its associated processes in this context (Coughlan et al., 2005). Understandably, without such guidance organisations are likely to continue experiencing communication difficulties and may have no way of identifying, analysing or remedying communication-related problems (B. Campbell et al., 2005; Cybulski & Lukaitis, 2005).

By adopting the design science research paradigm (Hevner et al., 2004), this research proposes an assessment method (a socio-technical artefact) that organisations can use to assess the communication practices that prevail between the personnel residing in their business and IT functions. To facilitate the development of this artefact, the concept of a 'maturity grid-based approach', originally a concept of the engineering design discipline (Maier et al., 2006; Maier, 2007), will be 'exapted'. The previous chapter explained this in detail, and shared the specific research process adopted for this development (see § 4.4).

Having identified a business (real-world) problem, and discussed how this research aims to address it; the primary aim of this chapter is now to describe the design and development of the assessment method itself (see Figure 4.4). To do so, it has three objectives: firstly, to specify the requirements for the assessment method; secondly, to introduce the approach chosen for development, namely, a maturity grid; and thirdly, to describe how this approach was applied to develop the method for assessing communication in business–IT alignment.

These and related issues will be discussed further in this chapter as follows: Firstly, the chapter specifies the objectives, target audience, requirements for the assessment method. It also discusses various approaches to finding solutions that were considered and presents an argument for the approach that was chosen (§ 5.2. Secondly, it introduces the chosen approach, namely, a 'maturity grid-based approach', and explores its general construction process (§ 5.3). Thirdly, it describes how this process was applied to develop the method for assessing communication in business–IT alignment (§ 5.4). In particular, it will discuss how underlying factors were determined for the assessment, how a systemic model was prepared based on these factors, and how this model was ultimately transposed into a maturity grid. Finally, it shares an example of the method to explain its inner workings and offer an overview of the ultimate outcome of the devel-

opment phase (§ 5.5). These issues will be summarised and conclusions drawn at the end of the chapter (§ 5.6).

Note that this chapter develops the artefact, which embodies the main contribution of this study. Subsequent chapters will share a process model for its usage, evidence of its application with a public sector organisation (see Chapter 6) and its evaluation (see Chapter 7).

5.2 TOWARDS AN ASSESSMENT METHOD: OBJECTIVES, REQUIREMENTS AND APPROACHES

As shown by the exploration of the extant literature on business–IT alignment (see Chapter 2), business and IT personnel need to communicate continuously and adequately to share information and build a harmonious relationship. If done successfully, then organisations can expect their alignment to improve; however, if not, then naturally consequences will follow. It therefore seems fruitful for organisations to assess their communication practices within this context (Coughlan et al., 2005; Cybulski & Lukaitis, 2005). Unfortunately, the literature offers limited support for this. To address this shortcoming, this study aims to develop an assessment method that organisations can use to analyse and assess their communication practices that exist between their business and IT personnel.

While a business (real-world) problem has thus been identified and substantiated, and a possible resolution proposed, the objectives and requirements for this resolution – an assessment method – have not yet been discussed. However, as chapter 4 illustrated, specifying the objectives for a solution is a critical step in the research process of a design science project, particularly because these objectives offer the backdrop against which the socio-technical artefact has to be developed (Peffers et al., 2007).

Given the clear necessity of specifying the objectives for a solution, this section aims to delineate the objectives for the envisaged assessment method. To do so, it will firstly explore the different forms an assessment could take, and their associated challenges and implications (§ 5.2.1). Secondly, after having discussed these implications, it will synthesise the insights gained so far and convert them into requirements for a viable assessment method (§ 5.2.2). In particular, it will discuss the target audience(s), the assessment requirements, and the different solution concepts that should be considered. Finally, the section will conclude

with a comparison of the different solution approaches and the selection of the most suitable approach for addressing these requirements (§ 5.2.3).

5.2.1   *Forms of Assessment: Challenges and Implications*

The literature review (see chapters 2 and 3) has discussed the importance of communication in business–IT alignment. This importance is acknowledged by both the academic (Luftman, 2003; Reich & Benbasat, 2000; Coughlan et al., 2005) and the practitioner (B. Campbell et al., 2005) communities. However, as chapter 3 has shown, assessing and managing such communication can be difficult because it is systemic in nature and is influenced by a variety of factors that are both internal and external to the organisation.

   Despite the difficulties involved, chapter 3 presented an argument to support the idea that a communication assessment could allow organisations to obtain understanding and insight into the multifaceted nature of communication among the personnel residing in the business and IT functions. Having said that, such an assessment could take different forms, each affecting the outcome, and presenting different challenges.

5.2.1.1   *Assessment as a Form of Measurement*

The first form (or then challenge) pertains to the complex and abstract nature of communication itself. Is it possible to say one way of communicating is better and, if so, by how much? An assessment requires criteria against which a process or an outcome is compared or measured but communication processes are highly complex and the relationship between 'input-and-output variables' cannot be predefined or predicted to function as a universally applicable, lasting standard (Eckert et al., 2004). In addition, communication involves people, and people have different preferences. What works for one person might not be appropriate for his or her colleagues. Thus, the question needs to be asked as to whether a measurement would be the right approach.

   Kaplan and Norton (1996) note that measurement alone is not appropriate for developing a deep understanding about the way processes are performed generally and does not lead directly to improved performance. There are, however, ways of overcoming this. For example, Maier et al. (2006) states that if one conceives of a communication assessment as an (instantaneous) assessment based on an individual's perception, given a certain situation, one might be able to find a way of measuring this. In other words, the communication process should not

be seen as being measured against a universally applicable and unchangeable standard. Instead, it should be approached in such a way as to allow the perceptions of several individuals to be compared and an inter-subjective valid assessment to be derived – as established collectively by the individuals themselves. Accordingly, the assessment would be seen as a form of feedback, something on which actions for improvement could be based.

These findings have certain implications for this study. Firstly, they imply that the assessment method being developed in this thesis needs to capture the perceptions of both business and IT personnel pertaining to the communication among themselves. Secondly, the assessment needs to facilitate some form of measurement to be made of these perceptions. Finally, if successful, the assessment should ultimately culminate in some sort of feedback, upon which improvements can be based.

5.2.1.2   *Auditing as a Form of Assessment*

Given what has been mentioned in the previous section, the goal of this thesis can be restated to develop an assessment method that enhances reflection and raises awareness of the factors that influence communication in business–IT alignment. This could be achieved by obtaining 'feedback' from the business and IT personnel. This, however, raises the issue of how the said feedback will be gathered. This study proposes that an audit could do this.

The practice of auditing is most commonly associated with assessing an organisation's financial health (D. Jones, 2002; Goldhaber & Krivonos, 1977). However, at its most basic, an audit is an evaluation of a designated process (Hargie & Tourish, 2009) and a communication assessment qualifies as such an audit (Odiorne, 1954). That is, it is an evaluation of the communication practices either throughout an entire organisation or between individual function(s) and/or departments. To this extent, a communication assessment acts as a means of analysing and assessing current communication practices in an organisation (Eckert et al., 2004), with the aim of producing a clearer understanding of how well communication works and the degree to which it satisfies the needs of the organisation (Maier et al., 2004).

For such an analysis and assessment to be made, several performance indicators would need to be captured. Chiesa, Coughlan, and Voss (1996) mention that an audit would typically require both current and desired performance indicators, since it attempts to identify gaps between them. Although generic, the same would also be true of a communication assessment (Maier et al., 2006). For

the communication practices in business–IT alignment to be audited, both the current and desired perceptions of the business and IT personnel would need to be captured.

Defining a communication assessment as a form of audit has certain implications for this study. Firstly, it dictates that the method being developed should not only capture the perceptions of business and IT personnel regarding the current communication practices among them, but also what they perceive as being desired. Secondly, it requires that the method facilitate the gap between the two 'indicators' to be identified. The latter implication is particularly important for business–IT alignment, as the gap will inform the organisation as to whether its alignment practices are optimal or need improving.

5.2.1.3 *Perception as a Basis for Assessment*

The discussion in the previous section has led to the notion of an assessment taking the form of an audit as a way of increasing both business personnel's and IT personnel's understanding of the factors that influence communication. Increased understanding – it is assumed – could be a way of increasing the success of communication management in business–IT alignment. However, as argued earlier, finding universally applicable, enduring standards for communication in business–IT alignment would seem to be impossible. What, then, could be the basis of assessment?

As mentioned earlier, Maier et al. (2006) state that if one conceives of a communication assessment as an (instantaneous) assessment based on an individual's perception, given a certain situation, one might be able to find a way of measuring that perception. Here one can differentiate between 'sensory perception' and perception that refers to a subjective value judgement[1] (Suchman, 1987; Clancey, 1997). While sensory perception refers to the process of acquiring, interpreting, selecting and organising sensory information, subjective value judgement (also known as situated cognition), on the other hand, entails the fact that one's procedural knowledge (knowledge of how to do things) is tightly bound to particular situations. In addition, our actions are direct responses to our perceptions of the situation in which we are working.

This thesis applies business and IT personnel's 'perception' of the current and desired communication practices as the basis for assessment. However, it approaches perception not from a sensory viewpoint but rather as situated cogni-

---

1 It is outside the scope of the thesis to go into definitional details about the many theories of perception and its underlying processes (for further details, see Suchman, 1987; Clancey, 1997; Gibson, 1966).

tion. That is, it holds that business and IT personnel will make adequate judgements about the communication occurring between them (Coughlan et al., 2005; Cybulski & Lukaitis, 2005), particularly in view of the fact that they will be working under given constraints and their immediate responses to communication will be indicative of the perceptions they hold.

This has distinct implications for this study. Firstly, it implies that business and IT personnel have their own perceptions of communication in business–IT alignment as part of their situated cognition. Secondly, it holds that these perceptions could be captured by investigating the personnel's actions, responses or choices – such as, for example, their answers to questions in a questionnaire. The latter implication is particularly relevant in that it affords the envisaged assessment method an approach whereby it could capture the perceptions held by the business and IT personnel.

5.2.1.4 *Assessment as a Basis for Action*

An assessment, as defined up to now, would provide some sort of feedback on communication in business–IT alignment. However, the feedback would only be possible if the perceptions of both business and IT personnel were captured. That said, the question remains as to how this feedback would result in the basis for future action. In other words, how could the communication between business and IT personnel be changed or controlled? Before answering this, one needs to consider both the locations of and mechanisms for changing communication.

If communication is conceptualised as a linear process, then naturally it can be controlled (Shannon & Weaver, 1964; Shannon, 1948). For example, if computer network throughput in an organisation is slow, the organisation may decide to expand the network or to install faster network devices. By contrast, if communication were approached from a systemic perspective it would seem to be a foregone conclusion that communication cannot be controlled. Particularly because communication is regarded as multifaceted and influenced by a variety of factors both internal and external to the organisation (Eckert et al., 2004).

While a systemic perspective of communication proposes that one cannot control communication, it is still possible to influence it. An argument presented in chapter 3 is particularly relevant here. General systems theory (GST) acknowledges that a 'system' has its own 'language' and reacts to influences from the 'environment' (i.e., everything outside the system) according to its own operational structure (Bertalanffy, 1968; Beer, 1984). This means that while the system

itself cannot be controlled directly, its environment may provide an opportunity to influence it (Luhmann, 1986).

In the context of this thesis, if the factors affecting communication in business–IT alignment (the 'environment') could be altered in some way; then a change or reaction in the communication (the 'system') would be triggered. This is supported by the theory of situated cognition, which holds that "human thoughts and actions are adapted to the environment" (Clancey, 1997), that is, because what people perceive, how they conceive of their activity, and what they do physically all develop together. However, how does one alter the factors influencing communication in business–IT alignment?

The answer comes in the form of reflection. As described in chapter 3 in the section on conceptualisations of communication (§3.2), conceptualisation influences perception and thus action. The way communicative success is conceived affects the solution space, that is, communication management (Eckert et al., 2004). Thus, if the business and IT personnel's conceptualisation of communication and the factors that influence it could be altered, their thoughts and actions would naturally adapt. Thus, by triggering reflection on the conceptualisations, and specifically on the factors, communication in business–IT alignment could be influenced.

Taking the above into account, the goal of the assessment method this thesis is developing is to trigger reflection on communication in business–IT alignment; that is, to raise awareness and ultimately alter the perceptions that both business and IT personnel hold of the factors influencing communication in business–IT alignment. Therefore, in line with Maier et al. (2006), the envisaged method will allow the personnel to reflect on their own personal perceptions and to think about whether these are appropriate or need to change. Hence, the assessment would act as the basis for future action and improvement.

Specifying reflection as the basis for action has certain implications for this study. Firstly, it dictates that the method being developed has to enable and support reflection on the factors influencing communication in business–IT alignment. In addition, it has to raise awareness of these factors thereby altering the conceptualisations held by both the business and IT personnel. What is more important, however, is that the method needs to accommodate the variety of factors influencing communication in business–IT alignment. This is particularly important, as the factors themselves would form the backdrop against which the rest of the method operates.

5.2.2 *Objectives for an Assessment Method*

Having explored the different forms that the assessment method will take, this section now synthesises the insights gained so far and converts them into requirements for the development of a viable assessment method. In particular, it discusses the target audience (§ 5.2.2.1) and the assessment requirements that need to be considered (§ 5.2.2.2).

5.2.2.1 *Target Audience*

The assessment method that this thesis develops is targeted specifically at business–IT alignment. Accordingly, its primary audience includes personnel residing in both the business and the IT functions of an organisation, including business staff (i.e., human resources and finance), IT staff (i.e., programmers and technicians), and even members of executive management. In this research, staff members representing each of these parties were required to provide data on their perceptions of communication during the business–IT alignment process.

While these aforementioned parties form the primary target audience of the method, other parties may also benefit from its application. These include project managers, IT consultants, and researchers. For example, project managers may capture their team's perception of communication, analyse the data, and identify areas of consensus and discrepancy, and thus areas for improvement. Consultants could apply the method in a similar way but could use the data collected from different organisations to either benchmark a given business or IT team, or benchmark organisations themselves[2]. Meanwhile, researchers could use the method as a technique to analyse the way communication is perceived in specific industries.

Taking the above into account, six different user groups can be identified for the envisaged method; namely, business and IT personnel, executive management, project managers, internal and external consultants, and academic researchers. Each of these parties has unique characteristics and has distinct requirements in terms of their interactions with the method.

5.2.2.2 *Assessment Requirements*

As mentioned earlier the goal of this thesis can be stated as to develop an assessment method that enhances reflection and raises awareness of factors influencing

---

2 Given the unique nature of communication in an organisation, benchmarking might not be possible. This is further discussed in the conclusion of this thesis (see Chapter 8).

communication in business–IT alignment by obtaining 'feedback' from business and IT personnel. In this section, the key objectives and the requirements for the assessment method are presented as they have emanated from the discussion that took place earlier in this chapter.

The *IEEE standard 1220* (2005) states that a requirement is a "statement identifying a capability, physical characteristic, or quality factor that bounds a product or process need for which a solution will be pursued". While discussion in the chapter so far has led to the identification of various challenges and a number of implications when assessing communication, the aim now becomes to synthesise these into the requirements of the assessment method; that is, the capabilities and characteristics that the assessment method needs to address.

The requirements elicited from the literature review and from the earlier sections of this chapter are presented below and are grouped into requirements relating to objectives, deployment in industry, and communication theory and assessment. Overall, a series of ten requirements is synthesised from the discussion presented in chapters 2 and 3, as well as the earlier sections of this chapter.

The business–IT communication assessment method will need to be able to do the following:

- *Requirements relating to objectives*

  1. address communication between either specific business and IT functions or all of them throughout an organisation

  2. enable and support reflection on communication within the business–IT alignment process

  3. assist in raising awareness of communication in business–IT alignment

- *Requirements relating to industry*

  4. be quick and easy to use for deployment in industry

  5. enable quick analysis and interpretation of results without prior knowledge

- *Requirements relating to communication theory and assessment*

  6. accommodate a variety of factors influencing communication within the business–IT alignment process

  7. provide a mechanism for (self-) assessment – in particular, to enable personnel residing in the business and IT functions to choose the current and desired communication states themselves

8. show degrees of growth within the factors, since different personnel might perceive the communication situation differently

9. account for the fact that one cannot measure communication objectively yet provide for inter-subjectively valid ranking

10. provide an opportunity for subsequent discussion among personnel residing in the business and IT functions.

While these requirements are forthcoming from the earlier chapters and discussion, they also coincide with the requirements stipulated for a communication assessment method in the discipline of engineering design (Maier, 2007). Therefore, in line with the argument that this study aims to 'exapt' this method to the business–IT alignment context, it also 'exapts' some requirements associated with it; the reason being that organisations may experience the same communication difficulties in both contexts (Coertze & Von Solms, 2015b). Furthermore, although some requirements in this study are unique, many of them are common to other fields. Having said that, the specifics being assessed in business–IT alignment differ from those of engineering design (for example, see Luftman, 2000, 2003; Reich & Benbasat, 2000), hence the need for a specific assessment method for business–IT alignment (see § 3.3).

5.2.3   *Solution Concepts and Approaches*

Having established a series of requirements for the development of the envisaged assessment method, this section investigates several assessment approaches for their viability in addressing these requirements.

In chapter 3, this thesis stipulated that a multitude of methods could be used and combined in various ways to assess communication. Authors such as Hargie and Tourish (2009), D. Jones (2002) and others (Porter & Roberts, 1976; Price, 1972) have described a variety of instruments, techniques, tools and methods used to assess or audit communication in organisations. Some of these methods include participant observation, interviews, questionnaires, critical incident analysis, experiments and focus group sessions (Hargie & Tourish, 2009). More recently, the engineering design discipline has employed a maturity grid-based approach (Maier et al., 2006).

It would therefore seem that communication can be assessed using a variety of different approaches and techniques, each having its own strengths and limitations (D. Jones, 2002). However, of interest to this study was which of these

approaches would most successfully address all the stipulated requirements for the envisaged assessment method. To this end, it evaluated the viability of several approaches. Among those considered were interviews, observation, critical incident analysis, focus groups, checklists, diary studies and the maturity grid-based approach because, as Hargie and Tourish (2009) maintain, these are the approaches most commonly associated with communication assessments. Based on this evaluation, the most appropriate and suitable method, in terms of its ability to meet the requirements, was selected (see Figure 5.1).

As seen in Figure 5.1, most of the approaches considered, apart from the maturity grid-based approach, either did not fulfil all the requirements or only addressed them partially. For example, in interviews a great deal of extra information may surface which may mean that a quick and straightforward analysis cannot be made (Requirement #5). In addition, interviews are conducted in isolation and thus do not facilitate group discussions – at least not in their typical form (Requirement #10).

In the case of observation, one of the weaknesses identified was the fact that it may alter the behaviour of those individuals being observed and may take several days. Thus, when measuring it against the requirements, it was believed that observation would not cater for quick analysis (Requirement #5), group discussion (Requirement #11), or provision for scoring of the current and desired situations by business and IT personnel themselves (Requirement #8). This trend continued when assessing most of the other approaches.

The focus group approach, however, showed great promise since it naturally allows for open and free communication (Krueger & Casey, 2009). In addition, the perceptions of multiple staff members can be gathered in a relatively short amount of time. Nevertheless, as D. Morgan (1993) states, the interpretation of the data gathered in this way can be time-consuming. Moreover, it would also be difficult for the assessment to remain objective and free of bias; additionally, focus groups are susceptible to group pressure, where individuals' responses may be influenced by those of their peers (Barbour, 2008). Consequently, this approach was rejected.

Ultimately, the maturity grid-based approach (Maier, Moultrie, & Clarkson, 2011) was chosen. Among the approaches considered, this particular approach was the only one that successfully satisfied and addressed all the requirements stipulated for the development of the assessment method. This choice coincided with the analysis and findings of Maier (2007), who also reported the maturity

Requirements

#1: Address communication between either specific business and IT functions or all of them

#2: Enable and support reflection on communication within the business-IT alignment process

#3: Assist in raising awareness of communication in business-IT alignment

#4: Be quick and easy to use for deployment in industry

#5: Enable quick analysis and interpretation of results without prior knowledge

#6: Accommodate a variety of factors influencing communication

#7: Provide a mechanism for (self-) assessment

#8: Show degrees of growth within the factors

#9: Provide inter-subjective valid ranking

#10: Provide an opportunity for discussion among personnel

Approach	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10
Interview	■	■	■	■	▨	■	■	□	■	□
Observation	■	□	▨	□	□	■	□	□	□	□
Critical incident analysis	■	■	■	□	□	■	□	□	□	■
Focus groups	■	■	■	■	▨	■	■	■	■	■
Checklists	■	□	■	□	▨	■	■	■	■	□
Diary studies	■	□	■	□	▨	□	■	□	□	□
Maturity grid approach	■	■	■	■	■	■	■	■	■	■

Legend:
- □ Requirement not fulfilled
- ▨ Requirement partially fulfilled
- ■ Requirement fulfilled

Figure 5.1. Evaluation of Different Assessment Approaches

grid-based approach to be the most suitable for a communication assessment method in engineering design.

What makes this approach unique is that it allows both the current and the desired perceptions of communication to be captured by business and IT personnel inter-subjectively, yet at the same time it also allows the subjective opinions of the personnel to surface. In addition, maturity grids are both a means of assessment and a part of a framework for improvement (Moultrie, 2004). This makes them ideal for use in this study, as the aim is to improve communication between business and IT personnel in the business–IT alignment process.

Taking all the above into consideration, the assessment of communication in business–IT alignment is difficult owing to its multifaceted nature. However, if such an assessment were to take the form of an audit, measuring the perceptions of both business and IT personnel, this difficulty could be alleviated. Such an assessment would provide feedback and would offer a basis on which future improvements could be made.

In aiming to develop a method to perform a communication assessment, this section stipulated a series of ten requirements against which several approaches where evaluated. Subsequently, a maturity grid-based approach was chosen as it was considered the most satisfactory of the various solution approaches available, including interviews, observation, critical incident analysis, focus groups, checklists, and diary studies. Given this, the maturity grid-based approach is explained in more detail in the next section.

5.3 MATURITY-GRID BASED APPROACH: OVERVIEW AND CONSTRUCTION

Now that it has been established that a maturity grid is the most appropriate approach to assess communication within business–IT alignment, it becomes necessary to explore the exact nature of a maturity grid. In doing so, this section firstly offers an overview of maturity grids (§ 5.3.1) and, secondly, presents a supporting methodology for their construction and application in this study (§ 5.3.2).

5.3.1 *Maturity Grids: What Are They and What Do They Entail?*

Fraser, Moultrie, and Gregory (2002) state that maturity grids are variants of the maturity approach. Similar to traditional maturity models, also known as Capability Maturity Models (CMMs), they depict several levels of maturity. How-

ever, there are distinct differences. Unlike a maturity model, which offers only an overall description of each maturity level, maturity grids provide information that is more detailed, since they typically describe, in a few phrases, the usual behaviour exhibited by an organisation at a specific level of 'maturity'. The important thing here is that they do this for each of several aspects of the area under study, not just overall. Thus, they provide a more differentiated analysis.

Furthermore, whereas maturity models require multiple aspects, or factors, to mature simultaneously before progressing along the maturity scale, a maturity grid allows each aspect to mature on its own independently. Therefore, one could understand a maturity grid perhaps as a collection of separate 'sub'-maturity models – although they would focus on a single area of interest. This becomes particularly evident when investigating the typical construction of such a grid.

In general, a maturity grid is structured around a matrix, which creates a series of cells by allocating (a) levels of maturity [columns] against (b) several key aspects or key activities [rows] (S. Austin et al., 2001). The cells then contain (c) text descriptions of typical performance at different levels of granularity. Figure 5.2 depicts this principle graphically.
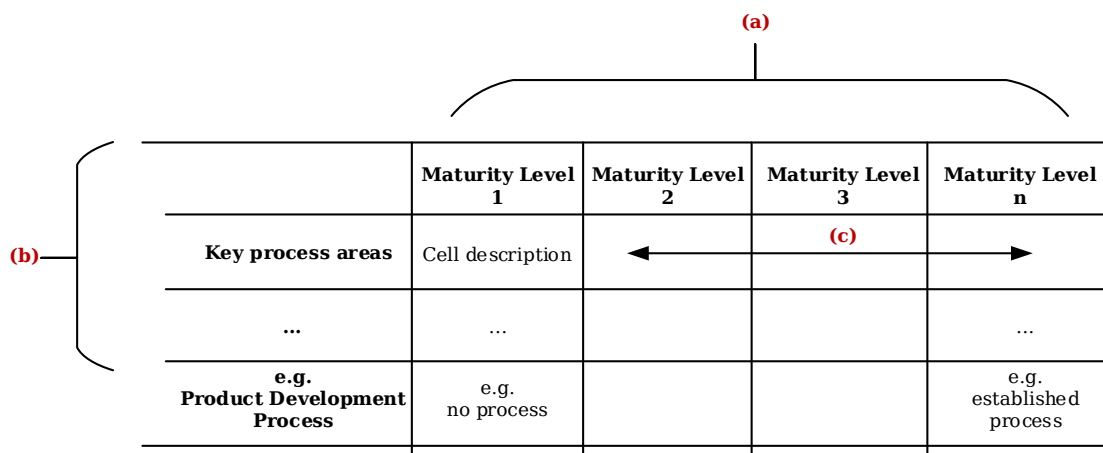
Figure 5.2. Concept of a Maturity Grid (Maier, Moultrie, & Clarkson, 2011)

Crosby (1996, 1979) first introduced this idea with his Quality Management Maturity Grid (QMMG). This grid defined six aspects of quality management at five levels of 'maturity', with the levels of maturity ranging from *'uncertainty'*, *'awakening'*, *'enlightenment'*, and *'wisdom'* to *'certainty'* (Fraser et al., 2002). Later, Moultrie (2004) used a maturity grid to audit the design process and products in engineering projects. She argued that maturity grids required less expertise and resources and, furthermore, avoided the bias towards the opinions of the researcher or a single informant. In 2007, Maier introduced this method as an

assessment method for communication in engineering design (Maier, 2007). She argued that the properties and benefits of maturity grids made it an ideal tool for organisations to assess their communication practices within this context, but stressed that it could be expanded to other disciplines as well.

5.3.2 *Methodology for Developing Maturity Grids*

By establishing the use of a maturity grid in developing the assessment method in this study and exploring what this entails, it now becomes necessary to understand how a maturity grid is developed.

Until recently there was no guidance on how one could develop a maturity grid. Instead, most authors referred to the Capability Maturity Models (CMMs) construction process (Paulk, Weber, Curtis, & Chrissis, 1995). However, as has been shown, maturity grids and CMMs differ. Realising this problem, Maier et al. (2011) proposed a detailed roadmap, or methodology, to develop maturity grids. They based this on their own comparison of extant maturity grids, including those of Crosby (1996, 1979) and Moultrie (2004), as well as their own field experience.

Their roadmap (see Figure 5.3) consists of four generic phases, namely, *planning*, *development*, *evaluation*, and *maintenance*. In turn, each phase consists of several steps or decisions that a researcher should make using a single method or a combination of appropriate research methods.

The first phase, *planning*, encompasses all the early decisions a researcher should make when aiming to develop a maturity grid. In particular, s/he needs to decide on the target audience (who will form part of the assessment), the purpose of the assessment, its scope, and the success criteria. These may make use of, among other things, literature reviews, interviews, observations, and case studies.

Once the initial planning has been done, the second phase starts. The second phase, *development*, concerns the architecture of the maturity grid and has a significant impact on its use. The architecture encompasses the maturity levels (rating scale) to be assigned (see a in Figure 5.2), the process areas or factors that need to be accessed (see b in Figure 5.2), the cell descriptions to be formulated (see c in Figure 5.2), and the administrative mechanism that will be used. This phase essentially entails designing and populating the maturity grid, which is considered the biggest and most important task of all.

Phase I: Planning

Step 1. Specify Audience

Step 2. Define Aim

Step 3. Clarify Scope

Step 4. Define Success Criteria

Phase II: Development

Step 1. Determine Influencing Factors

Step 2. Define Maturity Levels

Step 3. Formulate Cell Text

Step 4. Define Administration Mechanism

Phase III: Evaluation

Step 1. Validate Grid Usability / Feasibility

Step 2. Verify Finding Correctness

Phase IV: Maintenance

Step 1. Check Benchmark

Step 2. Maintain Results Database

Step 3. Document Process and Results

Figure 5.3. Maturity Grid Construction Methodology (Maier, Moultrie, & Clarkson, 2011)

Having completed the development phase, the third phase can commence. This phase, *evaluation*, is an important phase in the roadmap, since it serves a number of purposes. For example, the researcher will perform individual case studies or focus groups to validate the grid, to obtain feedback on whether the grid fulfils the requirements when applied in practice, and to identify items for refinement. In fact, this is the phase where the researcher will approach the intended audience directly and have them use the maturity grid. This is also then an opportune time to check the validity and correctness of the acquired results, since the findings should correspond with the actual observed situation. Typically, one would use follow-up workshops or interviews for this purpose.

The final phase, *maintenance*, reflects an ongoing process. Initially, only a few members in the intended audience may use and apply the newly developed grid. However, as its popularity increases and the researcher obtain more results and findings, the grid may need to be refined to ensure continued accuracy and relevance. Furthermore, given that domain knowledge and understanding may evolve, the grid will need to keep pace with the latest practices and developments, and, in addition, existing practices may become outdated. It is important to note that this phase will only be present in studies that have progressed well beyond proof-of-concept, since many members of the audience will have had time to use and apply the grid. Meanwhile, early proof-of-concept studies – such

as the one presented in this thesis – may have progressed only to the *evaluation* phase.

Given the discussion above, maturity grids are variants of the maturity approach (Fraser et al., 2002). While having some commonalities with maturity models, they do differ in their construction and application. Furthermore, although overshadowed by CMMs, the quality management (Crosby, 1996, 1979) and engineering design disciplines (Maier et al., 2006; Moultrie, 2004) have applied them successfully. However, of more interest to this study is the fact that the engineering discipline has used them successfully to assess communication in engineering design (Maier, 2007).

The question this study aims to answer is whether one can successfully 'exapt' this to the business–IT alignment context. In attempting to answer this, the study explored the maturity grid construction process. While most authors adhere to the CMMs construction process, this study opts to use a more appropriate methodology proposed by Maier et al. (2011). Having said that, it is important to bear in mind that this study still subscribes overall to the design science paradigm (Hevner et al., 2004). The reason for using the maturity grid methodology (outlined here) is that it acts as a supportive construction outlet for the design and development of the assessment method – the socio-technical artefact. This is supported by Peffers et al. (2007), who state that a design science project may employ supportive methodologies for the construction of the socio-technical artefact – that is, above and beyond the overarching methodology implied by the design science paradigm.

5.4 METHOD DEVELOPMENT

The previous section offered an overview of the maturity grid-based approach and presented a methodology or roadmap for its construction and application in this study (see Figure 5.3). This study opted to use this approach and roadmap in developing the assessment method, which henceforth is referred to as the 'Communication Alignment Maturity Improvement (CAMI) method'.

This study devised the CAMI method, based on a maturity grid, to assess communication between the personnel in the business and IT functions of an organisation as part of the business–IT alignment process. The development and application of the method spanned a period of two and a half years and followed the construction roadmap proposed by Maier et al. (2011) (see Figure 5.3). During the course of this study, a comprehensive literature review and a Delphi

study was conducted during phases I (*planning*) and II (*development*) and one application was undertaken as a transition between phases II and III (*evaluation*).

This section provides a detailed description of the way in which this study approached and executed the first two phases of the roadmap. Firstly, it re-emphasises the rationale behind the development of the CAMI method, the audience, the aim and scope, and the success criteria (§ 5.4.1). Secondly, it explains how the CAMI method was constructed by discussing the identification and selection of influencing factors and maturity levels, and the write-up of the text descriptions (§ 5.4.2). Please note that the evaluation phase of the method is presented in a subsequent chapter (see Chapter 7).

5.4.1 *Planning (Phase I): Audience, Aim, Scope and Success Criteria*

Prior to developing the CAMI method, a variety of initial decisions had to be made. In particular, the target audience (which would form part of the assessment), the purpose of the assessment, its scope, and the success criteria had to be determined. Many of these have already been established with the earlier literature review and sections in this chapter (see § 5.2), therefore a short summary follows.

Since the business–IT alignment context encompassed the business and IT functions of an organisation, the audience of the method was prescribed to be business and IT personnel. This recommendation was necessary since communication difficulties could present themselves anywhere between the business and IT functions. Furthermore, since communication practices in this context are so variable, the aim of the method was to assess the current practices, raise awareness among the participant audience and diagnose improvement opportunities for these practices (see § 5.2.1).

This study intended the method to be discipline-specific, that is, focused on the communication practices that take place between the personnel in the business, and the IT functions, as part of the business–IT alignment process. Within this context, a myriad of different factors or aspects can be assessed; hence, the scope of the method was the assessment of the organisational, functional or domain, team and individual factors. This constraint was deemed necessary, since business and IT personnel operate within a socio-technical system that is influenced by several factors both inside and outside the organisation itself (see § 3.3.3).

As for the success criteria, the literature review identified several requirements that the method had to address successfully (see § 5.2.2). In general, it had to be functional and useful for organisations in industry, therefore the success criteria for its usability emphasised clarity of language and ease of scoring and analysis. Furthermore, it had to be able to assess communication practices accurately and trigger reflection, learning, and awareness among the personnel residing in an organisation's business and IT functions.

5.4.2   *Development (Phase II): Influencing Factors, Maturity Levels, Text Descriptions and Administration Mechanisms*

Once the early decisions regarding the CAMI method's audience, aim, scope and success criteria had been made the actual development of the method commenced.

In developing the assessment, based on a maturity grid, several aspects had to be investigated and decided on. With reference to the structure of a maturity grid (see Figure 5.2), this study had to firstly identify the key influencing factors affecting communication in business–IT alignment, which would help to specify the individual rows of the maturity grid (§ 5.4.2.1). Secondly, it had to decide on the maturity levels for each of these factors, which subsequently comprise the columns of the maturity grid (§ 5.4.2.2). Thirdly, it had to prepare the descriptions for each of the grid cells (§ 5.4.2.3) and, finally, investigate and establish how organisations would use the grid as an assessment method – better known as the administration mechanism (§ 5.4.2.4).

5.4.2.1   *Influencing Factors (Grid Rows)*

This study, as argued in Chapter 3, considered communication to be a multi-faceted phenomenon and to be systemic in nature (Eckert et al., 2004). Therefore, it could be influenced by organisational, functional or domain, team and individual factors, since it operates within a socio-technical system – a 'system' that the business and IT personnel would be part of (Millar, 2009). In light hereof, it used Moray's (2000) factors of a socio-technical system as the preliminary starting point for the CAMI method.

However, Moray's (2000) factors do not account entirely for the unique context and audience of the method, namely, business–IT alignment. Therefore, further literature reviews were conducted to identify additional factors that could influence communication practices in business–IT alignment. Among others, the

literature reviews acknowledged Luftman's (2003) six aspects used to assess communication in his popular SAM assessment model (see Figure 1.1) and Coughlan et al.'s (2005) thematic analysis of communication problems. In addition, those factors proposed for the social dimension of business–IT alignment were also identified (Reich & Benbasat, 2000), given that communication was seen to form part of this dimension (see § 2.3.2.2). Lastly, since Nolan and McFarlan (2005) argue that the role and strategic use of IT could differ within an organisation and, therefore, influence the business–IT alignment process, this was added as a further preliminary factor.

In total, the literature reviews and examined studies culminated 49 preliminary factors that could influence communication practices in business–IT alignment (see Appendix A). These factors were grouped according to Moray's (2000) social-technical system description (see § 3.2.3). Hence, the factors ended in four categories: *environment*, *organisation*, the *function (team)*, and the *individual communicator*. These closely matched the systemic perspective of communication, as proposed by Eckert et al. (2004) (see § 3.2.4). Unfortunately, the accuracy and validity of these factors and categories were questionable, especially since this is the first study (known to the author) to combine them in attempting to assess communication explicitly in business–IT alignment. Consequently, the study employed a Delphi study (another research method) to triangulate the list of factors. This is in line with Mingers (2001), who states, different research methods focus on different aspects of reality and therefore a richer understanding of a research topic will be gained by combining several methods together.

The Delphi method can best be characterised as a method for structuring a group communication process so that the process is effective in allowing a group of individuals, as a whole, to deal with a complex problem (Hsu & Sandford, 2007). Unlike interviews or focus groups, the Delphi method provides a structured process for soliciting expert opinion on a particular subject and enables group interaction without needing a face-to-face meeting (Creswell, 2007). Given this, this study employed the Delphi method to validate the preliminary factors and, possibly, gather additional factors not identified in the academic literature. Hence, the Delphi method was employed in an exploratory capacity, as supported by Okoli and Pawlowski (2004).

The Delphi study spanned three rounds over the course of three months. Each round consisted of an electronic survey containing a combination of both closed and open-ended questions, which the participants had to complete. The participant panel was evenly distributed, and overall included twenty high-ranking

business and IT executives, IT auditors, and academics doing research in business–IT alignment or related disciplines[3] (see Appendix B). An international management expert also formed part of the panel. These participants were knowledgeable about business–IT alignment, and had immediate knowledge of communication and its importance in this context. From this group, nine experts continued to be involved in the full study until the last round (55% drop-off rate)[4]. The experts included an IT auditor, an international management expert, two high-ranking business executives, two high-ranking IT executives, and three academics.

Following the recommendations of both Okoli and Pawlowski (2004) and Hsu and Sandford (2007), the Delphi study started with an initial list of 49 preliminary factors. During the first round, the Delphi participants had to indicate to what extent each of these factors, in their opinion, influenced communication between personnel in the business and IT functions as part of the business–IT alignment process. The aim of this was to validate the initial list of factors identified from the academic literature. Based on the responses received, the participants agreed that most factors (42 out of the original 49) did influence communication in this context. Furthermore, they proposed an additional five factors, namely, 'tone from the top'; 'resource availability'; 'domain initiatives'; 'CEO's and board's IT 'savviness'' and 'employee demographics'. The round concluded with the participants suggesting that 47 factors influenced communication in the assessment context to some extent.

In the second round, the participants were asked to select and rank each of the factors according to their perceived importance. The aim here was to derive a more manageable subset of factors, or a minimum baseline of the most critical factors. This was essential since an assessment covering 47 factors in total would be too demanding for most organisations in industry – especially those with limited resources. Based on the responses received, the list of factors was narrowed down to 25 (see Appendix C). Although a drastic reduction, the par-

---

3 The Delphi study was conducted according to a strict anonymous policy. Hence, the names of the participants have been omitted from this thesis. Upon written permission from the said participants; their current roles, operating market(s), expertise and experience have been shared.

4 Although a high drop-off rate, this is common for a Delphi study (Witkin & Altschuld, 1995, p. 196). Experts are required to complete multiple questionnaires during a short time-frame, therefore their availability and interest may decline. In addition, some experts may participate in the initial rounds to share their thoughts and ideas but may refrain from participating in later rounds, since they may perceive that they have already shared enough information. There is a general rule of thumb that says that if a heterogeneous or homogeneous sample is required, a Delphi panel should consist of at least 10 to 15 experts (Skulmoski, Hartman, & Krahn, 2007).

ticipants deemed these 25 factors to be the most influential and considered their inclusion crucial for the assessment.

The third and final round gave the participants the opportunity to make final changes to the list of 25 factors. In particular, they had the opportunity to exclude any of the factors or to re-include factors that had been removed during the previous rounds. They could also reshuffle the factors within the different socio-technical categories (see earlier). The round concluded with most participants agreeing to retain all 25 factors[5] and none of the previously removed factors was re-included. Some participants gave reshuffling suggestions, but none of these suggestions was implemented because of the limited support for their inclusion. Consequently, the decision not to conduct another round was founded on the fact that the list of 25 factors was supported by the literature.

An important challenge in a Delphi study is that different people often have different understandings of the same concept, also referred to as the "inadequate pre-operational explication of constructs threat" (Cook & Campbell, 1979). As mentioned earlier, communication can be interpreted and conceptualised in different ways. Similarly, business–IT alignment means different things to different people. Consequently, all the questionnaires included short, unambiguous definitions of business–IT alignment, communication and the various factors affecting communication. Furthermore, the questionnaires were pilot-tested for ambiguities and vagueness before being sent to the participants. Having sad that, in the third round a comment was made that the descriptions of some factors were too lengthy and difficult to understand for business personnel. As a result, these descriptions were rephrased and shortened prior to inclusion in the final method. In addition, to ensure data accuracy and interpretation, a statistician was consulted after each round.

Overall, this study determined that a list of 25 factors (see Figure 5.4) was adequate for assessment purposes based on the collective results of the Delphi study and prior literature reviews. Subsequently, these factors were used as the grid rows in the maturity grid (see b in Figure 5.2); that is, the CAMI method.

---

5 The goal of this final round was primarily to come to greater consensus in the group. While a variety of different consensus interpretations exists, this study defined consensus as a measure of the stability of participants' responses in successive rounds. This was in agreement with Scheibe, Skutsch, and Schofer (1975), as they argue that this definition is more appropriate than the use of traditional percentage measures.

Environment
- *Legislation*
- *Business & IT standards*
- *Best Practices & guidelines*
- *Customers, services & products*
- *Technological developments*

Organisation
- *Business involvement in IT strategic planning*
- *IT involvement in business planning*
- *Management style*
- *Role and use of IT*
- *Corporate culture*
- *Organisational structure*
- *Reporting level of IT function head*
- *Executive management's IT savviness*
- *Input rights to ICT decisions*

Function / Domain (Team)
- *Leadership style*
- *Nature of function / domain initiatives*
- *Level of cooperation*
- *Communication style and ease of access*
- *Liaison breadth & effectiveness*
- *Cross-domain (mutual) understanding*
- *Knowledge sharing*

Personnel (Individual)
- *Experience, skills and competencies*
- *Job commitment*
- *Employee personality*
- *Job motivation*

Figure 5.4. Categorised List of 25 Factors

5.4.2.2   *Maturity Levels (Grid Columns)*

A constraint while determining the maturity levels was the limitation of assessing communication mentioned earlier; of implying, for example, 'the more the better', or 'the more interactive the better', or 'the faster the better'. Communication is difficult to assess, since it means different things to different people. Added to this, one cannot definitively state whether one instance of communication is better than another instance, since communication processes are highly

complex and the relationship between 'input-and-output variables' cannot be predefined or predicted to function as a universally applicable, lasting standard.

In view of this, as mentioned earlier, assessing communication in the business–IT alignment process has two goals. Firstly, to raise awareness of communication, and, secondly, to engage business and IT personnel and, ideally the organisation as a whole,in an ongoing reflective learning process. Given this, learning was identified as the overarching concept for the growth in the maturity levels - grid columns (see a in Figure 5.2). Learning is a dynamic concept, which emphasises the constantly changing nature of communication and organisations in general.

While several learning models exist, this study opted to use the ever-popular model of Argyris and Schon (1978, 1996) and, in particular, their three learning types as the maturity levels (grid columns) for the method. This corresponds with the study of Maier et al. (2006) and the arguments of Balhareth, Liu, and Manwani (2012). In addition, like Maier et al. (2006), an extra preliminary level was added to cater for instances where organisations did not reflect on their communication practices or did not perceive this to be important.

In total, four maturity levels were identified and included in the construction of the method[6]. These maturity levels are as follows:

MATURITY LEVEL 1: NO ACTION

Describes situations where the organisation (or the participants) does not reflect on the factor in question or communication (i.e., they either do not think about the factor or only seldom; or do not perceive it as important).

MATURITY LEVEL 2: CHANGE OF ACTION

Corresponds with the first learning type described by Argyris and Schon (1996), and points out that some action needs to be taken to correct a shortcoming but, other than that, tasks are carried out as usual.

MATURITY LEVEL 3: CHANGE OF ACTION & ATTITUDE

Matches the second learning type described by Argyris and Schon (1996); the organisation (or the participants) at this stage modify its actions, as well as thinking critically about existing norms, procedures, policies and objectives that govern its actions. This means that it not only corrects a

---

6 The reader is referred to Bandura (1977). Parallels can be drawn between the maturity levels in this study and the degree of observation and the observer, based on the system-theoretic and cybernetic concept of 'observation' (Von Glasersfeld, 1989). They can also be paralleled to the stage of system development, based on Willke (1994, 2000) (Level 1: *Demarcation and specialisation*; Level 2: *Structure and 'process regulation'*; Level 3: *Reflexion*, and Level 4: *Genesis*). Lastly, they can be compared to the maturity levels of the information security competence maturity model proposed by Thomson (2003).

mistake once, but also takes the general situation that led to a shortcoming into consideration.

MATURITY LEVEL 4: CONTINUOUS ADAPTATION
Corresponds to the third learning type described by Argyris and Schon (1996). It signifies a stage during which employees (a) are aware of the influence of a given factor on communication and (b) continuously check to see whether things are handled appropriately for the given situation.

5.4.2.3 *Cell Descriptions*

After identifying the 25 influencing factors (rows in the maturity grid) and the maturity levels (columns in the maturity grid), the textual content of the cells was composed (see c in Figure 5.2).

For each cell, taking into account the unique combination of factor and maturity level, a relevant cell description was drafted that was indicative of the factor's maturity at that level. In this way, the aim was to define the extent to which the organisation, from the participant's point of view, was aware of the influence, relevance, and prominence of the factor in question.

In drafting this text, the intention was to use the correct terminology and keep the descriptions as simple as possible. Having formulated the cell descriptions, the study, using a separate survey, subsequently elicited feedback from the participants of the Delphi study, which essentially added a fourth round to the Delphi study. Based on the recommendations and comments made by these participants, several cell descriptions were refined.

Table 5.1 offers an extract of the maturity grid, in particular its environmental factors and their associated descriptions, to provide a snapshot of the ultimate outcome of the development phase. Note that a full explanation of the maturity grid can be found in a later section.

5.4.2.4 *Administration Mechanism(s)*

Subsequently, after having addressed the influencing factors (grid rows), maturity levels (grid columns), and cell descriptions, a fully populated maturity grid was developed.

Subsequently, this study had to address the way the assessment's audience of participants would use the maturity grid to capture the current and desired communication states; that is, the state of communication currently existing among the personnel in the business and IT functions of an organisation. Several mecha-

nisms and approaches to achieve this were investigated, but ultimately Maier et al.'s (2006) proposal was followed to include two columns on the right-hand side of the grid. The first additional column allowed participants to record a maturity level for each factor indicative of the current maturity (according to them) experienced within the organisation, domain, or team. The second column allowed participants to enter a desired or ideal maturity envisaged.

These new data entry cells essentially converted the maturity grid into a 4-point Likert-type scale survey, allowing an assessment to be made. Participants from both the business and the IT functions would be required to select a current and desired maturity from the maturity level descriptions for each factor and record their opinion(s) in the space provided, thus ultimately assessing their current and desired states for each factor.

Collectively, these new entry cells catered for data collection during an assessment. The organisation could, in turn, use this data for analysis purposes and draw various findings and results from it. The exact process as to how this method would be employed to perform an assessment and how the data would be analysed is discussed in the following section.

Given the discussion above, a maturity grid to assess communication among personnel in the business and IT functions of an organisation has been developed (see Appendix D). The final maturity grid consists of 25 factors that influence this communication (rows), four maturity levels (columns), and appropriate cell descriptions (see a, b and c in Figure 5.2). This maturity grid (referred to as the CAMI method) will allow organisations to capture the current, and desired communication practices among personnel in their business and IT functions.

5.5 CAMI METHOD: MATURITY GRID EXAMPLE

The CAMI method, the development of which was discussed in the previous section, consists primarily of a paper-based 'maturity grid' sheet[7]. The full 'grid' sheet can be found in Appendix D.

The maturity grid sheet consists of the following items:

1. influencing categories

2. influencing factors (rows)

---

7 Although the CAMI method is presented as a paper-based artefact within this thesis, an electronic version is available and was made use of during the case study presented in the follow chapter.

3. four levels of maturity (columns)

4. cell descriptions

5. two scoring columns, one for the 'current', one for the 'desired' situation

6. references for scoring.

To illustrate the purpose of these items, the composition of the environmental factors will now be explained in more detail (see Table 5.1).

The influencing factors are grouped into four different influencing categories, which have been extracted from the literature (see §5.4.2.1) and include: (i) *environment*, (ii) *organisation*, (iii) *business-IT function (team)*, and (iv) *personnel*. The example, given by Table 5.1, resides in the *environment* category.

In the most current version of the maturity grid sheet, there are 25 influencing factors. For the full list of factors, see Appendix C. Looking at the example here, there are five factors listed in the rows: 'legislation', 'standards', 'best practices and guidelines', 'customers, services and products', and 'technological developments'. Like the selection of 'influence categories', these factors are based on an extensive literature review and the Delphi study (see §5.4.2).

The above-mentioned environmental factors are defined as follows:

- ***1.1. Legislation:*** Degree to which the organisation adheres to and is knowledgeable about the rules and policies that govern the way it should operate; typically for a specific activity (e.g., *Protection of Personal Information Bill (POPI), Electronic Communications and Transactions Act (ECTA), Sarbanes-Oxley*).

- ***1.2. Standards:*** Degree to which the organisation adheres to and is knowledgeable about both business standards, such as *ISO 9001*, and IT standards, such as *ISO/IEC 27002* and *ISO/IEC 38500*.

- ***1.3. Best Practices & guidelines:*** Degree to which the organisation adheres to and is knowledgeable about both governance best practices, such as the *King III Report on Corporate Governance* and the the *OECD Principles of Corporate Governance*, and IT best practices, such as *COBIT 5* and *TOGAF*.

- ***1.4. Customers, services and products:*** Degree to which the organisation is knowledgeable and shares information about the needs and demands of customers, service and\or products.

Factor #	Factor / Process	Definition / Description	Maturity Levels				Current	Desired
			1 No Action	2 Change of Action	3 Change of Action & Attitude	4 Continuous Adaption		
		ENVIRONMENTAL CATEGORY						
1.1	Legislation	*Degree to which the organization adheres to and is knowledgeable about the rules and policies that govern the way it should operate; typically for a specific activity (e.g., POPI, ECTA, Sarbanes-Oxley)*	We seldom think about them.	We somewhat know about them, but do not know how to apply them.	We know about them, but only apply them partially.	We regularly and continuously talk about them. We regularly adjust our business models and processes to align with them.	[ ]	[ ]
1.2	Standards	*Degree to which the organization adheres to and is knowledgeable about both business standards, such as ISO 9001, and IT standards, such as ISO/IEC 27002 and ISO/IEC 38500.*	We seldom think about them.	We somewhat know about them, but do not know how to apply them.	We know about them, but only apply them partially.	We regularly and continuously talk about them. We regularly adjust our business models and processes to align with them.	[ ]	[ ]
1.3	Best Practices & guidelines	*Degree to which the organization adheres to and is knowledgeable about both governance best practices, such as King III and OECD, and IT best practices, such as COBIT 5 and TOGAF.*	We seldom think about them.	We somewhat know about them, but do not know how to apply them.	We know about them, but only apply them partially.	We regularly and continuously talk about them. We regularly adjust our business models and processes to align with them.	[ ]	[ ]
1.4	Customers, services & products	*Degree to which the organization is knowledgeable and shares information about the needs and demands of customers, service and\or products.*	We seldom think about them.	We somewhat know them, and only reactively talk about them.	We know and proactively talk about them. Yet, we only partially align our business models and processes to them.	We regularly and continuously talk about them. We regularly adjust our business models and processes to align with them.	[ ]	[ ]
1.5	Technological developments	*Degree to which the organization is knowledgeable and shares information about the advances, improvements and alterations to technology in the market.*	We seldom think about them.	We somewhat know about them, and only reactively talk about them.	We know and proactively talk about them. Yet, we only partially align our business models and processes to them.	We regularly and continuously talk about them. We regularly adjust our business models and processes to align with them.	[ ]	[ ]

Table 5.1: Example of the CAMI Method (Environmental Factors)

Factor / Process	Maturity Levels				Current	Desired
	1	2	3	4		
	No Action	Change of Action	Change of Action & Attitude	Continuous Adaption	Current	Desired
Legislation	We seldom think about them.	We somewhat know about them, but do not know how to apply them.	We know about them, but only apply them partially.	We regularly and continuously talk about them. We regularly adjust our business models and processes to align with them.	[ ]	[ ]

Table 5.2: Example of Factor Row ('Legislation')

- ***1.5. Technological developments:*** Degree to which the organisation is knowledgeable and shares information about the advances, improvements, and alterations to technology in the market.

For each of these factors, there are four maturity levels. The definition of these maturity levels (1–4) is as follows:

- *Level 1:* No action

- *Level 2:* Change of action

- *Level 3:* Change of action and attitude

- *Level 4:* Continuous adaptation

Please refer to § 5.4.2.2 for a more detailed description and explanation of these maturity levels. In addition to the 'type of learning', there are two qualifying criteria for each level: 'degree of awareness' and 'degree of change'. In some cases, not all criteria are addressed simultaneously.

The individual cell descriptions are based on a unique combination of factor and maturity levels. In these descriptions, the aim was to define the extent to which the organisation, from the participant's point of view, was aware of the influence, relevance and the prominence of the factor in question. To explain this further, consider the cell descriptions for the factor 'legislation'. Italic quotes refer to the cell descriptions (see Table 5.2).

For Level 1 ('No action'), the cell description reads, *"We seldom think about them."* In this instance, the organisation (as perceived by the participant) regards legislation to be neither important nor influential to the communication between business and IT personnel.

For Level 2 ('Change of action'), the cell description states, *"We somewhat know about them, but do not know how to apply them"*. Here, legislation does have a prominence in the organisation, but its exact relevance and importance is not yet

known. Therefore, some awareness raising and learning has taken place. However, the attitude of the organisation still needs improving.

For Level 3 ('Change of action and attitude'), the cell description reads, *"We know about them, but only apply them partially."* In this instance, there is change in action as well as the general outlook (attitude) on how to approach legislation. The organisation is starting to consider its relevance, prominence and influence on communication between business and IT personnel. Therefore, its level of awareness has increased and so too its attitude towards legislation. However, this has not yet formed part of the *status quo*.

For Level 4 ('Continuous adaptation'), the cell description states, *"We regularly and continuously talk about them. We regularly adjust our business models and processes to align with them."* Accordingly, the organisation holds a general attitude of continuous adaptation to legislation. That is, legislation is driving the communication between business and IT personnel. In addition, personnel are aware of how this particular factor affects communication, realise when a change needs to occur and implement an adequate solution.

Apart from these cell descriptions, the last two columns in the grid sheet are allocated to the participant's own assessment of the maturity level for each factor, with one column being assigned to the current and one to the desired state. To further clarify the perspective to enable scoring, a written sentence was added underneath the heading of the grid sheet (influencing category). This indicates whether the participant should respond for the business or IT functions s/he resides in, for him or herself, or for the organisation as a whole, while allocating scores to each factor. This ensures a common reference point.

5.6   CONCLUSION

The primary aim of this chapter was to describe the design and development of the assessment method, termed the 'Communication Alignment Maturity Improvement (CAMI) method'. To do so, it firstly specified the requirements for the assessment method; secondly, it introduced the chosen approach for development, namely a maturity grid-based approach and, thirdly, described how this approach was applied to develop an assessment method for communication in business–IT alignment.

This chapter specified the target audience, as well as the requirements for the assessment method. It further discussed various approaches that were considered in obtaining solutions and presented an argument for the approach eventu-

ally chosen, namely, a maturity grid-based approach taken from the discipline of engineering design (Maier et al., 2006). In so doing, it became clear that the target audience for the assessment method would be personnel residing in the business and IT functions of organisations, although the ultimate outcome of the assessment would be used by the organisations' executive management.

In terms of the requirements, the chapter specified that the aim of the method was to assess the current communication practices, raise awareness among personnel, and identify improvement opportunities for these practices. To this extent, the method had to

1. address communication between either specific business functions and IT or all of them

2. offer the output needed to enable and support reflection on communication within the business–IT alignment process

3. assist in raising awareness of communication in business–IT alignment

4. be easy and quick to use for deployment in industry

5. enable quick analysis and interpretation of results without prior knowledge

6. accommodate a variety of factors influencing communication in the business–IT alignment process

7. provide a mechanism for (self-) assessment; in particular to enable personnel residing in the business and IT functions to choose the current and desired communication states themselves

8. show degrees of growth within the factors, since different personnel might perceive the communication situation in different ways

9. account for the fact that one cannot measure communication objectively, yet provide for inter-subjectively valid ranking

10. provide an opportunity for subsequent discussion among personnel residing in the business and IT functions.

Given these requirements, several approaches where explored to identify which would be most suitable for developing the assessment method. Approaches considered included interviews, observation, critical incident analysis, focus groups,

checklists, diary studies, and the maturity grid-based approach. While some partially addressed the requirements, upon inspection only the maturity grid-based approach was seen to cater for them all. Consequently, the chapter proceeded to discuss what the chosen approach entailed as well as the general grid construction process.

The chapter went on to explain that maturity grids are variants of the maturity approach. While having some commonalities with maturity models, they differ in their construction and use. For example, while maturity models require multiple aspects, or factors, to mature simultaneously before progressing along the maturity scale, a maturity grid allows each aspect factor to mature independently. Therefore, one may interpret a maturity grid as a collection of separate sub-maturity models with each focusing on a single area of interest. The chapter continued by explaining that a maturity grid is structured around a matrix, which creates a series of cells by allocating (a) levels of maturity [columns] against (b) several key aspects or key activities [rows]. The cells then contain (c) text descriptions of typical performance at different levels of granularity.

When it came to the construction of a maturity grid, a proposal by Maier et al. (2011) was explored, namely, a detailed roadmap or methodology for developing maturity grids. This proposal is based on their comparison of extant maturity grids and their field experience, and consist of four generic phases: planning, development, evaluation, and maintenance. Each phase in turn consists of several steps, or decisions, that have to be taken using a single, or combination of, appropriate research method(s).

Given the choice of the maturity grid-based approach and the viability of using the above-mentioned roadmap, the chapter next described the design and development of the CAMI method. In particular, it explained how underlying elements of the assessment method were identified using a Delphi study, as well as the way in which these elements were combined into a holistic model, and finally, how this was transposed to construct a maturity grid. In so doing, the primary objective of this thesis was met.

The chapter concluded by discussing an example of the CAMI method; explaining its inner workings and offering an overview of the ultimate outcome of the development phase. To this extent, an extract of the environmental factors of the method was depicted and explained. Note, however, that the exact application of the method in performing an assessment is yet still unknown. The following chapter will introduce this to the reader.

The next chapter marks the start of the fourth part of this thesis, namely, the demonstration and evaluation of the assessment method. It will firstly explain how the CAMI method will be used to perform a communication assessment in business–IT alignment, that is, by means of a process model. Secondly, it will share evidence of the method's application in a public sector organisation, by demonstrating the use of the method in a practical setting. In particular, the selection of the public sector organisation will be discussed, as well as the way in which the process model was followed and executed, and finally, what the resultant findings of the assessment were.

Part IV

DEMONSTRATION AND EVALUATION

METHOD USAGE AND APPLICATION

"A pinch of probability is worth a pound of perhaps."

— *James Thurber* (Inspirational, 2015)

This study has established a method for evaluating communication in business–IT align-ment. This method, referred to as the CAMI method, entails a maturity grid consisting of 25 factors that influence the communication (rows) and four maturity levels (columns). The grid allows organisations to capture, assess and, subsequently where applicable, im-prove the communication practices among personnel in their business and IT functions. This chapter firstly explains how the CAMI method will be used by organisations to assess communication in business–IT alignment. This will be accomplished through a process model. Secondly, it shares evidence of the method's application in a public sector organisation; that is, it demonstrates the use of the method within a practical setting. In particular, the selection of the public sector organisation will be discussed, as well as the way the process model was followed and executed and, finally, the findings of the assessment.

6.1 INTRODUCTION

The problem identified in this study is that despite the fact that communication between business staff and IT personnel is vital in achieving business–IT align-ment, there is a lack of approaches, methods, and tools whereby organisations can explicitly capture, assess and ultimately improve such communication. With-out such guidance, organisations are likely to continue experiencing communi-cation difficulties and may have no way of identifying, analysing or remedying communication-related problems (B. Campbell et al., 2005; Cybulski & Lukaitis, 2005).

Consequently, the Communication Alignment Maturity Improvement (CAMI) method developed in the previous chapter provides a method by which organ-isations can capture, assess, and improve the current communication practices among personnel in their business and IT functions. Despite the design and development details that have already been discussed, the exact application and performance of the method remains unknown. Moreover, the method has not yet

been demonstrated to solve one or more instances of the problem. However, as Peffers et al. (2007) state, demonstration of the socio-technical artefact qualifies as a crucial step in the research process of a design science project (see Figure 4.3).

In light of the above, the purpose of this chapter is now to demonstrate the CAMI method and to share evidence of its use in a practical setting (see Figure 4.4). To do so, it firstly offers a process model that graphically depicts the phases and steps involved in using the method to perform an assessment. Secondly, it demonstrates the use of the method in a practical setting.

These and related issues will be discussed further in this chapter as follows: Firstly, the way in which the CAMI method will be used to perform a communication assessment in business–IT alignment will be explained. This will be achieved by sharing a process model, which consists of several phases and accompanying steps (§ 6.2). Secondly, it shares evidence of the method's application in a public sector organisation; that is, it demonstrates the use of the method in a practical setting. In particular, the selection of the public sector organisation will be discussed, as well as the way the process model was followed and executed and, finally, the resultant findings of the assessment (§ 6.3). These issues will be summarised and conclusions drawn at the end of the chapter (§ 6.4).

6.2 USING THE CAMI METHOD: A PROCESS MODEL

The previous chapter described the development and creation of the CAMI method. This section now clarifies the way in which an organisation would go about utilising it to perform an assessment of the communication between the business and IT personnel. In particular, it explains the mechanics of the assessment, while also looking at the context of its use. This will be accomplished with a process model.

The term 'process model' is used in various contexts. For example, in business process modelling the enterprise process model is often referred to as the business process model (Mendling & Strembeck, 2008). In design science, process models are often used to describe the steps and phases involved in performing some activity. For example, Peffers et al. (2006) established a process model to depict the steps needed for the successful execution of a design science project. Process models typically track what actually happens during a process. In addition, they specifically share the sequence in which the steps should be performed (Rolland, Prakash, & Benjamen, 1999). As with most processes, these

models typically start with some input, then a processing phase, and finally an output (Hommes & Van Reijswoud, 2000).

Taking the above into account, this study designed and developed a process model to depict graphically the steps and phases involved in applying the CAMI method. In other words, a model was devised to show the input(s), processing and output(s) of an assessment using this method. For an overview of this model, see Figure 6.1.
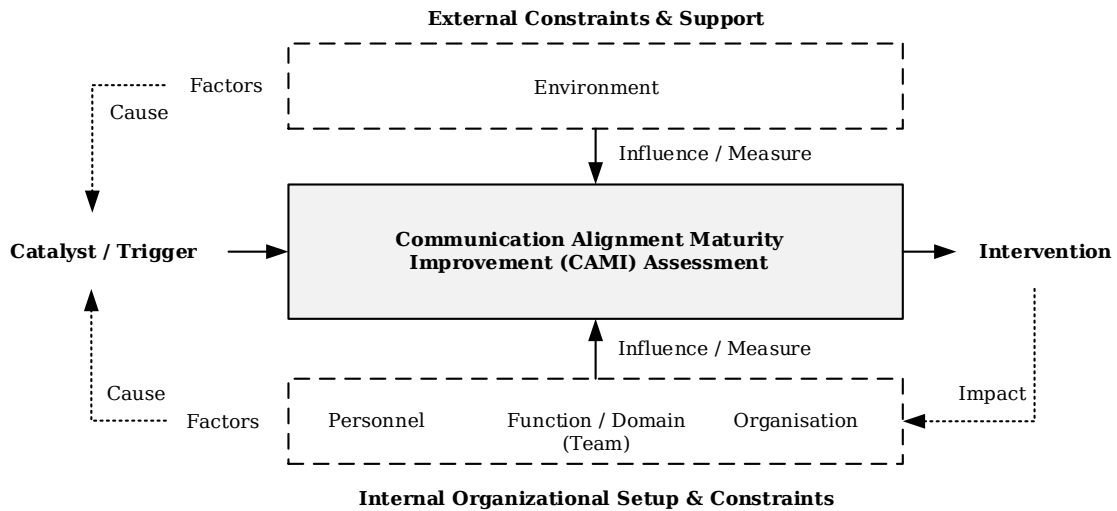

Figure 6.1. Overview of CAMI Assessment Process

The diagram above is a simplified representation of both the steps an organisation would take to perform an assessment using the CAMI method and the context of its use. It describes a dynamic, iterative process that starts with a catalyst or trigger that can originate from inside or outside the organisation. This catalyst motivates an organisation to perform the assessment, and when effective, will raise awareness and increase the understanding of communication among the organisation's business and IT personnel as part of business–IT alignment. It will detect those current communication practices that are troublesome and those functioning effectively. This, in turn, will allow the organisation to identify or devise some change interventions to improve the practices.

The simplified diagram merely acts as a starting point; this section now aims to expand on it to offer further insight into the assessment process and its context. The remainder of this section explores the catalyst or trigger to the assessment in detail, (§ 6.2.1) and then investigates the phases and steps an organisation would follow to perform the assessment (§ 6.2.2). Finally, it examines the possible change interventions that may be required to improve the communication

practices (§ 6.2.3). The intention is, by the end of the section, to have developed and shared a fully detailed process model (§ 6.2.4).

6.2.1 Trigger/Catalyst (Input)

The *catalyst* in the process model (see Figure 6.1) represents the particular trigger that will initiate the need for an organisation to perform the assessment. Although organisations might perform the assessment spontaneously, perhaps simply to ensure a fruitful working environment, this is unlikely, as inadequate communication is usually the cause of a problem, the problem itself or even is symptomatic of a problem (Maier et al., 2004). Essentially, what the process model emphasises is a *catalyst* is usually necessary to stimulate the organisation to consider and discuss communication-related problems. Once this occurs, it will induce the organisation to perform a communication assessment using the CAMI method.

Based on an adaptation of the work of Figueroa, Kincaid, Rani, and Lewis (2002), four potential catalysts or triggers may be discerned that will initiate the requirement for performing an assessment (see Figure 6.2).

These *catalysts* or *triggers* include the following:

Catalyst / Trigger

Internal Stimulus

Change Agent

Policies
(External)

Vision
(Internal)
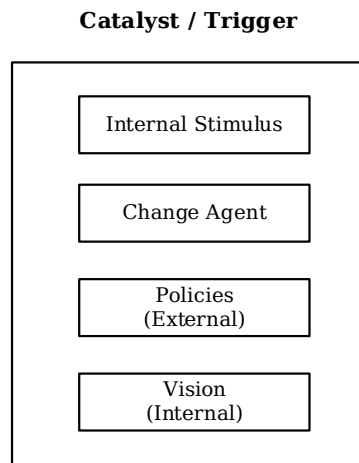
Figure 6.2. Catalysts to a CAMI Assessment

These *catalysts or triggers* entail:

1. *An internal stimulus* – it may be that many IT projects are not on time, or are over-budget, that business and IT personnel are not communicating properly or are criticising each other, and that the business and IT strategies are not effectively aligned, and are not supporting each other.

2. *A change agent* – typically, a consultant or researcher may visit the organisation to initiate a discussion on problems experienced. Alternatively, a local leader may suggest that personnel need to improve their current communication practices.

3. *Policy changes* – it may be that changes in business or IT best practices, such as *COBIT 5*, prompt it to act; for instance, *COBIT 5*'s new goals cascade may prompt an organisation to investigate its communication practices, thus ensuring that its personnel communicate adequately, and share business and IT goals.

4. *Vision changes* – these may stem from executive management or the board of directors issuing specific requirements for the organisational staff. It could be that a new directive or policy stipulates that business and IT personnel should communicate more or, perhaps, that they should aim to nullify any misalignment between them.

6.2.2   *Assessment Phases & Steps (Process)*

The central box of the simplified model (see Figure 6.1) depicts the assessment itself; that is, what the organisation would need to do after a particular trigger has initiated the need for them to perform an assessment. Performing an assessment using the CAMI method involves a sequential process or series of three phases, each with a number of steps (see Figure 6.3). An organisation would need to execute these to perform the assessment. Either an in-house facilitator or external consultant could help the organisation with this.

The assessment process comprises three phases, namely:

1. planning and data acquisition

2. data processing and analysis

3. outcome reporting and strategising.

Each of these phases will now be discussed individually in more detail. In particular, their associated steps will be explored and mention made of how they should be executed by an organisation.

Communication Alignment Maturity Improvement (CAMI) Assessment Process
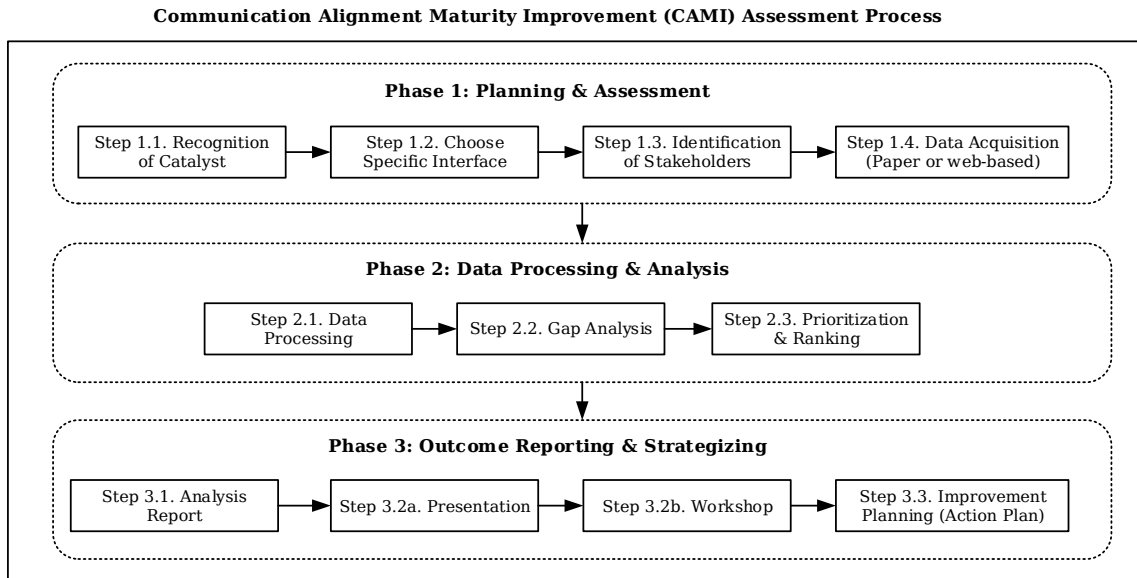
Figure 6.3. CAMI Assessment Process: Phases and Steps

6.2.2.1 *Phase 1: Planning and Data Acquisition*

In phase 1, *the planning and data acquisition phase*, the first step involves having the organisation recognise the catalyst or trigger. Based on this, the second step would commence, where the organisation will need to decide in which function(s) within its structures (i.e., human resources and IT, or finance and IT) to conduct the assessment. Perhaps the trigger suggests that a communication problem exists throughout the entire organisation, in that all business units are struggling to communicate with IT, or vice versa. On the other hand, it might be merely a localised problem in that it occurs only between the finance and IT function(s), for example. Once the location of the problem has been decided, the organisation will proceed to step three, where it will need to identify and approach the personnel in these functions to agree to become the assessment participants. This is a vital step, since these individuals (the assessment participants) will be directly involved in the fourth and, final, step.

During the fourth step, the participants will complete the maturity grid survey anonymously, as explained in the previous chapter. Here either an in-house or an external facilitator will ask the participants from the different functions to award a maturity score from one to four to each of the 25 factors[1] with respect

---

1 These 25 factors are those that the Delphi study participants concluded were adequate for the purpose, and capture the most critical factors influencing communication between business and IT personnel. They cover environmental, organisational, functional or domain, and individual factors according to a socio-technical system perspective. These factors correspond with the top and bottom boxes of the simplified model.

to their current and desired states – that is, for the communication practices occurring between the applicable business and IT functions. They will do this using a survey, based on the maturity grid[2] (see Appendix E).

6.2.2.2 *Phase 2: Data Processing and Analysis*

The data gathered from the participants (phase 1) feeds into phase 2, *the data processing and analysis phase*. As a first step, the facilitator or a designated person will collect and enter the collected data into a simple Excel application prepared by the researcher[3]. During data capturing, each participant will have indicated within which function s/he operates (e.g., IT, or business). The facilitator thus will be required to enter this into the Excel application, allowing it to group the data received from the different functions. Subsequently, using various built-in formulas and calculations, the application will calculate the mean (or averaged) values[4] of the current and desired scores for each factor, both per function and overall. It will then run a gap analysis of the data (second step).

During the second step (the gap analysis), the application calculates the 'distance' (or delta) between the average scores for the current and desired maturity of each factor (absolute values of desired minus current). It performs this calculation (cf. Table 6.1) once for all the answers received (overall) and once by differentiating between the different functions (e.g., business and IT). This offers an indication as to how mature the factors are perceived to be and to what degree they need to be improved to reach the 'ideal' maturity reflected by the assessment participants. Obviously, the greater the 'distance' between the current maturity and the desired maturity, the greater the need for intervention would be.

In addition to this gap analysis, the application also investigates the individual scores of the participants more closely as this may highlight specific areas of misalignment. In particular, it compares the current scores reflected per factor by the business functions with those reflected by the IT function(s) to identify

---

2 Although the survey is presented as a paper-based artefact within this thesis, an electronic version is available and was made use of during the case study presented later in this chapter.

3 The Excel application signifies a software tool that the researcher developed, which simplifies the data processing and analysis phase of the CAMI method. This same tool also greatly reduces the time it requires for analysis results to be produced in an easily understandable format.

4 Several aggregation procedures exist that could be used to obtain a single current and desired maturity level indicator. Using the mean value of a series is most commonly associated with business–IT alignment assessments, for example Luftman (2000) prescribes its use in his popular SAM assessment model. Alternatives, although not considered in this study, include using the mode of a series, or using a heuristic that looks at the relationship between the modes of each factor against the central tendency given by its medium (Khaiata & Zualkernan, 2009).

Level	Factor	#	Overall (N=11)			Business (N=8)			IT (N=3)		
			Delta	Current	Desired	Delta	Current	Desired	Delta	Current	Desired
Environment	Legislation	1.1	1.36	2.55	3.91	1.50	2.38	3.88	1.00	3.00	4.00
	Standards	1.2	1.36	2.27	3.64	1.50	2.00	3.50	1.00	3.00	4.00
	Best practices & guidelines	1.3	1.00	2.82	3.82	1.00	2.75	3.75	1.00	3.00	4.00
	Customers, services & products	1.4	1.55	2.18	3.73	1.50	2.25	3.75	1.67	2.00	3.67
	Technological developments	1.5	1.27	2.55	3.82	1.50	2.50	4.00	0.67	2.67	3.33
	Total		1.31	2.47	3.78	1.40	2.38	3.78	1.07	2.73	3.80

High maturity $0.0 \leq |x| \leq 1.0$

Moderate Maturity $1.01 \leq |x| \leq 2.00$

Low maturity $2.01 \leq |x| < 3.00$

Table 6.1: Example of Maturity Calculation ('Environment' Category)

discrepancies in their perceptions. It does the same for the desired scores in order to identify discrepancies in their expectations. The hypothesis is that the scores of the personnel in the business and IT functions should ideally be aligned. This would ensure they are of the same mind and strive towards a common goal[5].

To illustrate this more graphically (see Table 6.2), the application calculates, for example, the average score for the current maturity (perception) of the Cooperation factor among the business and IT personnel. From that, it calculates the 'distance' or delta between them by subtracting one score from the other. It then does the same separately for the desired maturity (expectation). These differences (discrepancies) between the mean scores indicate the extent of the perception and expectation misalignment, and the resultant need for action planning by the organisation relating to the specific factor. Obviously, the greater the difference, the greater the misalignment and the greater the need for intervention would be.

To allow for ease of interpretation, the application marks these differences (discrepancies) using a traffic light system[6]:

- *Red*. Factors highlighted in red show a difference of between 2.01 and 3.00 between function scores. This means the difference between either the cur-

---

5 The comparison approach used by this study for the individual scores most closely aligns with the matching approach reported by Van Grembergen and De Haes (2009). The matching approach looks at the difference in rating between two pairs of related items. When there is a high difference between the ratings of related items alignment is low, and conversely, when there is a low difference alignment is high.

6 The ranges or criteria used by this study for the traffic light system closely match those prescribed by Maier (2007). The ranges, however, have been adapted to allow for a wider classification. In the future, organisations may decide on their own ranges depending on their personal preferences.

Level of Influence	Factor #	Factor / Process	Perception		Expectation		Difference (△)			
			Business	IT	Business	IT	Perception Mismatch (Max: △3)		Expectation Mismatch (Max: △3)	
Business/IT Function (Team)	3.1	Leadership style	2.13	2.33	3.88	3.67	△ 0.21 ✓		△ 0.21 ✓	
	3.2	Function (Team) initiatives	2.75	1.67	3.63	3.67	△ 1.08 ⚠		△ 0.04 ✓	
	3.3	Cooperation	3.00	2.00	3.88	3.33	△ 1.00 ✓		△ 0.54 ✓	
	3.4	Communication style and ease of access	3.13	2.00	3.88	4.00	△ 1.13 ⚠		△ 0.13 ✓	
	3.5	Liaison(s) breadth & effectiveness	2.63	2.33	3.50	4.00	△ 0.29 ✓		△ 0.50 ✓	
	3.6	Cross-domain (mutual) understanding	2.25	2.33	3.63	3.67	△ 0.08 ✓		△ 0.04 ✓	
	3.7	Knowledge sharing	2.50	2.67	3.63	4.00	△ 0.17 ✓		△ 0.38 ✓	
							Score:	△ 3.96	△ 1.83	
							Max:	△ 21.00	△ 21.00	

Table 6.2: Example of Score Analysis Calculation ('Function' Category)

rent, or the desired maturity scores for the factor under scrutiny is significant between functions. For example, business might indicate a current maturity score of 4.0 for a factor, while IT scores only 1.0.

- *Orange*. Orange signifies a difference of between 1.01 and 2.00 between function scores.

- *Green*. Factors marked green show either no difference or a difference less than or equal to 1.00. This means the difference between the current and the desired maturity scores for the factor under scrutiny is small between functions. This would indicate that the scores of the business and IT participants are closely aligned and that there is agreement between them on the maturity of the factor(s).

While this analysis should alert the organisation to problems and factors that they can improve on, it may not be immediately apparent what the factors are that are cause for concern. To identify this, the application also produces an informative report as a third step to this phase (see Appendix G).

During the third step of this phase, the application sorts the factors from red to green, in line with the descriptions given above, in descending order according to their overall current and desired situational differences. The factors that appear first in the report will either be those where the distance between their current and desired maturity is largest, or where participants agreed least on either the current or the desired situation between the functions. Meanwhile, the factors that appear lower down in the report will be those that achieved better maturity and/or score alignment.

This same report also includes several graphs, which offer both an overview and an in-depth graphical analysis of the current and desired situations, and

the differences in function perceptions and expectations. For example, it depicts a delta chart (see Figure 6.4), where current and desired score deviations are expressed as 'blips' on a line. The larger the 'blip', the more the scores deviate among the business and IT functions. It also presents several radar charts, where the given scores can be graphically compared by category or influence level (see Figure 6.5).

This report will offer a wealth of information that will feed directly into the last phase of the assessment, *the outcome reporting and strategising phase*.

6.2.2.3   *Phase 3: Outcome Reporting and Strategising*

Phase 3, *the outcome reporting and strategising phase*, will start with the facilitator or responsible person studying the report produced at the end of Phase 2. S/he will then submit the findings to management or some responsible committee. An alternative, if not supportive, approach would be to arrange a workshop. The facilitator could then use the results, together with the report, and present it to management either verbally with presentation foils, or in a written report.

Having received the findings from the facilitator, either in written or verbal form, management or the responsible committee should then brainstorm the results and identity specific improvement opportunities from the findings. They would have to do so themselves, since the assessment method does not offer any assistance in this regard. Once this has been done, they could plan how to instigate improvements and change in the organisation, and draft an action plan for interventions – the ultimate output of the assessment.

6.2.3   *Interventions (Outputs)*

The intervention in the process model (see Figure 6.1) represents the particular mechanism(s) that the organisation would have identified for improving the current communication practices between the personnel in the business and IT functions. When implemented, these mechanisms should affect the organisation's internal set-up and constraints (i.e., the personnel, function or organisational factors and their properties – see bottom box of Figure 6.1).
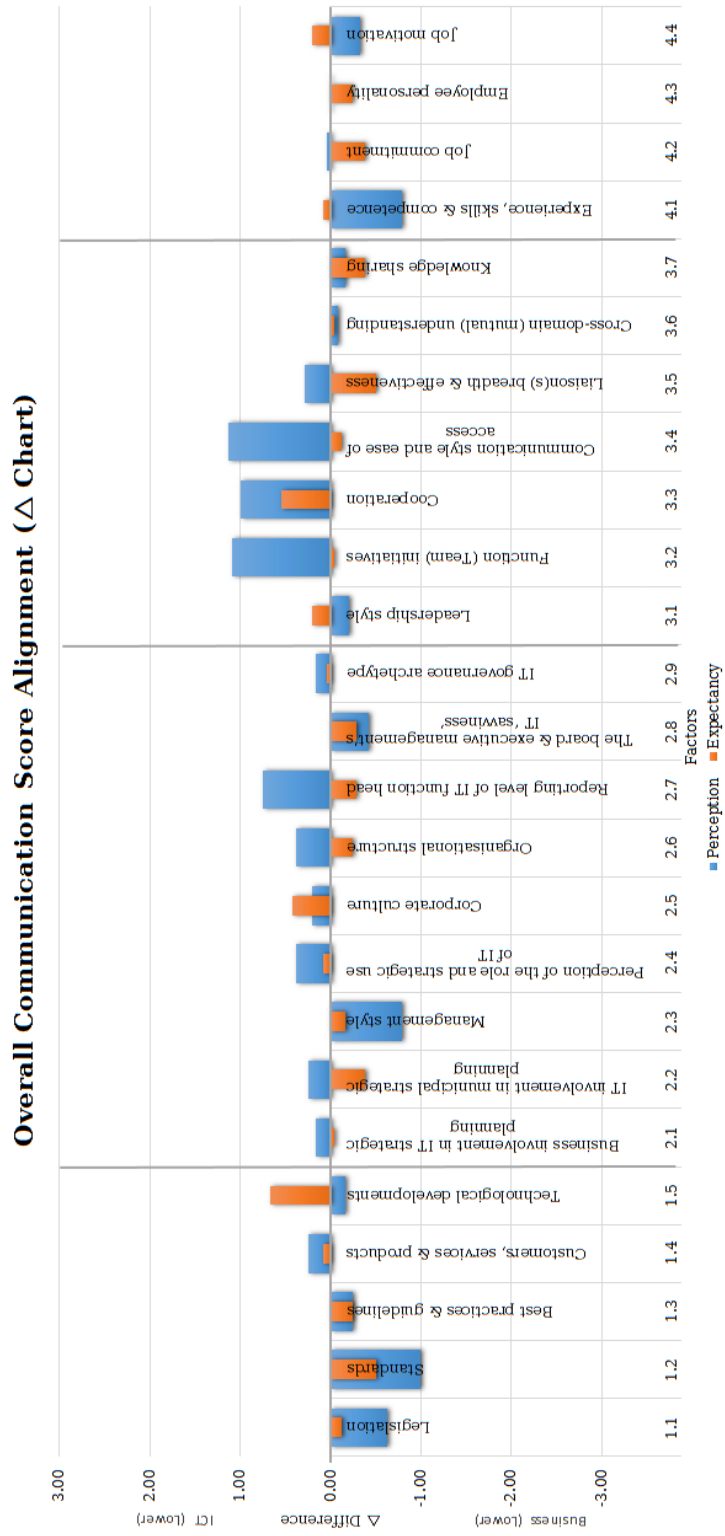
Figure 6.4. Example Delta Chart
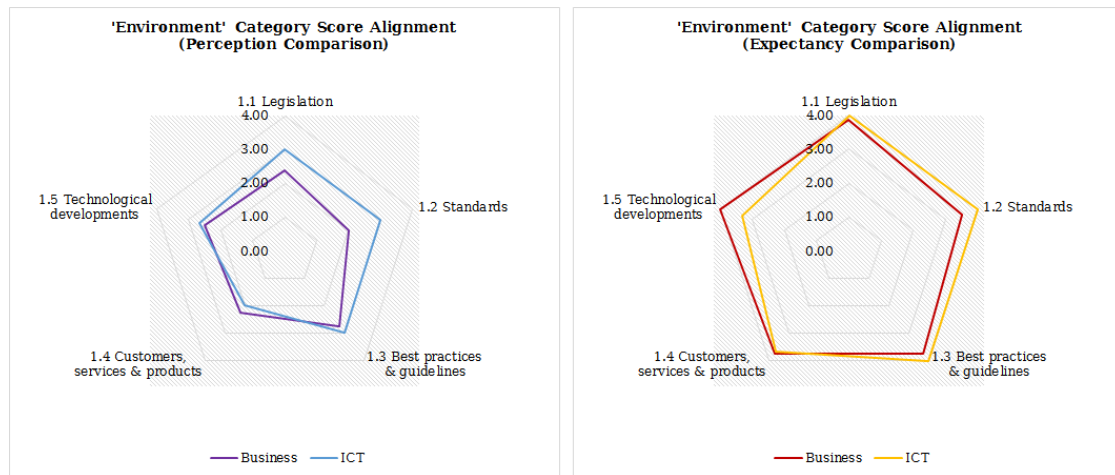
Figure 6.5. Example Radar Charts ('Environment' Category)

Organisations could decide on three different types of intervention[7] in order to instigate improvements and change in their communication practices (see Figure 6.6). These interventions include:
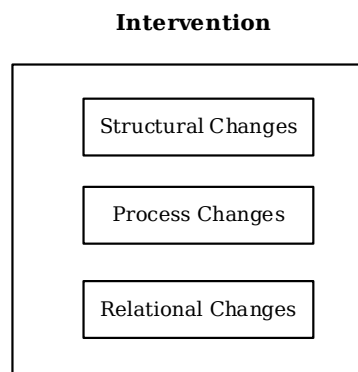
Intervention

Figure 6.6. Interventions from a CAMI Assessment

1. *Structural changes* affect the structure of the organisation. They may include establishing an IT steering committee, changing the reporting line of the head of IT (or CIO), or, perhaps, decentralising the IT function to work more closely with the business staff.

---

7 These interventions, surprisingly, match those of IT governance. However, this is not new. Van Grembergen and De Haes (2009), for example, have reported that IT governance and business–IT alignment are closely related. In particular, they state that the ultimate outcome of IT governance is the proper alignment of IT with the business. Similarly, *COBIT 5* (ISACA, 2012b), a popular IT governance framework, also refers to this inter-relationship. Hence, one would expect that IT governance and its mechanisms could affect not only business–IT alignment as a whole, but also its subsets – in this case, the communication practices between business and IT personnel in an organisation.

2. *Process changes* directly affect the processes that the organisation is employing between the business and IT personnel. These may include redefining the business and IT strategic planning processes to ensure that both business and IT personnel have equal input to strategies. It further entails that the board of directors revisit and improve service level agreements between the business and IT functions, and lastly, that they consider introducing or adapting project governance and project portfolio management.

3. *Relational changes* affect the personnel and their interrelationships more closely. These may include offering staff training or co-locating business and IT personnel to work more closely in a physical location within the organisation; alternatively, executive management could be required to set a good example, with senior business and IT management acting as 'partners'.

Once an organisation has implemented the intervention(s) identified, the CAMI assessment will be complete. However, as the simplified process model suggests (see Figure 6.1), over the course of time a new trigger or catalyst may again present itself. The organisation could then redo the assessment, possibly identify new problems, and apply additional intervention(s). This process would repeat itself until the organisation is satisfied that the current communication practices between the personnel in the business and IT functions are effective and appropriate. That said, the organisation should ideally still perform the assessment periodically to ensure that everything is as expected, even though no new problems may have surfaced.

6.2.4 *Putting It All Together*

The previous sections explained the simplified process model (see Figure 6.1) to offer further insight into the CAMI assessment process and its context. They firstly explored the catalyst or trigger to the assessment (see §6.2.1) in detail. Here, four potential catalysts or triggers were identified that could initiate the requirement for performing an assessment (see Figure 6.2). Secondly, the phases and steps an organisation would follow to perform the assessment were investigated (see §6.2.2). An assessment using the CAMI method involves a sequential process or series of three phases, each with a number of steps (see Figure 6.3). Finally, the likely change interventions that could be required to improve the communication practices were examined (see §6.2.3). Here, three different types

of interventions that an organisation could decide on to instigate improvements and change in their communication practices were discussed (see Figure 6.6).

These discussions were intended to assist in the development of a fully detailed process model. Having outlined the necessary details, Figure 6.7 now shares the complete process model. Note that the overarching concept(s) it contains still parallel the simplified model; the difference being that this new diagram includes the full details afforded by the aforementioned sections.

To conclude, there is a definitive process to follow when performing an assessment using the CAMI method. As the detailed process model shows, the method's application can best be described as a dynamic, iterative process involving several phases and steps; that is, a process that requires an input (a trigger), processing (the assessment) and culminates in an output (an intervention). To ensure that organisations perform each of these phases and steps with ease, both a survey and an Excel tool have been designed and developed to accompany the method. These assist to simplify the assessment process.

6.3 METHOD APPLICATION: A CASE STUDY

While the previous chapter described the design and development of the CAMI method, and earlier sections outlined its application, this section now presents the next phase of the assessment method's iterative development; i.e., demonstration.

Case study research has long had a prominent place in many disciplines and professions, ranging from psychology, anthropology, sociology and political science to education, clinical science, social work and administrative science (Baxter & Jack, 2008). A case study may be defined as a research method where an empirical inquiry is made to analyse persons, events, decisions, periods, projects, policies, institutions or other systems (Creswell, 2007). Thomas (2011) explains that a case, that is, the subject of the inquiry, will often be an instance of a class of phenomena that provides an analytical frame – an object. It is then within this object that the study is conducted and within which the case is illuminated and explicated. A key characteristic, however, is that the case resides within its real-life context and is typically analysed holistically (Creswell, 2007). Yin (2013) extends this by stating that a case analysis might involve studying a single case, or multiple cases, depending on the generalisability of the analytical frame(s).

Taking the above into account, this study opted to conduct a single case (in-depth) study at a public sector organisation in South Africa. The intent hereof
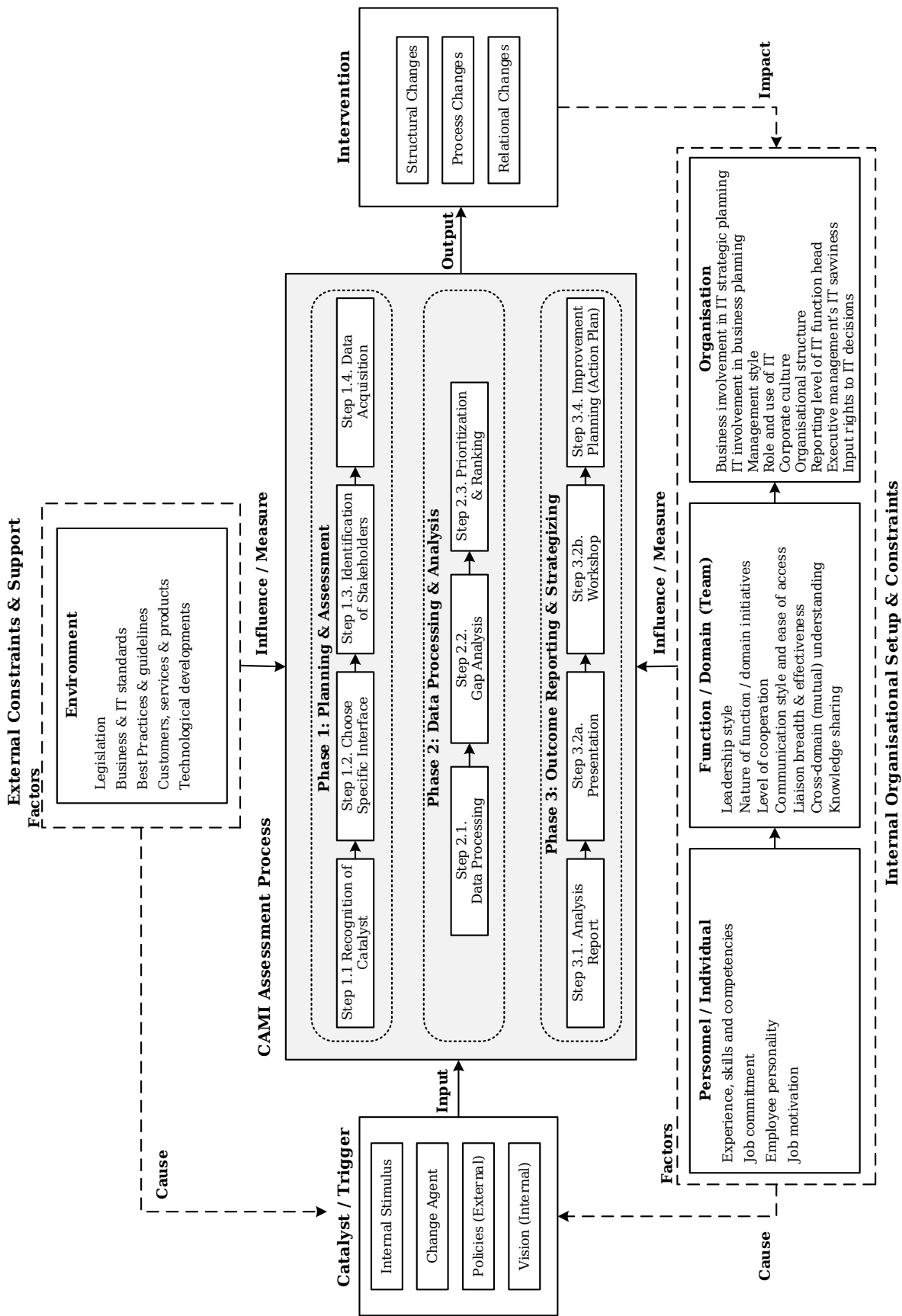
Figure 6.7. Detailed CAMI Assessment Process Model

was to demonstrate the method's application and provide a concrete example of the scope of possible analysis options discussed in the previous section. Note that multiple cases could not be investigated since no two organisations operate the same and the communication practices that exist among their business and IT personnel would differ.

The following items pertaining to the case study will be discussed in the remainder of this section: Firstly, some background information about the public sector organisation will be shared (§6.3.1). Secondly, the purpose of the assessment and the process that was followed will be explained (§6.3.2). Specific reference will be made to how the earlier given process model was applied. Thirdly, the results and findings forthcoming from the assessment will be shared (§6.3.3) and, lastly, the recommendations for change interventions will be discussed (§6.3.4).

6.3.1 *Background*

Using convenience sampling, a public sector organisation – that is, a district municipality – in South Africa was approached to perform a communication assessment using the CAMI method[8]. This formed part of a larger research project and was based on a long-standing relationship with the entity.

District municipalities administer and make rules for a district, which includes more than one local municipality. In essence, a district municipality and underlying local municipalities share the responsibility for local government in their areas and are obligated by law to ensure that all communities, particularly disadvantaged communities, have equal access to resources and services. A primary function of a district municipality is to help those local municipalities that do not have the necessary capacity (finances, facilities, staff, or knowledge) to provide services to their communities.

The particular district municipality that was approached had a series of functions and ongoing projects, namely

---

8 The public sector organisation had known business-IT alignment discrepancies, especially in regards to the communication among its business and IT personnel. Based hereupon, the organisation was selected given that this research would hold particular benefit to its business-IT alignment improvement strategy, and would assist the originating university in continuing and growing its engagement with the entity. Note that a leading automotive organisation was also approached, but the CAMI survey responses did not yield sufficient data for analysis purposes (see §7.4.2). That said, the communication situation in one organisation would differ from that in other organisations. The intent of this demonstration was to perform an immediate proof-of-concept validation, the case study of the public sector organisation suffices; but additional case studies would need to be conducted in future for further validation and evidence.

- ensuring integrated development planning for the whole district

- developing and maintaining waste disposal sites

- acting as an agent for provincial government to maintain road infrastructure

- facilitating municipal health services

- facilitating fire-fighting services

- controlling the fresh produce markets

- promoting local tourism.

Many, if not all, of these projects depended heavily on the adequate implementation and operation of IT in the organisation. Hence, the executive management expressed a definitive need for business–IT alignment, including proper communication in accordance with this study. This coincided with recent policy approved by Cabinet in November 2012, known as the *Public Service Corporate Governance of ICT Policy Framework* (Department of Public Service and Administration, 2012).

This policy necessitates that both district and local municipalities institutionalise corporate governance of IT as an integral part of their corporate governance practices. This means that they have to plan and implement the alignment between their strategic goals and IT strategy, which includes attaining proper communication between the municipality's business and IT function(s).

Given this policy and the requirement for ensuring proper communication in business–IT alignment, the particular district municipality showed interest in performing a communication assessment using the CAMI method, because communication problems were becoming commonplace between the municipality's business and IT function(s). Having identified the trigger/catalyst for an assessment, the district municipality was approached for an initial workshop. During this workshop, their executive management and staff decided on the scope of the assessment, the people that would be involved, and the envisaged period over which it would extend. A week later, they gave their buy-in and consent to commence with the assessment.

6.3.2 *Assessment Purpose and Process*

The purpose of the assessment, in accordance with the previous section, was to ascertain whether the organisation was managing the (human) communication between the personnel in its business and IT functions fairly, efficiently and effectively in order to ensure sound business–IT alignment.

With this in mind, the specific objectives of the assessment were to (a) evaluate the current and (b) desired state of communication, and issues pertinent to it, among the personnel. Furthermore, (c) to identify potential areas for improving the existing communication situation and, (d) ultimately, raise awareness and assist their executive management to make informed strategic decisions for action planning and change management.

Given the widespread use and dependence on IT in the organisation, the executive management indicated that all the departments and functions would form part of the assessment. Eleven personnel operating in the business-related (8) and IT functions (3) of the organisation were approached to participate in the assessment. These participants had worked at the organisation for several years, and where familiar with the operations and practices in their respective functions. Some of the participants represented administrative staff while others resided in middle to top management.

Once the organisation's executive management had selected the participants, each participant was forwarded a web-link to the assessment survey (see Appendix E). In addition, the purpose and the method (of capturing their perceptions of factors influencing communication) were also explained to them. The survey took the form of anonymous participation, with the only request being that the participants had to indicate within which core function in the organisation they operated. This allowed the business-related and IT functions to be compared during the analysis of the data.

In completing the survey, the participants had to choose a maturity score varying between one and four for each of the 25 factors with respect to their assessment of the current and desired states of communication maturity. They were reminded to think of their immediate team while answering; this was also written below each heading in the survey. At the end of the survey they were also asked to comment on the content, usability, understandability, ability to cause reflection, and ability to raise awareness of the survey (see Appendix F and Chapter 7).

Once these survey responses (scores) were obtained, the necessary maturity calculations and gap analysis were performed. On this basis, several findings could be discerned.

6.3.3   *Results and Findings*

The main findings of the assessment reflected that, firstly, the current communication maturity levels between the business and the IT functions were well aligned at *2.37* and *2.32*, respectively. Secondly, the 'gap' between the overall current and the desired maturity levels was high. The district municipality scored an overall communication maturity score of *2.36* out of a potential score of four (see Table 6.3). This suggested that the business and IT personnel found the current communication situation between them to be above average. However, they agreed that many improvements were still warranted in certain areas to reach the desired outcome (*3.70*).

Overall Maturity			Business Maturity (N=8)			IT Maturity (N=3)		
Delta	Current	Desired	Delta	Current	Desired	Delta	Current	Desired
1.34	2.36	3.70	1.31	2.37	3.68	1.43	2.32	3.75

Table 6.3: Overall Maturity Calculated Scores

A positive finding was that the business and IT personnel's current and desired communication maturity levels were similar. This suggested that the business and IT personnel perceived and experienced the current communication situation similarly. They also regarded the ideal communication situation similarly. This finding became particularly evident when investigating the individual maturity scores given by the respective personnel.

Only a few discrepancies were found among the maturity scores received (see Table 6.4). Most personnel's scores corresponded with those of their colleagues and counterparts. Where score discrepancies did present themselves, these were mostly minor, as only score differences of between *0.01* and *2.00* were measured (see the *Score Sheet – Score Analysis* in Appendix G). Overall, the current (perception) scores received differed a little more than the respective desired (expectation) scores.

According to Table 6.4, the *'Organisation'* and *'Function (Team)'* categories showed slightly more maturity level discrepancies (categories 2 and 3, respectively). Business and IT personnel differed slightly in their scores for the current (perception)

Category Score Mismatch

Level of Influence	Category #	Category	Difference (△)	
			Perception Mismatch	Expectation Mismatch
Category	1	Environment	△ 2.29 ✓	△ 1.63 ✓
	2	Organisation	△ 3.50 ✓	△ 1.96 ✓
	3	Function (Team)	△ 3.96 ✓	△ 1.83 ✓
	4	Personnel	△ 1.17 ✓	△ 0.92 ✓

	Score:	△ 10.92	△ 6.33
	Max:	△ 75.00	△ 75.00

Detailed Score Mismatch Breakdown

Level of Influence	Factor #	Factor / Process	Perception		Expectation		Difference (△)	
			Business	IT	Business	IT	Perception Mismatch (Max: △3)	Expectation Mismatch (Max: △3)
1. Environment	1.1	Legislation	2.38	3.00	3.88	4.00	△ 0.63 ✓	△ 0.13 ✓
	1.2	Standards	2.00	3.00	3.50	4.00	△ 1.00 ✓	△ 0.50 ✓
	1.3	Best practices & guidelines	2.75	3.00	3.75	4.00	△ 0.25 ✓	△ 0.25 ✓
	1.4	Customers, services & products	2.25	2.00	3.75	3.67	△ 0.25 ✓	△ 0.08 ✓
	1.5	Technological developments	2.50	2.67	4.00	3.33	△ 0.17 ✓	△ 0.67 ✓

	Score:	△ 2.29	△ 1.63
	Max:	△ 15.00	△ 15.00

Level of Influence	Factor #	Factor / Process	Perception		Expectation		Difference (△)	
			Business	IT	Business	IT	Perception Mismatch (Max: △3)	Expectation Mismatch (Max: △3)
2. Organisation	2.1	Business involvement in IT strategic planning	2.50	2.33	3.63	3.67	△ 0.17 ✓	△ 0.04 ✓
	2.2	IT involvement in municipal strategic planning	2.25	2.00	3.63	4.00	△ 0.25 ✓	△ 0.38 ✓
	2.3	Management style	1.88	2.67	3.50	3.67	△ 0.79 ✓	△ 0.17 ✓
	2.4	Perception of the role and strategic use of IT	2.38	2.00	3.75	3.67	△ 0.38 ✓	△ 0.08 ✓
	2.5	Corporate culture	1.88	1.67	3.75	3.33	△ 0.21 ✓	△ 0.42 ✓
	2.6	Organisational structure	2.38	2.00	3.75	4.00	△ 0.38 ✓	△ 0.25 ✓
	2.7	Reporting level of IT function head	2.75	2.00	3.38	3.67	△ 0.75 ✓	△ 0.29 ✓
	2.8	The board & executive management's IT 'savviness'	2.25	2.67	3.38	3.67	△ 0.42 ✓	△ 0.29 ✓
	2.9	IT governance archetype	2.50	2.33	3.38	3.33	△ 0.17 ✓	△ 0.04 ✓

	Score:	△ 3.50	△ 1.96
	Max:	△ 27.00	△ 27.00

Level of Influence	Factor #	Factor / Process	Perception		Expectation		Difference (△)	
			Business	IT	Business	IT	Perception Mismatch (Max: △3)	Expectation Mismatch (Max: △3)
3. Business/IT Function (Team)	3.1	Leadership style	2.13	2.33	3.88	3.67	△ 0.21 ✓	△ 0.21 ✓
	3.2	Function (Team) initiatives	2.75	1.67	3.63	3.67	△ 1.08 ◐	△ 0.04 ✓
	3.3	Cooperation	3.00	2.00	3.88	3.33	△ 1.00 ✓	△ 0.54 ✓
	3.4	Communication style and ease of access	3.13	2.00	3.88	4.00	△ 1.13 ◐	△ 0.13 ✓
	3.5	Liaison(s) breadth & effectiveness	2.63	2.33	3.50	4.00	△ 0.29 ✓	△ 0.50 ✓
	3.6	Cross-domain (mutual) understanding	2.25	2.33	3.63	3.67	△ 0.08 ✓	△ 0.04 ✓
	3.7	Knowledge sharing	2.50	2.67	3.63	4.00	△ 0.17 ✓	△ 0.38 ✓

	Score:	△ 3.96	△ 1.83
	Max:	△ 21.00	△ 21.00

Level of Influence	Factor #	Factor / Process	Perception		Expectation		Difference (△)	
			Business	IT	Business	IT	Perception Mismatch (Max: △3)	Expectation Mismatch (Max: △3)
4. Personnel	4.1	Experience, skills & competence	1.9	2.7	3.8	3.7	△ 0.79 ✓	△ 0.08 ✓
	4.2	Job commitment	2.4	2.3	3.6	4.0	△ 0.04 ✓	△ 0.38 ✓
	4.3	Employee personality	2.0	2.0	3.8	4.0	△ 0.00 ✓	△ 0.25 ✓
	4.4	Job motivation	2.0	2.3	3.9	3.7	△ 0.33 ✓	△ 0.21 ✓

	Score:	△ 1.17	△ 0.92
	Max:	△ 12.00	△ 12.00

Table 6.4: Score Analysis

and for the desired (expectancy) scores in the *'Organisation'* category. These differences appeared to revolve around the *Management Style* (#2.3); *Corporate Culture* (#2.5) and *Reporting Level of the IT Function Head* (#2.7) factors (see both charts in Figure 6.8). In general, the business personnel perceived these factors to be more mature than did their IT counterparts. In contrast, the IT personnel's expectations were slightly higher.
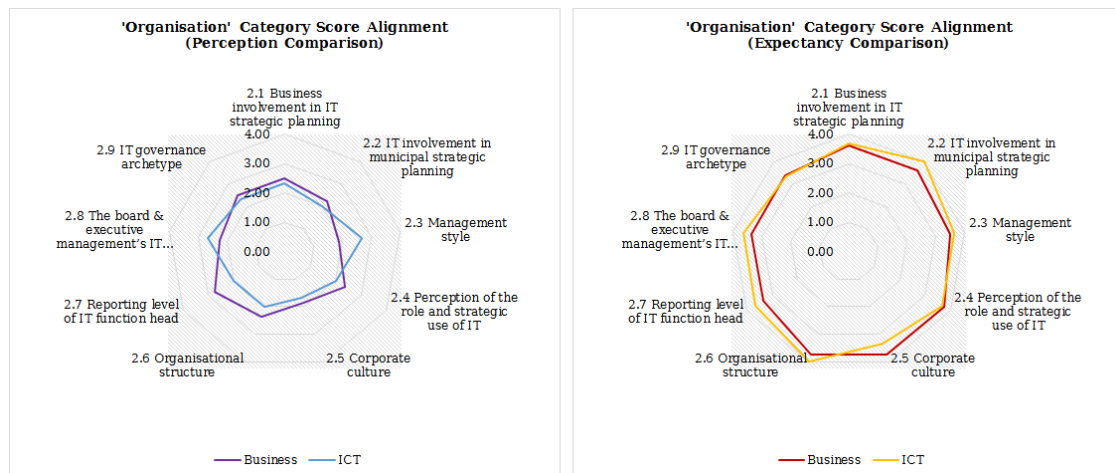
Figure 6.8. 'Organisation' Category Radar Charts

The business and IT personnel also differed slightly in scoring the factors in the *'Function (Team)'* category (see Figure 6.9). It appeared that most of their differences revolved around *Co-operation* (#3.3). Similar to the *'Organisation'* category, business personnel again perceived the factors in the *'Function (Team)'* category to be more mature than did their IT counterparts.
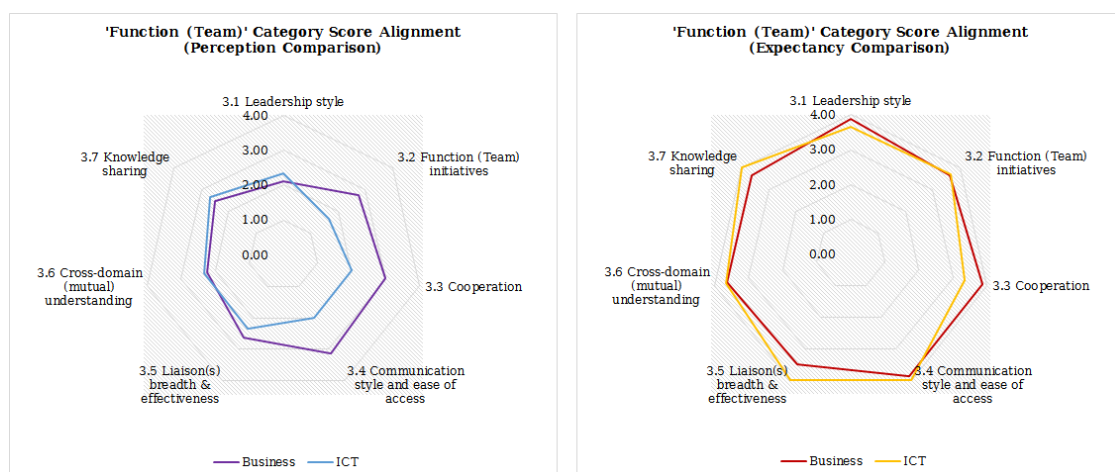

Figure 6.9. 'Function' Category Radar Charts

After calculating the overall communication maturity, and analysing the individual scores, a gap analysis was performed (see Figure 6.10 or Appendix G for

full analysis). The gap analysis found fourteen factors on which all the personnel agreed in terms of the gap between the current and the desired situations. The personnel agreed on a small gap for two factors: *Best Practices and Guidelines* (#1.3) and *IT Governance Archetype* (#2.9) factors. This suggested that these two factors were considerably mature in the municipality. Meanwhile, the personnel regarded the other twelve factors as showing a moderate gap (between *1.00* and *2.00*).

The gap analysis uncovered several factors where the business personnel rated them lower in maturity, as opposed to their IT counterparts. These factors included aspects relating to *Legislation* (#1.1); *Standards* (#1.2); *Technology Developments* (#1.5); *Management Style* (#2.3); *Council and Management's IT 'Savviness'* (#2.8) and *Experience, Skills, and Competence* (#4.1). It is of importance to note that three of these discrepancies related to the environment within which the municipality operates. In retrospect, the business personnel might have perceived the maturity of these factors differently because they work with them, and are affected by them every day. Therefore, they might have overlooked their importance and influence. Nevertheless, these discrepancies did suggest the need for further investigation.

The gap analysis also uncovered several factors that business personnel rated higher in maturity than did their IT counterparts. For example, the IT personnel perceived the *Reporting Level of the IT Function Head* (#2.7) to be less appropriate than did their business counterparts. They also considered the maturity of *Function (Team) Initiatives* (#3.2) differently. The IT personnel expressed that they had little input to the municipal initiatives. While this comment was warranted, they did propose that business personnel should afford them the opportunity to share their ideas and instigate some initiatives (albeit jointly).

An area of concern was that the gap analysis highlighted a discrepancy relating to *Co-operation* (#3.3), with the IT personnel perceiving the level of co-operation to be less mature than did their business counterparts. These results were similar to those of the *Communication Style and Ease of Access* (#3.4), and *Liaison(s) Breadth and Effectiveness* (#3.5) factors. Given that these aspects play a vital role in the alignment process, it was essential that these discrepancies form part of further investigation and improvements.

To summarise, the assessment highlighted that the current communication situation in the district municipality among its business and IT personnel was quite positive. Despite this, some improvements were warranted specifically with re-
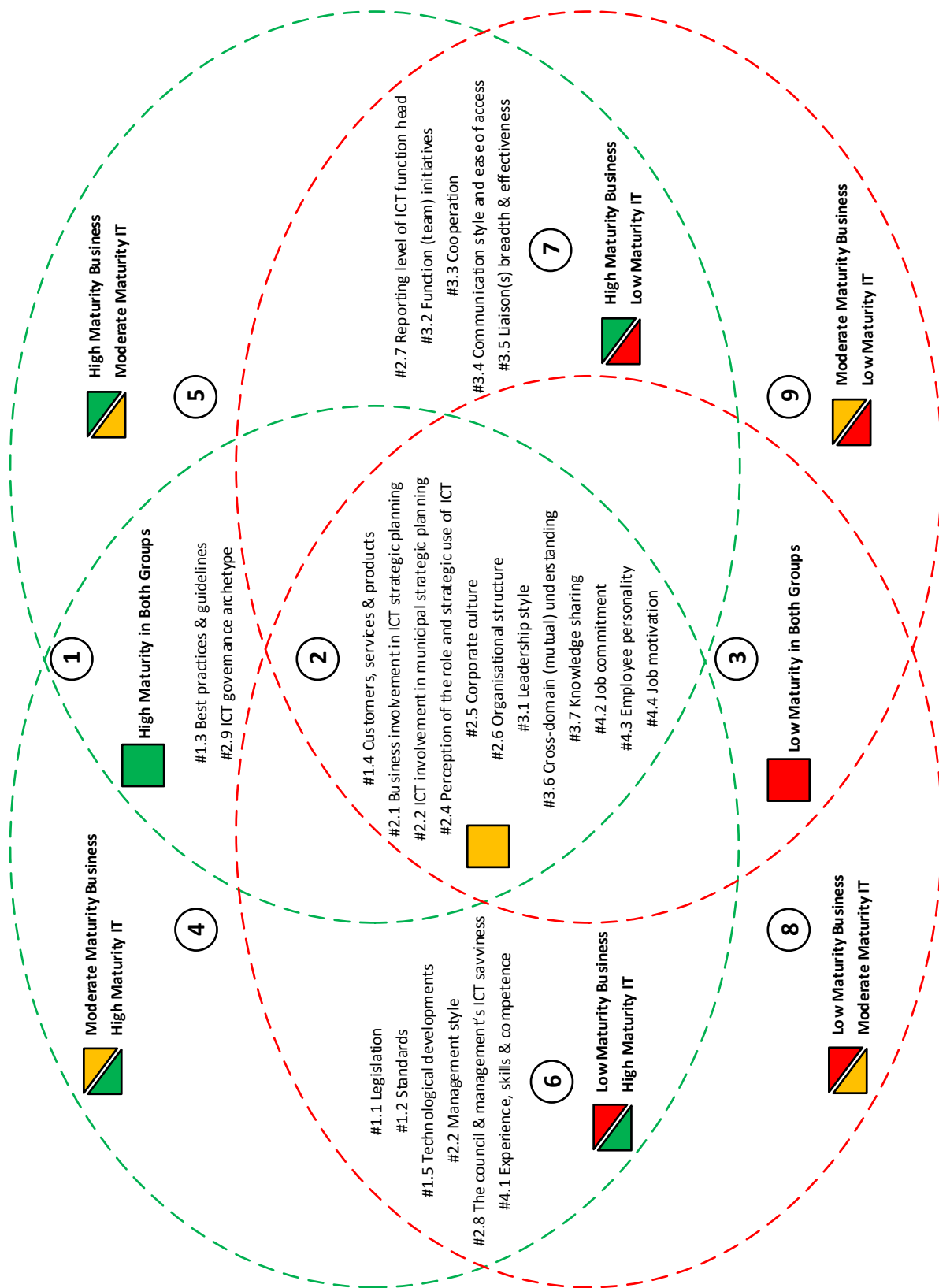
Figure 6.10. Gap Analysis Diagram

gard to factors in the *'Organisation'* category, such as *Corporate Culture* (#2.5), and the *'Function (Team)'* category, such as *Co-operation* (#3.3).

6.3.4 *Recommendations*

Having completed the assessment using the CAMI method, the aforementioned results and findings were presented at a follow-up workshop on the premises of the district municipality. Subsequent to the workshop, a written report was prepared and sent to the executive management. The report included a brief description of the method and application process, the key results and several recommendations.

Based on the findings, the following five recommendations were suggested to the executive management of the district municipality:

- The executive management could arrange a workshop with the senior business and IT personnel to discuss the discrepancies and areas of concern highlighted in the above findings. In particular, a discussion on the underlying *'Organisation'* factors and those relating to the status of *Co-operation* (#3.3) among the business and IT functions could be beneficial.

- Both business and IT personnel perceived that the *Management Style* (#2.3) and *Corporate Culture* (#2.5) did not fully support free and open communication between them. Given the obvious importance of this, the executive management may want to alter the management style used and instigate corporate cultural change to assist and facilitate such free and open communication.

- The IT personnel indicated that they often had little input to the municipal goals, mission, and initiatives. Consequently, the executive management may wish to investigate ways of giving IT members an opportunity to voice their ideas and, as such, to initiate municipal initiatives (albeit if only jointly with the business functions).

- The business personnel indicated that their level of IT experience, skills, and competence sometimes hindered their adequate interaction with the IT members and the subsequent understanding of such interactions. The executive management may want to investigate approaches whereby they could improve business personnel's understanding of IT, the role of the IT function, and its current initiatives. The same is also true for the IT personnel and their knowledge of the business-related functions.

- While the perceived communication maturity is well aligned among the business and IT personnel (*2.37/2.32*), it is still low as both parties aspire to a desired maturity level of *3.70*. Given that there are still opportunities for improvement, all employees should remain vigilant and proactive in instigating these improvements and alerting their counterparts and superiors to any communication difficulties.

To conclude, by using the CAMI method it was indeed possible to (a) evaluate the current and (b) desired state of communication and the issues pertinent to it. Furthermore, it was possible (c) to identify potential areas for improving the situation, (d) ultimately, did help to raise awareness, and assist the executive management to make informed strategy decisions for action planning and change management. Therefore, this section has demonstrated that a maturity grid-based method is suitable for capturing, analysing, and assessing the maturity of the communication processes within the business–IT alignment context. In addition, it has revealed that the method's output could reveal several interesting results and findings. These findings should provide executive management and the rest of an organisation with valuable insights.

6.4 CONCLUSION

The primary aim of this chapter was to demonstrate the CAMI method and to share evidence of its application in a practical setting. To do so, it firstly offered a process model that graphically depicted the phases and steps involved in using the method to perform an assessment, and secondly, shared evidence of the method's application in a practical setting.

The use of a maturity grid-based approach led to the development of a method for assessing communication in business–IT alignment. However, the exact application of the method in performing an assessment was still unknown. To this extent, this chapter introduced a process model that guides an organisation in using the CAMI method to perform an assessment. As the process model showed, the method's application could best be described as a dynamic, iterative process involving several phases and steps. While seemingly complex, a survey and an Excel tool were designed and developed to accompany the method, which help to simplify the assessment process.

The chapter continued to present a case study performed at a public sector organisation to demonstrate the utility, quality, and efficacy of the method in industry. By applying the method in a public sector organisation, this study

demonstrated that it was indeed possible to perform a viable assessment on communication within the business–IT alignment context. The method allowed the organisation to capture, analyse, and assess both (a) the 'current' communication practices and (b) the 'desired' communication situation between the personnel residing in its business and IT functions. Furthermore, it (c) assisted it in identifying potential areas for improving communication, d) ultimately, helping to raise awareness and assist its executive management in making informed and strategic decisions to improve human communication between the personnel residing in the business and IT functions.

Beyond the immediate benefits of the case study listed above, several other practical benefits of the method were also discerned. For example, the method

- provided the possibility to capture communication practices based on the scores of the individual participants

- assisted in reflecting on communication practices

- raised awareness

- generated discussion

- enabled a quick overview of the perceptions of business and IT personnel on both the current and the desired states of factors influencing communication in business–IT alignment

- allowed for a gap analysis of the distance between the current and desired scores for each factor scored by the participants

- allowed for discrepancy analysis between the perceptions of the business and IT personnel

- captured both the positioning of the individuals and the consensus of the two functions, and guided improvement planning.

Having demonstrated that CAMI method can indeed be used in a practical setting, the next chapter will turn to its evaluation; that is, it will reflect on the research process leading up to the development of the method and evaluate the theoretical underpinnings and application of the method.

METHOD EVALUATION

"It is common sense to take a method and try it. If it fails, admit it frankly and try another. But above all, try something."

– *Franklik D. Roosevelt* (BrainyQuote, 2015d)

This study has established an assessment method for assessing communication in business–IT alignment. The previous chapter presented a case study performed in a public sector organisation to demonstrate the utility, quality, and efficacy of this method. Despite the conclusiveness of the case study, the method still needs validation to ascertain its applicability for academia and practitioners. The current chapter thus shares evaluation results and their interpretation for the CAMI method. It takes specific care to explain what the results mean and how they relate back to the objectives stated in the introduction chapter.

7.1 INTRODUCTION

This research established a method to assess communication in business–IT alignment, which was termed the 'Communication Alignment Maturity Improvement (CAMI) method'. The previous chapter presented a case study performed at a public sector organisation to demonstrate its utility, quality, and efficacy. Despite the conclusiveness of the case study, the method still needs evaluation to ascertain its applicability for academia and practitioners.

Hevner and Chatterjee (2010) indicate in their discourse on design science research that evaluation is concerned with the utility of an artefact, whereas validity is about the truthfulness of claims and their reliability and robustness. The research process followed in this study required that an artefact be produced and evaluated to demonstrate its value together with evidence addressing criteria such as validity, quality, and efficacy (see Figure 4.4). Often such evaluation entails comparing the objectives of a solution with the actual observed results from use of the artefact during the demonstration (Peffers et al., 2006).

To perform an evaluation, a researcher can employ a variety of different methods (Olivier, 2009). Since this study produced a socio-technical artefact, it opted to use member validation (Douglas, 1976), triangulation (Guion, Diehl, & McDonald, 2011) and argumentation as the overarching evaluation methods. The

member validation formed part of the case study that was reported in the previous chapter. In essence, member validation entailed taking the assessment results back to the field and asking whether members recognised, understood and accepted them as being truthful and useful (Douglas, 1976). Meanwhile, triangulation involved that the researcher compared his/her findings with other academic or practitioner sources; to ensure consistency and correctness (Guion et al., 2011)[1].

In light of the above, the purpose of this chapter is to share the evaluation results of the methods that were employed and to discuss their implications for the CAMI method with regard to its applicability for academia and practitioners (see Figure 4.4). To do so, it explains what the results were, what they imply, and how they relate back to the objectives stated in the introduction chapter, while also reflecting back on the research process that led to the development of the method, its theoretical underpinnings, and the results of its application in industry.

These and related issues will be discussed further in this chapter as follows: Firstly, it explains how the CAMI method was evaluated (§7.2). Secondly, it shares the evaluation results on the functionality, usability, usefulness and learn effect of the method. In addition, the results on the method's ability to trigger reflection and the correctness of results obtained are discussed (§7.3). Thirdly, it offers the lessons learnt from developing and applying the method in industry. In particular, the implications for researchers, IT managers and consultant will be discussed (§7.4). These issues will be summarised and conclusions drawn at the end of the chapter (§7.5).

7.2 EVALUATION APPROACH AND METHODS

This study intended the assessment method to allow for the quick identification and diagnosis of areas of communication that require more attention to move from the (assessed) current situation to the desired one. A maturity grid-based approach allows for areas of improvement to be identified according to the scores awarded by participants during an assessment (Maier et al., 2011). Results from the method function as initiators for further actions in industry (Maier et al., 2006).

---

1 Given the novelty of the CAMI method, it was difficult to triangulate the results obtained with other literature. In attempting to triangulate the method's results, the public sector organisation alluded to an independent study performed by another university.

According to Bloor (1997), sociologists (and anthropologists) have developed two main techniques as alternative methods for evaluating qualitative research such as this study has produced. The first technique, member validation, judges findings valid by demonstrating a correspondence between the researcher's findings and the understanding held by members of the organisation being analysed. In simpler terms, member validation involves having the researcher take his/her results back to the field and asking if members recognise, understand and accept them (Douglas, 1976, p. 131). The second technique is triangulation, whereby a researcher may judge findings valid when different and contrasting methods of data collection yield similar findings on the same research subject (Guion et al., 2011). Both of these techniques, according to Emerson (1981) and Bloor (1997), allow a researcher to reconsider his/her initial analyses from a novel standpoint and lead to enhanced understanding.

To validate or evaluate the outcome(s) of the CAMI method, member validation and triangulation were incorporated into the case study performed at a public sector organisation (see Chapter 6). In particular, participants in the case study were afforded an opportunity (by using a survey) to indicate to what extent the method caused them to reflect on communication and whether it affected their level of awareness. In addition, they were asked to give an indication of how understandable the content of the method was (see Appendix F). These indicators, and others, corresponded with the initial requirements stipulated for a valid assessment method (see Chapter 5). Beyond these, the results and findings forthcoming from the case study was triangulated with another independent study performed by another university at the same entity. The following section will discuss the collective results of the member validation and triangulation efforts.

7.3 EVALUATION RESULTS

Based on the initial requirements stipulated for a valid assessment method, responses where elicited from the case study participants with regard to several selected criteria on the CAMI method. These included

1. functionality and usability

2. usefulness

3. awareness raising and triggering reflection

4. correctness of the results obtained.

This section now discusses the participant responses and evaluation results associated with each of these criteria. Evidence is taken from two sources, namely, a survey that was distributed to all eleven participants during the assessment at the public sector organisation (see Appendix F), and feedback obtained from the same participants and the organisation's executive management at a follow-up workshop held after the assessment.

7.3.1 *Functionality and Usability*

According to Hevner et al. (2004), the primary goal of design science research is the creation of an artefact that exhibits utility. For an artefact to exhibit utility, it has to contain the functionality necessary to perform the intended task(s). Nevertheless, having appropriate functionality is not a guarantor of usability; instead, functionality acts as a prerequisite for usability to accrue.

Functionality: Taking the above into account, this study evaluated the CAMI method's functionality using a single-case (in-depth) case study of a public sector organisation in South Africa. During the case study, eleven personnel operating in the business-related (8) and IT functions (3) of the organisation were approached to participate in a business–IT communication assessment.

Each participant was forwarded a web-link to an assessment survey (see Appendix D) and the purpose and the method (to capture their perceptions of factors influencing communication) were explained to them. The survey took the form of anonymous participation, with the only request being that the participants had to indicate in which core function of the organisation they operated. This allowed the business-related and IT functions to be compared during the data analysis.

In completing the survey, the participants had to choose a maturity score varying between one and four for each of 25 factors with respect to their assessment of the current and desired states of communication maturity.

When answering participants were reminded to think of their immediate team and this was reiterated below each heading in the survey. At the end of the survey they were also asked to comment on the content, usability, understandability, ability to cause reflection, and ability to raise awareness of the survey (see Appendix E).

Based on the assessment results and findings, the CAMI method allowed the organisation to (a) evaluate the current and (b) the desired state of communication and issues pertinent to it. Furthermore, it allowed it (c) to identify potential

areas for improving the situation and, (d) ultimately, helped to raise awareness and assisted the executive management to make informed strategic decisions for action planning and change management.

Overall, the CAMI method provided a relatively quick way of assessing the perceptions of business and IT personnel on factors influencing the current and desired states of communication between them.

Usability: Wilson (2002, p. 28) states that usability predominantly addresses the degree to which users understands the language used in an artefact. Considering this, this study evaluated the CAMI method's usability by ascertaining how easy it was for the participants to understand the content of the assessment survey.

To achieve this, participants had to rate the method's ease of understanding shortly after they had completed the assessment survey. Two Likert-scale questions were employed for this purpose. The first asked the participants to rate the understandability of the method content, while the second asked participants to rate how easy it was for them to capture their perceptions. In both cases, a space for comments was provided where the participants could expand on their responses. These questions were included to find evidence to support whether the language and content used in the CAMI method was appropriate. A key focus was on the description of the factors and the maturity levels, the cell descriptions and the ease of scoring.

In reflecting on the responses, most of the participants indicated that the content of the method was moderately easy to understand. Some, however, reported items that caused confusion. For example, a few business personnel reported that they did not have knowledge of some of the abbreviations used in the method. This ultimately culminated in comments that read as follows:

> *"From a business perspective, I did not always understand the questions asked."*

> *"Abbreviations should be explained."*

> *"It should be made more simple, especially for those not within the IT function. The rest was not too complicated to understand."*

Subsequently the use of some abbreviations were amended and, where application, removed. An international management expert was also consulted, who helped in rewording some factor descriptions and giving practical examples.

As for the ease of scoring, most participants indicated that the scoring process was moderately difficult. In particular, participants mentioned that because the

text for the choices of answers was different for each factor, the scoring process was somewhat tedious. Nevertheless, they commented that the choices at times did help them to make informed selections:

> *"Scoring each factor was quite tedious, in that I had to read through all the descriptions. Yet, I appreciated the additional information when I had to make a tough call."*

Taken together, these results suggest that the method was adequately understandable. However, some improvement(s) could be made that would add to its value.

7.3.2 *Usefulness*

Beyond usefulness, Hevner and Chatterjee (2010) explain that an artefact's utility also aligns closely with its usefulness; that is, an artefact will only exhibit utility if it provides value to the intended user. In this study, usefulness could be seen to refer to whether the public sector organisation could use the method appropriately, and whether it led to the identification of likely breakdown points for communication among its business and IT personnel.

Usefulness: The specific objectives of the assessment conducted at the public sector organisation were to (a) evaluate the current and (b) desired state of communication, and issues pertinent to it, among their business and IT personnel. Furthermore, (c) to identify potential areas for improving the communication situation and, (d) ultimately, raise awareness and assisting executive management to make informed strategic decisions for action planning and change management.

As indicated in the previous section, the functionality afforded by the method allowed these objectives to be met. In so doing, the method also proved useful, since the organisation quickly obtained a snapshot of the current and desired communication maturity. In addition, the organisation was given a list of recommendations whereby change interventions could be made. Thus, the method not only informed the organisation about likely breakdown points but also went beyond this by offering suggestions for improvement. The method's usefulness subsequently became particularly evident in the post-assessment workshop when the following comments, among others, were received:

"The findings and results afforded by this assessment are very valuable. It gives us a good starting point to addressing many of our known communication problems."

"Whilst the results of the assessment might not be unknown; the assessment did force me to think and reflect on whether things are working as they should. It 'shakes the boat'. Therefore, I would consider it to be quite useful to us and other organisations."

"This assessment would be extremely useful when new IT innovations and initiatives are being launched. This way we can ensure that communication is optimal between the business and IT personnel from the start."

"When things fail, they often fail due to a lack of communication between our business and IT personnel. This assessment offers a viable and, even innovative, approach for us to investigate what needs to change."

7.3.3 *Raising Awareness and Triggering Reflection*

The goal of the assessment method was to trigger reflection on communication in business–IT alignment. In other words, it intended to raise awareness and ultimately alter the perceptions that both business and IT personnel held of the factors influencing the communication in business–IT alignment (see Chapter 5). To this extent, the utility of the method was bound to its capability in raising awareness and triggering reflection.

Drawing on the participants' responses, nine of the eleven participants indicated that the assessment had a moderate to extreme impact on their immediate awareness of the importance of communication in business–IT alignment. Therefore, the method and survey did indeed help raise awareness of communication among the participants. However, the extent of such awareness differed depending on the individual participant's prior knowledge and experience. The following comment supports this:

"The assessment did not improve my awareness of communication much, but only because I already had a strong understanding of its importance during the business–IT alignment process. For others, this assessment might prove highly beneficial."

While appraising the ability of the assessment to trigger reflection, all eleven participants indicated that the assessment caused them to reflect on the level of

communication between themselves and their colleagues. In fact, many stated that the assessment was an interesting and novel way to achieve this, particularly since it specifically highlighted the 25 most influential factors that affect communication in business–IT alignment.

These responses reinforce the view that the CAMI method shows sufficient promise to raise awareness and trigger reflection among the assessment participants. Therefore, this study in total has shown that a maturity grid-based method is suitable for capturing, analysing, and assessing the maturity of communication processes within the business–IT alignment context. In addition, it has revealed that the method's output could uncover several interesting results and findings. These findings should help raise awareness and trigger reflection. However, they can only do so if they are accurate. Therefore, the correctness of the results also directly affects the method's utility.

7.3.4 *Correctness of Results*

Having evaluated the method's functionality, usability, and usefulness, the study subsequently had to evaluate whether the method produced truthful results; that are, whether the method produced the 'correct' results, and whether the assessment participants agreed with them.

Establishing what constitutes 'correct' was difficult, owing to the challenge of defining objective and quantitative criteria for communicative success. Consequently, it was rather opted to ask the question as to whether similar results could be derived using other means of data collection. In addition, whether the assessment participants agreed with the results. To this extent, the method's results were evaluated using member validation (Douglas, 1976, p. 131) and triangulation (Guion et al., 2011). In the case of triangulation, if other means produced similar results then naturally the method's results had to be accurate.

During the post-assessment workshop at the public sector organisation, the results of the assessment were reported back to the assessment participants and the executive management. They agreed with the results of the gap analysis and the areas identified that required attention for improvement. In fact, the head of the IT function commented and thereby confirmed that the results accurately represented the actual state of communication between the business and IT personnel:

> *"These results confirm my suspicions and closely align with my own view*
> *of the current communication situation. I know that our corporate culture*

needs work, and that collaboration between the business and IT functions
need improvement. This assessment clearly points these out."

Given the novelty of the method, it was difficult to triangulate the results obtained with other literature. In attempting to triangulate the method's results, the public sector organisation alluded to an independent study performed by another university[2]:

"Another university performed a study here about a year ago. They at-
tempted to capture where we could improve our existing business practices.
This study's results closely correspond with yours."

While the focus of that study differed from the one reported in this thesis, it nevertheless arrived at similar conclusions; namely, that the organisation needed to improve its corporate culture and co-operation. Consequently, the results were triangulated, in that another research team using different methods had obtained similar results (albeit, whilst investigating different aspects).

All in all, based on the participants' responses and above-mentioned triangulation, there is evidence that the method does produce accurate results, that is, results that find approval among the assessment participants. In addition, the method reflects an adequate snapshot of the communication that takes place between business and IT personnel in an organisation.

7.4 LESSONS LEARNT

The application of the CAMI method at the public sector organisation, in conjunction with the evaluation results, makes it possible in retrospect to identify several aspects that have been learnt in this study. As stated in Chapter 5, the method is intended for use by academic researchers, management personnel, and consultants. A discussion of lessons learnt aims to enhance the use of this method further.

7.4.1 *Factors Influencing Communication in Business–IT Alignment*

Communication by its very nature is abstract and multifaceted. To render the concept of human communication in business–IT alignment more 'tangible', this

---

2 Due to the sensitivity of the study, the results were not published. The public sector organisation, whilst having access to the study's results, refrained from making them available.

thesis used factors influencing communication as indicators to interpret, analyse, and assess communication. Having said that it is important to bear in mind that communication between business and IT personnel during the alignment process could be influenced by a limitless spectrum of factors, which often interact in complex and unpredictable ways.

For academic purposes, the list of factors influencing communication in business–IT alignment identified had to be consistent and justified. For industry applicability, however, a certain degree of flexibility and tailoring may need to exist. For example, some factors might not be applicable to all types of organisation. Moreover, the terminology used to describe a factor might also need to be adjusted.

In future studies, it might be more beneficial to start with the full list of 49 factors (see Appendix A) and have an organisation select those factors that are most applicable to it. Nevertheless, some form of baseline would still need to be maintained. The lesson here is that a researcher will need to strike a balance between developing an exhaustive list of factors and a usable one. This is supported by Moultrie (2004), who states that an appropriate number of factors for an audit method is estimated to average around 20.

7.4.2   *Applying the CAMI Method*

Selection and active participation of assessment participants: The CAMI method predominantly depends on the selection and active involvement of participants. It is vital that a representative sample of participants representing the business and IT functions be obtained. However, since many organisations rely on a centralised IT function (McElheran, 2012), only a few IT personnel might be required to participate in an assessment. On the other hand, several business personnel would be required, since business functions could differ widely in their interactions with the IT function(s).

This lesson became particularly evident when a leading automotive organisation was approached to perform an assessment using the CAMI method. While this organisation, similar to the public sector organisation, performed all the necessary steps of the assessment process, only IT personnel responded to the assessment survey, despite the fact that several business personnel were also approached. Ultimately, the lack of business personnel participation voided the assessment; since no comparison could be made between the scores of business and IT personnel. This meant that this assessment could neither be reported on nor included in this thesis.

Beyond selecting a representative sample, it is important that the assessment participants be informed about the purpose of the assessment. As Maier (2007) states, engagement will be higher if participants know how they will benefit from the assessment. For a successful externally administered assessment to be performed, it is vital for management personnel in the organisation to inform the participants about the circumstances. This could include information about the purpose of the wider research project, the objectives of the assessment and the participants' agreement on who will participate. This study had particular success when top management bought into the idea of the assessment and issued a directive that all personnel should support the assessment efforts.

Facilitator conducting the assessment: Conducting a fair assessment depends largely on the facilitator of the assessment remaining impartial and unbiased. However, the outcome of the assessment will always be influenced to a certain degree by the facilitator, since s/he needs to start the discussions, direct the search for causes and solutions, and forward the assessment survey to the participants.

While the CAMI method was developed for use by organisations as an in-house diagnostic tool, it is unlikely that an in-house facilitator will remain unbiased. Therefore, the lesson learnt here is that the method might be more suitable for use by external consultants, who would be able to ensure that the assessment remains fair and that the results are accurate. In addition, they could use the assessment as a starting point for offering further advice to the organisation for improvements to accrue. This lesson learnt does not void the usefulness of the method as an in-house tool, but rather draws attention to the care that needs to be taken when selecting a facilitator.

7.5 CONCLUSION

This chapter shared the evaluation results of the CAMI method and their interpretation. In so doing, it explained the results and their implications, as well as how they related back to the objectives stated in the introduction chapter. It simultaneously reflected on the research process that led to the development of the method, its theoretical underpinnings, and the results of its application in industry.

This chapter evaluated the method predominantly by way of member validation. The participants in the case study of the public sector organisation indicated that they appreciated the method's functionality, usability and usefulness,

as well as its ability to raise awareness and trigger reflection. Participants appraised the method as an interesting and novel way of being made aware of and assessing communication in business–IT alignment. Thus, the accuracy of the results was supported by way of triangulation and observation.

A comparison of results from other researchers using different methods, as well as researcher observations, suggests that an accurate picture was painted, and that the method identified the right issues for improvement. The assessment method yielded valuable insights and in a short period suggested areas for improvement. Uncertainties remain, however, as to the depth of analysis obtained. However, the assessment method was intended as a quick diagnostic instrument. Hence, for researchers or practitioners attempting to answer questions pertinent to the nature of communication in business–IT alignment, the repeated application of the method or combining it with ethnographic-oriented empirical studies may lead to a greater depth of insights.

The chapter concluded by sharing lessons learnt from the research, and the preparation and implementation of the method. In particular, it emphasised that while the list of factors influencing communication in business–IT alignment identified needed to be consistent and justified, a certain degree of flexibility and tailoring may need to take place when the method is applied in industry. It also noted the importance of obtaining a representative sample of participants from both the business and IT functions. Furthermore, these participants should be informed about the purpose of the assessment and the results expected by managers in the organisation. Lastly, it highlighted the risks associated with, and the necessity for carefully, selecting a facilitator to direct the assessment. Choosing an unbiased facilitator is crucial in ensuring that a fair and valid assessment is performed. To this extent, the chapter recommended that organisations use external consultants instead of an in-house facilitator when performing an assessment using the method.

The following chapter concludes this thesis by summarising the main findings and contributions made, while also indicating some limitations and future research opportunities. Furthermore, research publications emanating from this work will be mentioned.

Part V

CONCLUSION

CONCLUSION

"I think and think for months and years. Ninety-nine times, the conclusion is false. The hundredth time I am right"

— *Albert Einstein* (BrainyQuote, 2015a)

This chapter aims to conclude this work by summarising the main findings and the contributions it made, while also indicating some limitations and future research opportunities. It also lists the research publications emanating from this work.

8.1 INTRODUCTION

The previous four chapters have described the development of an assessment method for communication in business–IT alignment, demonstrated its application in industry, and ultimately evaluated its feasibility and utility.

This chapter concludes the thesis by summarising the work that has been done and describing how the research objectives set out in the Introduction (see Chapter 8) have been accomplished. Further, the contributions made and further research opportunities presented by this thesis will be discussed.

The following section presents a summarised account of each chapter and helps to support the main argument(s) and research objectives of this research.

8.2 CHAPTER SUMMARIES

Chapter 1 briefly introduced information technology (IT) and highlighted the importance of it in modern-day business. It showed that the dependence on IT in today's business environment is increasing rapidly and argued that IT plays a large part in a business's success. It also highlighted the fact that true business value can only be obtained from IT if it is aligned with the goals, objectives, and processes of the business. This is better known as business–IT alignment.

The chapter started by discussing business–IT alignment, and its concepts and requirements. It argued that communication is a core problem and challenge that businesses experience when addressing the social dimension of business–

IT alignment. It also highlighted the fact that there is at present a lack of approaches, methods, and tools to help organisations in this regard. In fact, it showed that few studies have explicitly looked at communication within the context of business–IT alignment (Coughlan et al., 2005). Moreover, even fewer studies have specifically produced methods or approaches whereby organisations can analyse or assess this communication. This is alarming, since without such methods or approaches organisations are likely to continue experiencing communication problems while trying to achieve proper alignment and may have no way of identifying, analysing, assessing or even remedying them.

These arguments formed the basis of this study and supported its main objective, namely, to develop an assessment method to assist organisations (self-)assess and elicit areas for improving the communication practices between their business staff and IT personnel. Further, it stipulated the research design (Hevner et al., 2004; March & Smith, 1995; Gregor & Hevner, 2013) and methodology (Peffers et al., 2007) this study would follow. Finally, it gave a brief outline of the chapters of this thesis.

Chapter 2 positioned and emphasised the importance of communication within the business–IT alignment context. To do so, it firstly introduced the concept of business–IT alignment and, secondly, its related requirement of communication between business and IT personnel for information flow and mutual understanding.

It discussed the importance of information in relation to the success of modern organisations in general, and IT as an enabler. Subsequently, the chapter emphasised that organisations are investing profoundly in IT to obtain competitive advantages; however, competitive advantages and true business value can only be obtained if IT is aligned with the business's goals, objectives and processes, and vice versa. Consequently, the individual theories, past empirical research studies and findings from practice pertaining to business–IT alignment were introduced. On this basis, it became clear that business–IT alignment is a multifaceted and complex construct. To this extent, it highlighted that one could interpret and investigate the construct from different perspectives, but each is influenced by a variety of different factors.

Based on these works and findings, the chapter concluded by underlining the fact that communication (as a social construct) is critical in achieving business–IT alignment. In fact, it stipulated that communication between business and IT personnel for information sharing and information flow is vital, especially in view of the fact that they need to exchange ideas, knowledge, and information

constantly in order to understand and fully commit to the missions, objectives, and plans of both the business and IT. Therefore, it was argued that organisations should be mindful of the role communication plays in alignment and should ensure that they address it adequately.

Chapter 3 explored communication in business–IT alignment from a theoretic perspective. To do so, it firstly gave an overview of the different ways in which communication could be conceptualised and, secondly, explored the unique characteristics of communication in business–IT alignment. Thirdly, it investigated likely problems associated with said communication and, lastly, examined communication assessments as a likely approach or technique whereby such problems could be identified and analysed.

This chapter reviewed various perspectives on communication to describe how one can investigate, assess, and ultimately remedy communicative events. In particular, it explored the information-centred, interaction, situational and systemic perspectives.

A systemic perspective, based on general systems theory (Bertalanffy, 1968) and sociological systems theory (Luhmann, 1995), integrates the three aforementioned information-centred, interaction, situational perspectives. By adopting this perspective, one could better understand the various individual factors and elements that define a communicative event, since the information, interaction, and situation would be considered within the larger system in which they operate, as opposed to a narrower view. Consequently, the focus shifted to that of co-ordination and mutual understanding between the communicators (Taylor et al., 1996) – a view that was adopted in this thesis.

Adopting a systemic perspective on communication had several implications for this thesis. It firstly implied that one could consider the alignment process to be a 'social system' of which communication formed part. In addition, it is influenced by both internal and external factors and constraints. However, the external factors only partially account for the behaviour and practices displayed by the business and IT personnel (or the individual communicators), since they operate according to their own cognitive and emotional systems. Therefore, the priority became how one could influence internal factors within the communicators to improve their personal behaviour, given that the external factors and constraints can only be steered to a moderate extent.

By adopting a systemic perspective, the chapter next explored and discussed the unique characteristics pertaining to the business–IT alignment context. It showed that while some characteristics are universally applicable to all processes

in organisations, the interrelationship between business and IT personnel during the alignment process affords an exclusive backdrop, which ultimately presents several unique challenges. If these challenges are not adequately addressed then naturally communication breakdowns may come to exist.

Consequently, given that business–IT related communication is important and could easily break down, the chapter argued that it would seem necessary for organisations to invest time and effort into identifying, analysing, and ultimately remedying communication breakdowns. However, it also highlighted the fact that, at present, no known approaches or techniques exist to do so in the business–IT alignment area. This is in sharp contrast to other disciplines, such as engineering design (Maier et al., 2004, 2006; Eckert et al., 2004).

On this basis, the chapter concluded by sharing evidence that a communication assessment could provide an approach whereby business–IT related communication could be analysed. In doing so, it highlighted the fact that such assessments had become commonplace in other disciplines, such as organisational communication (Hargie & Tourish, 2009). Unfortunately, none was found to exist that catered specifically for the unique context and characteristics of business–IT alignment. Thus, this thesis proposed to devise such a communication assessment for business–IT alignment – in the form of an assessment method.

Chapter 4 provided a high-level overview of the methodology followed in this study to devise the assessment method. To do so, it firstly discussed the philosophical assumptions and considerations that influenced the choice of research paradigm. Secondly, it argued for and examined the specific research paradigm selected for this study, namely, design science and, thirdly, introduced the specific research process employed.

The chapter reviewed various philosophical paradigms. In so doing, it became clear that research could be approached from two differing viewpoints. These viewpoints include (logical) positivism and phenomenology. While both are popular, Collis and Hussey (2009) explain that few researchers today operate purely according to either one; instead, many combine elements of both to take a broader and, often complementary, view of the research phenomenon. Some of these intermediary paradigms have a strong empirical grounding (i.e., post-positivism), while others might be more interpretive (Creswell, 2007). This was also true of this study.

Given the aim of this study, it intermittently subscribed to a view where reality is derived from the transmission of information. Hence, it leaned toward a positivist paradigm (G. Morgan & Smircich, 1980), as indicated in Figure 4.1.

However, the study also accepted the view that the world is a social construction, sustained through a process of human action and interaction. The latter approach is referred to as phenomenological (G. Morgan & Smircich, 1980) and is particularly evident when this study addressed the perceptions and expectations of business and IT personnel pertaining to communication among them. Thus, the research philosophy held by this study could best be described as 'pragmatism' (Burrell & Morgan, 1979; P. Johnson & Duberley, 2000).

In holding a 'pragmatic' viewpoint, the chapter explained that this study prescribed to neither a strict positivist nor a strict phenomenological viewpoint (Creswell, 2007). Instead, it focused on the practical use and success of the method being developed to assess communication in business–IT alignment. To this extent, the chapter discussed the fact that the study employed a specific research paradigm and research methods because they were appropriate for the specific context and the outcome sought (Dalsgaard, 2014; Hovorka, 2009). That is, it employed the selected research paradigm and methods because they were suitable for use in information systems (IS) research and catered for the development or design of an assessment method.

The chapter next examined the research paradigm. Hevner et al. (2004) state that only one of two research paradigms could be used in information systems (IS) research, namely, behavioural science or design science. Since this study attempted to develop, or design, a socio-technical artefact, the paradigm of design science was ideally suited according to Peffers et al. (2007) and supported by Hevner et al. (2004). This argument found further support in that both Hevner et al. (2004) and March and Smith (1995) argue that methods (algorithms and practices) are valid artefacts to be produced by design science projects. Moreover, design science, as conceptualised by Simon (1996); also supports a pragmatic research philosophy – as is used within this study.

In adopting a design science paradigm, the chapter identified the existence of several research processes that could be adopted and used in this study (Hevner & Chatterjee, 2010). However, an argument was made to adopt Peffers et al.'s (2006) design science research process (DSRP), since it is built on the expectations and guidelines of leading design science authors. Moreover, but by using case analysis it was shown to match the methods and processes used in existing and successful design science projects. The process that was opted for suggests that a design science project, such as this study, needs to address six steps successfully if a valid contribution is to be made. These steps include, namely, problem

identification and motivation; definition of the objectives for a solution; design and development; demonstration; evaluation; and communication.

Hevner and Chatterjee (2010) warn that these steps are only valuable if they can be applied appropriately to the specific design situation and problem context of a research project. Consequently, this chapter concluded by sharing evidence to suggest that all the necessary steps of Peffers et al.'s (2006) design science research process (DSRP) had been adequately planned and addressed. Consequently, this study could uphold sufficient academic rigour and ensure a scientific contribution (Peffers et al., 2007).

Chapter 5 described the design and development of the assessment method, termed the 'Communication Alignment Maturity Improvement (CAMI) method'. To do so, it firstly specified the requirements for the assessment method. Secondly, introduced the approach chosen for development, namely, a maturity grid-based approach and, thirdly, described how this approach was applied to develop the assessment method for communication in business–IT alignment.

The chapter specified the target audience and the requirements of such an assessment method. Further, it discussed various solution approaches that were considered and presented an argument for the approach chosen, namely, a maturity grid-based approach from the discipline of engineering design (Maier et al., 2006). In so doing, it became clear that the target audience for the assessment method would be personnel residing in the business and IT functions of organisations, while the ultimate outcome of such an assessment would be used by organisations' executive management. As for the requirements, the chapter specified that the aim of the method was to assess the current communication practices, raise awareness among the personnel, and diagnose improvement opportunities for these practices. To this extent, the method had to

1. address communication between either specific business functions and IT or all of them

2. offer output needed to enable and support reflection on communication in the business–IT alignment process

3. assist in raising awareness of communication in business–IT alignment

4. be easy and quick to use for deployment in industry

5. enable quick analysis and interpretation of results without prior knowledge

6. accommodate a variety of factors influencing communication in the business–IT alignment process

7. provide a mechanism for (self-) assessment to, in particular, enable personnel residing in the business and IT functions to choose the current and desired communication states themselves

8. show degrees of growth within the factors, since different personnel might perceive the communication situation in different ways

9. account for the fact that one cannot measure communication objectively yet provide for inter-subjectively valid ranking

10. provide an opportunity for subsequent discussion among personnel residing in the business and IT functions.

Given these requirements, several approaches were explored in order to identify which would be most suitable for developing the assessment method. Approaches considered included interviews, observations, critical incident analysis, focus groups, checklists, diary studies, and the maturity grid-based approach. While some partially addressed the requirements, only the maturity grid-based approach was seen to cater for all of them. Consequently, the chapter proceeded to conduct an overview of the chosen approach and to discuss the general construction process.

The chapter showed that maturity grids are variants of the maturity approach. While sharing some commonalities with maturity models they differ in their construction and application. Whereas maturity models require multiple aspects, or factors, to mature simultaneously before progressing along the maturity scale, a maturity grid allows each aspect to mature on its own independently. Therefore, one could interpret a maturity grid perhaps as a collection of separate 'sub'-maturity models – although they would focus on a single area of interest. The chapter further identified that a maturity grid is structured around a matrix, which creates a series of cells by allocating (a) levels of maturity [columns] against (b) several key aspects or key activities [rows]. The cells then contain (c) text descriptions of typical performance at different levels of granularity.

With regard to the construction of a maturity grid, a proposal by Maier et al. (2011) was explored which entails a detailed roadmap, or methodology. This methodology is based on their comparison of extant maturity grids as well as their field experience. The methodology consists of four generic phases, namely, planning, development, evaluation and maintenance, each of which consists of

several steps, or decisions, that one should make using a single research method or a combination of method(s).

Given the choice of the maturity grid-based approach and the viability of using the above-mentioned roadmap, the chapter next described the design and development of the CAMI method. In particular, it explained how underlying elements of the assessment method were identified using a Delphi study, as well as the way these elements were combined into a holistic model and, finally, transposed to construct a maturity grid. In so doing, the primary objective of this thesis was met.

The chapter concluded by sharing an example of the CAMI method to explain its inner workings and offer an overview of the ultimate outcome of the development phase. To this extent, an extract of the environmental factors of the method was depicted and explained.

Chapter 6 demonstrated the CAMI method and shared evidence of its application in a practical setting. To do so, it firstly offered a process model that graphically depicted the phases and steps involved in using the method to perform an assessment. Secondly, it shared evidence of the method's application in a practical setting.

The use of a maturity grid-based approach led to the development of a method for assessing communication in business–IT alignment. However, the exact application of the method in performing an assessment was yet unknown. To this extent, the chapter introduced a process model that could guide an organisation in using the method to perform an assessment. As the process model showed, the method's application could best be described as a dynamic, iterative process involving several phases and steps. While seemingly complex, a survey and an Excel tool was designed and developed to accompany the method.

The chapter continued by presenting a case study to demonstrate the utility, quality, and efficacy of the method in industry. By applying the method at a public sector organisation, this study proved that it was indeed possible to perform a viable assessment of communication within the business–IT alignment context. The method allowed the organisation to capture, analyse, and assess both the (a) 'current' communication practices and (b) 'desired' communication situation between the personnel residing in their business and IT functions. Furthermore, it (c) assisted them in identifying potential areas for improving communication, d) ultimately, helping to raise awareness and assist their executive management in making informed and strategic decisions to improve human communication between the personnel residing in the business and IT functions.

Beyond the immediate benefits of the case listed above, several other practical benefits of the method could also be discerned. For example, the method

- provided the possibility of capturing communication practices based on the scores of the individual participants

- assisted in reflecting on communication practices

- raised awareness

- generated discussion;

- enabled a quick overview of the perceptions of business and IT personnel on both the 'as-is' and the 'to-be' states of factors influencing communication in business–IT alignment

- allowed for a gap analysis of distance between the current and desired scores for each factor scored by the participants

- allowed for discrepancy analysis between perceptions of the business and IT personnel

- captured both the positioning of the individuals and the consensus of the two functions

- guided improvement planning.

Chapter 7 shared the CAMI method evaluation results and their interpretation. To do so it explained what the results were, what they implied and how they related back to the objectives stated in the introduction chapter, while simultaneously reflecting back on the research process that led to the development of the method, its theoretical underpinnings, and the results of its application in industry.

This chapter evaluated the method predominantly by way of member validation. The participants in the case study of the public sector organisation appreciated the method's functionality, usability, usefulness, and its ability to raise awareness and trigger reflection. Participants indicated their appraisal of the method as an interesting and novel way of being made aware of and assessing communication in business–IT alignment. The accuracy of the results was supported by way of triangulation and observation.

A comparison of results from other researchers using different methods, as well as researcher observations, suggested that an accurate picture had been

painted, and the method identified the right issues for improvement. The assessment method yielded valuable insights and suggested areas for improvement within a short period. Uncertainties remained however as to the depth of analysis obtained but is has to be remember that the assessment method was intended to be a quick diagnostic instrument. If a researcher or practitioner is attempting to identify issues that are pertinent to the nature of communication in business–IT alignment, the repeated application of the method or combining it with ethnographic-oriented empirical studies may lead to a greater depth of insight.

The chapter concluded by sharing lessons learnt concerning the research, preparation, and implementation of the method. In particular, it emphasised that while the list of factors influencing communication in business–IT alignment needed to be consistent and justified, a certain degree of flexibility and tailoring may need to be applied if this assessment is conducted in industry. It also noted the importance of obtaining a representative sample of participants representing both the business and the IT functions. Furthermore, managers in the organisation should inform these participants about the purpose of the assessment and the results expected. Lastly, the chapter highlighted the risks associated with the selection of a facilitator and the necessity assessment do so carefully, as an unbiased facilitator is crucial to ensuring that a fair and valid assessment is performed. To this extent, the chapter recommended that organisations use external consultants instead of an in-house facilitator when performing an assessment using the method.

These chapters have helped to structure the main argument and the research objectives. It is, however, important to understand how a resolution to this argument was obtained and how the research objectives were achieved.

8.3 REFLECTING ON THE RESEARCH OBJECTIVES

The primary research problem for this thesis was stated as follows (see § 1.2):

> *Communication between business staff and IT personnel is vital in achieving business–IT alignment; however, the lack of approaches, methods and tools for explicitly capturing, assessing, and ultimately improving it remains a burden for organisations.*

This problem statement informed the primary objective of the research (see § 1.4):

To develop an assessment method to empower organisations in (self-) assessing and improving the communication practices between their business staff and IT personnel, as part of business–IT alignment.

A number of secondary objectives were stated to help achieve the primary objective of the research and provide a resolution for the problem statement (see § 1.4):

The first of these secondary objectives was *"to determine the relationship between business–IT alignment and communication, and its implications for research and practice."* This thesis achieved this secondary objective by introducing, firstly, business–IT alignment and, secondly, the literature on communication both in the introduction (see Chapter 1) and the literature review chapters (see Chapters 2 and 3). Specific mention was made of what business–IT alignment entails (see § 2.3.1), how it consists of both an intellectual and social dimension (see § 2.3.2), and that communication forms part of the latter dimension. Furthermore, literature was explored that offers comprehensive evidence of the relationship between business–IT alignment and communication, and that emphasises that communication between business and IT personnel during the alignment process can be troublesome (see § 2.4). Accordingly, it argued that organisations need assistance in this regard but that no known approaches, methods, or tools exist.

The second of the secondary objectives was *"to explore modern theories, existing strategies, and approaches whereby organisations could assess communication in business–IT alignment."* This thesis achieved this by integrating and contextualising the literature related to assessment, and communication (see Chapter 3). In addition, other disciplines where communication has already been successful assessed were also investigated (see § 3.5). Given this information, a series of principles, requirements, techniques and methods were determined, which later governed the development of the solution for this work (see § 5.2).

The third of the secondary objectives was *"to articulate a method by which organisations can (self-) assess and elicit areas for improving their communication practices between their business and IT personnel"*. This objective was accomplished by developing an assessment method targeting the team interface between business and IT personnel in

organisations (see Chapter 5). The method, termed the 'Communication Alignment Maturity Improvement (CAMI) method', drew on the concept of a maturity grid, stemming from software development (Paulk et al., 1995; Radice, Harding, Munnis, & Philips, 1985), quality management (Crosby, 1996, 1979) and, specifically, engineering design (Maier et al., 2006; Moultrie, 2004) disciplines. The CAMI method is supported by an Excel-based software tool, an electronic survey, and a process model (see §6.2).

Although not an explicit objective, but part of the design science process (see Figure 4.3), the CAMI method was demonstrated and evaluated at a public sector organisation in South Africa (see chapters 6 and 7). During this case study, in-depth data was gathered and findings deduced. Consequently, this study showed that the method was feasible for application in industry and that it did exhibit utility. Hence, the method addressed the requirements for acceptance as set out by the design science paradigm (see Chapter 4), and met the established objectives for a valid assessment (see Chapter 5). Consequently, it may be considered a valid contribution.

Given the above, it can be argued that the three secondary objectives have been successfully addressed and the evaluation of the method has proved fruitful. Therefore, it can again be argued that the primary objective, *"to develop an assessment method to empower organisations in (self-) assessing and improving the communication practices between their business staff and IT personnel, as part of business–IT alignment,"* has been achieved.

8.4   CONTRIBUTIONS

The work in this thesis led to several contributions being made to the existing literature. These contributions relate to the emphasis placed on and exploration this thesis made of communication in business–IT alignment, factors associated with the assessment method, as well as the development of the assessment method itself and its 'exaptation' from the engineering design discipline. Each of the above-mentioned contributions will now be detailed to offer insight into their relevance, importance and, ultimately, value to the research and practitioner communities.

8.4.1   *Communication in Business–IT Alignment*

At its core, the alignment process is all about communication and mutual understanding of data, roles and responsibilities, identities, incentives and other types of organisational and technical information. It would thus seem fruitful for organisations to explore the communication between their business and IT personnel as part of the alignment process (Coughlan et al., 2005); particularly in view of the fact that it can either enhance alignment, result in major challenges and even hinder it.

While leading authors have emphasised communication as an important enabler of alignment, this factor has rarely been studied. As Schlosser et al. (2012) state, many studies have investigated the intellectual dimension of alignment, while a far smaller number have looked into the human and social dimensions. Inspired by the works of Coughlan et al. (2005), Cybulski and Lukaitis (2005) and Luftman (2003), this research specifically investigated the interface between communication and business–IT alignment. In so doing, this research has contributed to improving the understanding of the role communication plays within the business–IT alignment process. In addition, it has emphasised the importance of assessing communication and ultimately remedying communication-related problems between business and IT personnel in an organisation. Although this is not new, it should reinvigorate the importance of this concept and ignite renewed interest among academics and practitioners.

Beyond this contribution, this research juxtaposed different ways of conceptualising communication in business–IT alignment. These conceptualisations include information, interaction, and situation-centred theories. Taken together, this thesis has shown that a combination of these conceptualisations could afford a more comprehensive and complete understanding of communication. As far, as could be determined, this was the first study of its kind to draw attention to this within the business–IT alignment discipline.

8.4.2   *Factors Influencing Communication in Business–IT Alignment*

Communication by its very nature is abstract and multifaceted. To render the concept of human communication in business–IT alignment more 'tangible', this thesis used factors influencing communication as indicators to interpret, analyse, and assess communication. In view of this, communication between business and IT personnel during the alignment process could be influenced by a limitless

spectrum of factors, which often interact in complex and unpredictable ways. To investigate the phenomenon and develop a viable assessment method, this study first had to capture those factors that possibly influence communication and identify the general framework within which they fit.

This thesis drew heavily on the socio-technical framework proposed by Moray (2000), the business–IT alignment literature (Luftman, 2003; Reich & Benbasat, 2000; Coughlan et al., 2005; Cybulski & Lukaitis, 2005), as well as a diverse body of other literature (Maier et al., 2004; Millar, 2009; Schoeneborn, 2011). To ensure the validity and accuracy of factors, a Delphi study (Okoli & Pawlowski, 2004) was conducted to incorporate industry members' experience and perceptions of factors that they perceived to affect their daily work and communication. After three separate Delphi rounds, a final list of 25 factors was confirmed for inclusion in the assessment method.

This study has shown the extraction of factors to be viable. It is important to note, however, that this was not intended to be a 'proven' or 'correct' model. Future studies may well scrutinise these factors and subject them to tests of validity. However, in producing a conceptual model and synthesising and presenting factors from several strands of literature, this present study contributes to the advancement of business–IT alignment knowledge by providing a comprehensive list of factors as a starting point for a taxonomy to assess communication in business–IT alignment – surpassing the proposals of Luftman (2003) and Coughlan et al. (2005). This taxonomy could inform improvements in the way Luftman's (2003) SAM assessment model assesses the communication criterion, particularly in view of the fact that Sledgianowski et al. (2004, 2006) found that the model did not fully address all the variation they observed in the organisational data for this criterion.

8.4.3   *Assessing Communication in Business–IT Alignment: The CAMI Method*

There is no universal standard or objective quality index for successful communication. Therefore, attempting to establish such a standard for business–IT alignment would be nearly impossible. Yet, it is possible to assess communication to some extent between business and IT personnel during the alignment process – but only if approached correctly.

Inspired by a maturity grid-approach from the engineering design discipline (Maier, 2007), this research developed and field-tested an assessment method for communication in business–IT alignment – termed the 'Communication Align-

ment Maturity Improvement (CAMI) method'. This method consisted primarily of a maturity grid (Maier et al., 2011) which was introduced to industry in the form of an electronic survey.

Factors influencing the communication assessed were taken to be indicators for communication maturity and likely problem areas. Consequently, these were considered key aspects to assess with the maturity grid. As to the rationale behind maturity levels that are assigned against these factors, this thesis adapted the concept of a learning theory (Argyris & Schon, 1978, 1996). This corresponds with the original proposal of Maier (2007) and argumentation of Balhareth et al. (2012).

The scores given during the surveys by the business and IT personnel were used to capture their perceptions and expectations on the current and desired states of a number of factors influencing communication in business–IT alignment. This enabled the assessment of the gap between their actual and preferred state of communication and discrepancies between the average scores from the two domains. Through feedback and discussions, underlying conditions of the differences between the current and desired states and the differences in perceptions and expectation were obtained and actions identified.

Given this, this thesis has indicated that it is viable and even possible to assess communication in business–IT alignment using a maturity grid-based approach, particularly since it provides 'feedback' and 'reflection' on the communication practices that take place between the business and IT personnel. This in turn may function as a starting point for action planning and strategising.

8.4.4 *Exaptation of the Maturity Grid-Based Assessment Approach*

Gregor and Hevner (2013) argue that a researcher may face a research situation in which the artefacts required in a field are not available or are suboptimal. However, effective artefacts may exist in related problem areas that may be adapted or, more accurately, 'exapted' to the new problem context.

As this thesis has outlined, the business–IT alignment literature to date had not yet proposed or delivered any satisfactory methods, tools or approaches whereby organisations can explicitly capture, assess and ultimately improve the communication practices that take place between their business and IT personnel. Consequently, a shortage of acceptable artefact(s) in this regard existed.

From the literature reviews, it became apparent that an approach existed within the engineering design discipline that could be 'exapted' to remedy this

shortage. As Maier (2007) states in a concluding remark to her thesis, the maturity grid-based approach she was proposing could be extended to other disciplines and application areas; therefore arguing that it could be 'exapted'. However, the question remained whether one could successfully 'exapt' this to the business–IT alignment context, whether it would yield similar benefits, and whether it would offer a method that could be viable for use by organisations.

By 'exapting' and successfully demonstrating the application of the maturity grid-based approach in assessing communication in the business–IT alignment context, this thesis has validated Maier's (2007) proposal, as well as illustrating that the approach is in fact viable and that it could be applied in other disciplines. As far as could be determined, this is the first study to do so, hence this makes a significant contribution, given that other disciplines and researchers – based upon the successful 'exaptation' of the approach in this thesis – may be alerted to the approach's application and applicability. This may in the future help to raise the approach to a de facto standard for assessing communication, thereby allowing it to mature and a well-developed design theory to accrue.

8.5 LIMITATIONS

Generally, by deciding on a certain topic, approach or method, several research decisions has to be made (Bateson, 1987). Along with these decisions come assumptions and often limitations. This thesis has made many methodological, theoretical, and practical decisions. These relate to the maturity grid-approach, factors associated with the assessment method itself, as well as the case study conducted at the public sector organisation.

8.5.1 *Maturity Grid-Based Assessment Approach*

In adopting the maturity grid-based approach, several limitations were introduced into this thesis:

- Firstly, communication is by its very nature a complex and abstract phenomenon. A maturity grid strikes a balance between such a complex reality and the simplicity of the underlying model; therefore, it may not adequately reflect the true complexities of the phenomena and may not provide an organisation with sufficiently meaningful information.

- Secondly, a maturity grid treats all factors to be assessed as distinct. Therefore, no interrelation or casual connections between factors are catered for. This is in sharp contrast to more complex maturity models, which require 'maturity' in some factors before one can move up a level. For a simple snapshot of the current or desired communication situation, this does not seem to be a cause for great concern, as the casual connections can be addressed during the discussions between the different personnel in the organisation.

- Thirdly, while a maturity grid can assist an organisation in identifying potential communication problems, raising awareness, and allowing for 'reflection', it is not intended to perform the role of a root cause analysis. Instead, organisations would need to resort to other methods to capture the exact cause of a problem. As such, the sufficiency of a maturity grid-based method as a standalone method for remedying communication problems and ultimately improving the communication practices in business–IT alignment is difficult to ascertain. If used as a subjective diagnostic tool, as is the case in this thesis, the method does appear to be sufficient – but it may prove inadequate if used for other purposes.

8.5.2 *Factors Influencing Communication in Business–IT Alignment*

Another limitation refers to the conceptual model of factors on which the assessment method was developed. This study has shown the extraction of factors to be viable. However, while the Delphi participants reported that the 25 factors were the most critical factors, others might have been neglected or even overlooked. Moreover, other research methods might have yielded different factors – given that Delphi studies have certain limitations. In addition, no study in the business–IT alignment literature at present offers a comprehensive taxonomy for communication. Therefore, triangulation and comparisons between factors are difficult to execute thus rendering it difficult to ascertain the exact validity of the factors that were included in the model.

8.5.3 *Demonstration of the Method*

Owing to the distinct nature of the case study performed at the public sector organisation, general conclusions may not necessarily be drawn. In particular, the

case resided in a local setting. Therefore, it is difficult to prescribe whether similar findings, benefits, and results would be attainable internationally. Moreover, the communication situation in one organisation would differ from that in other organisations. For an immediate proof-of-concept validation, this case study appears to have sufficed; but additional case studies would need to be conducted in future for further validation and evidence.

The case study poses another limitation. Did the assessment lead to business–IT alignment improvements in the public sector organisation visited? Because of changes implemented after the assessment had been conducted, did certain aspects become clearer, did communication increase, were the business and IT functions more efficient, and could the business–IT alignment process be said to have improved? Whether this resulted is a complex chain of cause and effects that cannot be verified within the scope of this thesis. That said, Luftman (2003), Reich and Benbasat (2000) and Coughlan et al. (2005) argue that any improvement in communication would have a positive impact on business–IT alignment.

8.6 FUTURE RESEARCH OPPORTUNITIES

Part of the contribution of this thesis stems from creating opportunities for further research. In fact, many of the previously highlighted limitations afford valid concerns to be investigated. These opportunities refer to, among others, the conceptual model of factors, benchmarking, the actual assessment approach, the data analysis process, the assessment triggers and outcome(s), and external consultancy.

8.6.1 *Conceptual Model of Factors*

The previous section outlined that a limitation entails the conceptual model of factors upon which the assessment method was developed. In particular, the model was not intended to be a 'proven' or 'correct' model, but rather to be viable for application in this thesis. Future research could explore these factors in more depth and possibly attempt to validate them explicitly.

In particular, future research could employ other research methods for factor elicitation. This would allow comparisons to be made between the factors that this thesis is proposing and those gathered by means of other methods. One recommendation is that actual ethnographic observations or interviews be performed in an industry setting. This might lead to direct insight into the factors

that may affect communication during the alignment process. This may also overcome some of the Delphi study limitations.

The conceptual model of factors (see Figure 5.4) included factors referring to individual communicator (business or IT members). While the preliminary list of 49 factors (see Appendix A) did include some cognitive and personality related factors, these were mostly excluded later by the Delphi participants. Future research could explore these cognitive and personality related factors more explicitly.

Finally, yet importantly, as far as could be determined no study in the business–IT alignment literature at present offers a comprehensive taxonomy of communication. The conceptual model of factors might be seen as a starting point for such a taxonomy. Given this and the above-mentioned opportunities, future studies could attempt to establish a dedicated taxonomy for communication in business–IT alignment. This would greatly enhance our understanding of communication during the alignment process and would afford a universal approach whereby business–IT related communication could be assessed.

8.6.2   *Benchmarking Communication in Business–IT Alignment*

Should the assessment method developed in this thesis be adopted by industry and more assessments be made, the accumulated data could then be used to compare companies with each other. However, the contextual and situational settings would probably differ between companies; for example, the size, turnover, product spectrum, and industry selected will vary. Nevertheless, given enough data to form clusters of companies according to product, industry sector, or size of company, such data could likely be used for benchmarking purposes.

Future research could help in this effort by using the CAMI method to assess communication in different industry settings. This would provide the data needed for benchmarking measures to accrue over time.

8.6.3   *Other Approaches to Assess Communication*

This thesis opted to use the maturity grid-based approach to assess communication. Although well argued and supported, other complementary approaches do exist. For example, Hargie and Tourish (2009) outline, among others, interviews, observation, critical incident analysis, focus groups, checklists and diary

studies. Each of these methods afford different levels of analysis and has its own strengths and weaknesses (Creswell, 2007; Patton, 2001).

Future work could compare and contrast the method proposed in this thesis with these alternative methods, and may even explore different combinations of methods. That said, the original requirements stipulated for an assessment method (see § 5.2) would need to be adhered to. In addition, these other methods would afford different methodological and epistemological assumptions, some of which may overcome the limitations of this thesis while others may not. Therefore, researchers would need to evaluate the methods carefully before application.

8.6.4 *Data Analysis Process (Delta Calculations)*

This thesis employed a somewhat unorthodox approach to compare the differences between the perceptions and expectations of the business and IT personnel on communication in an organisation (see § 6.2.2). In particular, it calculated the 'distance' (or then delta) between the mean scores for the current and desired maturity of each factor for business and IT.

Future research could employ different statistical and, perhaps, non-statistical approaches for the comparison process. It would be interesting to observe whether other approaches yield different results and/or other insights into the data. For example, Maier (2007), on whose work this thesis is based, opted to perform a traditional gap analysis on the captured data. However, researchers should be careful to ensure that they make the correct comparisons and that their findings correspond with the intent of the assessment.

8.6.5 *Assessment Triggers and Outcomes*

During the case study conducted at the public sector organisation, this thesis did not ascertain whether the assessment conducted led to business–IT alignment improvements in the organisations visited. It also did not quantify the change interventions that were needed to improve the organisation's communication situation.

Future research could explore, firstly, the interrelationship between the assessment itself and the outcomes it may produce. This would require a significant investment in time, since some change interventions might only yield results long after implementation. Therefore, longitudinal studies or even replicative

studies might be required. Secondly, future research could explore the change interventions themselves. What change interventions are required to improve a certain factor? While this thesis did not recommended interventions for each factor, literature does exist that offers some suggestions for most of them.

This thesis prescribed that a particular trigger would initiate the necessity for an organisation to perform an assessment. Future research could explore these triggers in more depth to (i) determine those triggers that are more likely to occur, and (ii) to offer different examples of triggers within each category. Additionally, future research could attempt to develop a health-check that organisations could perform to indicate to them the necessity for performing an assessment (Luftman, 2003; Reich & Benbasat, 2000; Coughlan et al., 2005).

8.6.6 *External Consultancy*

As delineated in Chapter 1, this study focused on human communication between business and IT personnel across the internal reporting lines in an organisation, forming part of the social dimension of business–IT alignment. Thus, external consultancy teams were excluded whom may upon request interface with an organisation's business and/or IT personnel. As result, communication between business consultants and internal business staff, and IT consultants and internal IT staff were neither considered nor addressed.

While excluded from the scope of the study, external consultancy is becoming more common place in many organisations worldwide. Although the CAMI method does not explicitly cater for the unique communication that may occur between consultants and internal staff; it does hold the promise that it could cater for it. That said, some of the factors that have been identified and included in the method might not be applicable to this form of communication. Therefore, future research could explore external consultancy in more detail and verify whether the existing method already addresses it sufficiently. In the event that it does not, research could be performed to determine what distinct factors would need to be introduced to the method; thereby to extent it into the external consultancy domain.

8.7 PUBLICATIONS STEMMING FROM THIS RESEARCH

The following publications have resulted directly from the work in this thesis:

- Coertze, J. & Von Solms, R. (2015a). A Maturity Grid-Based Assessment Method for Communication in Business-IT Alignment. *MIS Quarterly*. Submitted on *15 October 2015*.

- Coertze, J. & Von Solms, R. (2015b). Towards a Cybernetics-Based Communication Framework for IT Governance. In *Proceedings of the 48ᵗʰ Hawaii International Conference on System Sciences*. IEEE

- Coertze, J. & Von Solms, R. (2013a). The Board and CIO: The IT Alignment Challenge. In *Proceedings of the 47ᵗʰ Hawaii International Conference on System Sciences*. IEEE

Some publications also resulted from the preliminary investigations and argumentation for this research:

- Coertze, J. & Von Solms, R. (2014). The Murky Waters of IT Governance. In *Proceedings of the Information Security for South Africa Conference*. IEEE

- Coertze, J. & Von Solms, R. (2013b). The Board and IT Governance: A Replicative Study. *African Journal of Business Management*, *7*(34)

8.8 CONCLUSION

Business–IT alignment deals with the way in which organisations can optimally apply IT in an appropriate and timely way and in harmony with their business strategies, goals and needs (Luftman, 2003). To facilitate such harmony, communication between business and IT personnel is vital from a social perspective (Coughlan et al., 2005).

Several studies recognise communication as a critical factor in business–IT alignment and it is thus a major concern. Despite this, there is at present no satisfactory method by which organisations can capture, analyse and assess communication and its related processes in this context (Coughlan et al., 2005). Without clear guidance in this regard, organisations are likely to continue experiencing communication problems while trying to achieve proper alignment and may have no way of identifying, analysing, assessing or remedying them.

To this end, this thesis reported on research undertaken to develop and validate a method for assessing communication within the business–IT alignment context. The method, termed the 'Communication Alignment Maturity Improvement (CAMI) method', drew on the concept of a maturity grid, borrowed from

the fields of software development (Paulk et al., 1995; Radice et al., 1985), quality management (Crosby, 1996, 1979), and, more specifically, engineering design (Maier et al., 2006; Moultrie, 2004).

The method and its underpinning model presented in this thesis offer a novel way of assessing communication. They allow for perceptions and expectations on factors influencing it to be elicited in a forum that is accessible to both business and IT personnel in modern-day organisations. The method also integrates the existing literature from multiple domains, including engineering, communication, and management.

By adopting a systemic perspective, a multitude of factors that influence communication during the daily work practices of both business and IT personnel are used to assess the current state of communication and the desired situation, thereby rendering an intangible subject more comprehensible.

This novel assessment method has been demonstrated and evaluated at a public sector organisation, namely, a district municipality, in South Africa using a case study. During this case study, in-depth data was gathered and findings detailed. Accordingly, this study showed that the method is feasible for application in industry and that it does exhibit utility. Hence, the method addressed the requirements for acceptance, as set out by the design science paradigm (see Chapter 4) and the established objectives for a valid assessment (see Chapter 5). Consequently, it may be considered a valid contribution.

In essence, organisations can use this maturity grid-based method as a diagnostic tool for identifying communication difficulties or problem areas quickly. Moreover, it will also allow them to gauge where improvements might be necessary and possible, which is vital if this method is to have a positive effect ultimately on the overall alignment process.

Part VI

APPENDICES

PRELIMINARY 49 FACTORS FOR THE CAMI METHOD

	ENVIRONMENTAL CATEGORY
1.1	**Social norms:** *The rules, customs or standards of behaviour accepted as normal by members of the public and to which individuals are expected to conform (e.g., honesty, respect, integrity etc.)*
1.2	**National language:** *The language spoken and written by the majority of the members of the public; this also refers to the official language of the country, as it is recognised and adopted by the government*
1.3	**National culture:** *The current values, beliefs and attitudes that characterise members of the public and guide their practices; typically captured in the Constitution of a country*
1.4	**Geography:** *The area(s) within which the organisation operates or sells its products/services (e.g., local — single location, local — dispersed, local and international etc.)*
1.5	**Legislation:** *The rules and policies instituted by the government that govern the way in which enterprises operate; typically for a specific activity (e.g., POPI, ECTA, Sarbanes-Oxley)*
1.6	**Authorities and agencies:** *The official institutions or organisations, often created by the government, which are responsible for managing a particular duty or service (e.g., ICASA, DPSA)*
1.7	**Rules and regulations:** *The written governmental orders, having the force of law, employed to control, direct or manage particular organisational activities (e.g., The King III Report)*
1.8	**Standards:** *The articulation of and compliance with both business standards, such as ISO 9001, and IT standards, such as ISO/IEC 27002 and ISO/IEC 38500 (e.g., non-existent or not enforced, defined and enforced at functional level, defined and enforced throughout an organisation)*
1.9	**Industry sector:** *The industry within which the organisation operates (e.g., manufacturing, agriculture, construction etc.)*

1.10	**Economy:** *The state of the country or region's production, consumption of goods and services and the supply of money.*
1.11	**Technological developments:** *The advances, improvements, and alterations being made to technology in the market within which the organisation trades.*
1.12	**Market trends:** *The (short- or long-term) general developments or changes being experienced in the market within which the organisation trades.*
1.13	**Suppliers:** *The vendors who provide goods or services to the organisation.*
1.14	**Customers:** *The persons who buy goods or services from the organisation.*
	ORGANISATIONAL CATEGORY
2.1	**Corporate culture:** *The current values, beliefs and attitudes that characterise an organisation and guide its practices; typically captured in the mission or vision statement of an organisation.*
2.2	**Organisational demographics:** *The socio-economic characteristics of an organisation's personnel expressed statistically (e.g., average age, education level)*
2.3	**Management style:** *The approach used by the organisation to manage its initiatives, projects and personnel (e.g., command and control, consensus-based, results-based, profit/value-based, relationship-based)*
2.4	**Organisational structure:** *The type of management structure employed by the organisation to manage both the business and IT personnel (e.g., top-down, matrix, autonomous)*
2.5	**IT governance archetype:** *The combinations of people who have either decision rights or input rights to IT decisions (e.g., business monarchy, IT monarchy, feudal, federal, IT duopoly, anarchy)*
2.6	**IT division location:** *The physical location of the IT division and personnel in relation to the rest of the organisation (e.g., centralised, decentralised, federated/hybrid) and the extent to which this promotes co-operation between the business and IT personnel.*
2.7	**IT history:** *The performance track record of IT within the organisation (e.g., they never deliver on time, or on budget...!)*
2.8	**Perception of the role and strategic use of IT:** *How the executive management views IT's contribution to the organisation (e.g., the cost of doing business, an asset, a fundamental enabler, a fundamental driver, a business partner)*

2.9	**IT involvement in business strategic planning:** *The degree of involvement of IT personnel during the strategic planning of the business strategy*
2.10	**Business involvement in IT strategic planning:** *The degree of involvement of business personnel during the strategic planning of the IT strategy.*
2.11	**Reporting level of IT department head:** At which management level the head of the IT department (e.g., CIO) operates, and to whom s/he immediately reports in the organisation (e.g., the CEO, CFO, COO etc.)
2.12	**Work ethics:** *The values and beliefs held by the personnel in an organisation, and whereby they approach their daily work activities (e.g., hard work, diligence, moral benefit)*
2.13	**Organisational procedures:** *The set of policies and procedures that define, regulate and inform personnel on how they should operate and perform specific work activities.*
2.14	**Architectural settings:** *The nature, purpose, prominence and distribution of business and IT applications and systems throughout the organisation.*
2.15	**Organisational education/learning:** *The methods (e.g., intra-nets, bulletin boards, education, meetings, e-mail) in place to promote the education/learning of experiences, problems, objectives and critical success factors within the organisation.*
2.16	**Communication protocol:** *The communication protocol (ease of access, familiarity of stakeholders) used throughout the whole organisation; this also pertains to the communication style used (e.g., one-way, two-way, formal or informal, flexible)*
BUSINESS-IT FUNCTION (TEAM) CATEGORY	
3.1	**Cooperation:** *The extent to which a trust, confidence, cultural, social and political environment exists across IT and business units in the organisation (e.g., minimal interaction, transactional relationship, approaching informal etc.)*
3.2	**Leadership style:** *The manner and approach used by the business and IT leaders in providing direction, implementing plans and motivating their respective personnel (e.g., authoritarian, paternalistic, transactional, transformational etc.)*
3.3	**Competition:** *The extent to which the business and IT domains are competing for the same resources (e.g., human resources, funding, physical equipment etc.)*

3.4	**Team spirit:** *The extent to which a feeling of camaraderie exists among the members within the domain, enabling them to cooperate and work well together.*
3.5	**Group norms:** *The unspoken, and often unwritten, set of informal rules that govern the behaviours of individuals within the domain.*
3.6	**Domain language, tasks & projects:** *The specific constructs, jargon and instruments used within the business and IT domains. This also refers to the nature and type of tasks and projects performed by each domain.*
3.7	**Domain culture:** *The extent to which IT personnel view themselves as being part of the organisation and assisting their business personnel counterparts; also, how business personnel perceive IT personnel involvement in their own activities (e.g., a them-and-us culture, one-team culture)*
3.8	**Cross-domain (mutual) understanding:** *The extent to which IT personnel understand the organisation's business environment (e.g., its customers, competitors, processes, partners/alliances); this also pertains to the extent to which business personnel understand the IT environment (e.g., its current and potential capabilities, systems, services, processes)*
3.9	**Knowledge sharing:** *The extent to which there is knowledge sharing (intellectual understanding and appreciation of the problems/opportunities, tasks, roles, objectives, priorities, goals, direction, etc.) between IT and business personnel.*
3.10	**Role descriptions & contacts:** *The extent to which clarity and understanding exist of both business and IT personnel's roles in the organisation and with whom they should co-operate on particular issues.*
3.11	**Liaison(s) breadth & effectiveness:** *The use, role and effectiveness of IT and business liaisons (e.g., CIO's, IT oversight committee, IT steering committee) to facilitate the transfer of IT knowledge to the business personnel and business knowledge to the IT personnel.*
3.12	**Communication protocol:** *The communication protocol (ease of access, familiarity of stakeholders) used between the business and IT personnel; this also pertains to the communication style (e.g., one-way, two-way, formal or informal, flexibility)*
PERSONNEL CATEGORY	
4.1	**Job satisfaction:** *The extent to which an employee is content with his/her job, the nature of work and style of supervision (e.g., whether they like the job, or individual aspects or facets of the job etc.)*

4.2	**Job motivation:** *The extent to which an employee is motivated to be continually interested and committed to his/her job, role, and to make an effort to attain pre-stipulated goals.*
4.3	**Job commitment:** *The extent to which an employee feels responsible for the mission and objectives of the organisation; this also refers to an employee's psychological attachment to the organisation.*
4.4	**Employee personality:** *The combination of characteristics or qualities that form an employee's distinctive character (e.g., his/her way of behaving, as well as the feelings, and the thoughts of the employee)*
4.5	**Personal attitude, beliefs & perceptions:** *The combination of how an individual sees and interprets work situations, as well as behaves towards such situations.*
4.6	**Cognitive styles:** *The preferred way in which an individual thinks, perceives and remembers information (e.g., the employee prefers to adapt and use time-honoured techniques; the employee prefers to be innovative)*
4.7	**Experience, skills & competence:** *The degree of business and IT experience, skills and competencies held by the business and IT personnel respectively.*

B

LIST OF DELPHI STUDY PARTICIPANTS

No.	Role / Position	Sector	Years' Exp.	Education	International	Last Round
1	Professor in Internal Audit	Education	25+	DCom: Internal Audit		Yes
2	Professor in Management Consulting & ICT Consultant	Education	26	PhD: Computer Sciences, DBA		Yes
3	Director at International Consulting Firm	IT Consulting	22	CISA, CISM, CRISC		Yes
4	Managing Director of IT Firm / IT Researcher	IT Consulting	20	MBA		Yes
5	Chief Information Officer (CIO)	Public Sector	15	MTech: IT		Yes
6	Professor in Business Management	Education	10	PhD: Commerce in Business Management		Yes
7	Postdoctoral Research Fellow in ICT	Education	6	PhD: Information Systems	Yes	Yes
8	Digital Transformation and Board Governance Specialist	Management Consulting	5	PhD: IT, MBA, Harvard Corporate Governance	Yes	Yes
9	Business Advisor	Management Consulting	5	-		Yes
10	Financial Planning Consultant	Education	15+	MCom Financial Planning, CFP		
11	Professor in Information Systems	Education	15	PhD: IT		
12	Advisory Board Member, Technology Researcher, Advisor	IT Consulting	15	PhD: Information Systems		
13	Chief Information Security Officer (CISO)	Automotive	13	BCom, CISA		
14	Director of ICT Services	Education	10	-		
15	Commercial Engineer	Automotive	10	MPhil: Accounting		
16	Lecturer in Business Management	Education	10	BCom Honours		
17	Technical Support Unit & Acting Programme Director	Construction	8	MBA		
18	Public Sector Technical Specialist at International Consulting Firm	IT Consulting	6	BCom, CA		
19	Director of ICT	Education	5	PhD: IT		
20	Manager at International Consulting Firm	IT Consulting	5	PhD: IT, CGEIT		

C

	ENVIRONMENTAL CATEGORY
1.1	**Legislation:** *Degree to which the organization adheres to and is knowledgeable about the rules and policies that govern the way it should operate; typically for a specific activity (e.g., POPI, ECTA, Sarbanes-Oxley)*
1.2	**Standards:** *Degree to which the organization adheres to and is knowledgeable about both business standards, such as ISO 9001, and IT standards, such as ISO/IEC 27002 and ISO/IEC 38500.*
1.3	**Best practices & guidelines:** *Degree to which the organization adheres to and is knowledgeable about both governance best practices, such as King III and OECD, and IT best practices, such as COBIT 5 and TOGAF.*
1.4	**Customers, products & services:** *Degree to which the organization is knowledgeable and shares information about the needs and demands of customers, service and\or products.*
1.5	**Technological developments:** *Degree to which the organization is knowledgeable and shares information about the advances, improvements, and alterations to technology in the market.*
	ORGANISATIONAL CATEGORY
2.1	**Business involvement in IT strategic planning:** *Degree business involvement during the strategic planning of the IT strategy.*
2.2	**IT involvement in business strategic planning:** *Degree IT involvement during the strategic planning of the business strategy.*
2.3	**Management style:** *Degree to which the organization understands how it can change the management style (e.g., command and control, consensus-based, results-based, profit/value-based, relationship-based) to achieve clear communication.*

2.4	**Perception of the role and strategic use of IT:** *How the board and executive management view IT's contribution to the organization (e.g., the cost of doing business, an asset, a fundamental enabler, a fundamental driver, a business partner)*
2.5	**Corporate culture:** *Degree to which current values, beliefs, and attitudes of the organization promote free and open communication; typically captured in the mission or vision statements.*
2.6	**Organisational structure:** *Degree to which the organization understands how it can change the organisational structure used to manage the business and IT functions (e.g., top-down, matrix, autonomous) to achieve clear communication.*
2.7	**Reporting level of IT function head:** *At which management level the head of the IT function (e.g., Chief Information Officer - CIO) operates, and to whom s/he immediately reports (e.g., the CEO, CFO, etc.)*
2.8	**The board and executive management's IT 'savviness':** *Degree to which the board, executive managers and supporting management are knowledgeable about IT and exhibit digital leadership.*
2.9	**IT governance archetype (Input rights to IT decisions):** *Degree to which the organization understands how it can change the combination of people who have either decision rights or input rights to IT decisions to achieve clear communication.*
	BUSINESS-IT FUNCTION (TEAM) CATEGORY
3.1	**Leadership style:** *Degree to which the business and IT leaders promote free and open communication when providing direction, implementing plans and motivating personnel.*
3.2	**Function (Team) initiatives:** *Degree to which the business functions drive IT initiatives and visa versa.*
3.3	**Cooperation:** *Degree to which cooperation exists between the business and IT functions.*
3.4	**Communication style and ease of access:** *Degree of ease with which the business and IT functions interact and how familiar they are with each other's roles.*
3.5	**Liaison(s) breadth & effectiveness**: *Degree to which business and IT liaisons (e.g., CIO's, IT oversight committee, IT steering committee) are used to effectively transfer knowledge between the business and IT functions and vice versa.*

3.6	**Cross-domain (mutual) understanding:** *Degree to which the business functions understand the IT environment (e.g., its current and potential capabilities, systems, services, processes) and visa versa.*
3.7	**Knowledge sharing:** *Degree to which there is knowledge sharing (intellectual understanding and appreciation of the problems/opportunities, tasks, roles, objectives, priorities, goals, direction, etc.) between the business and IT functions.*
	PERSONNEL CATEGORY
4.1	**Experience, skills & competence:** *How often do employees receive training and attend workshops to improve their work experience, communication skills and build competencies.*
4.2	**Job commitment:** *Degree to which employees feel responsible for the mission and objectives of their function and the municipality; also, whether they are committed to communicating with others.*
4.3	**Employee personality:** *Degree to which the employees' distinctive character (e.g., their way of behaving, as well as their feelings, and their thoughts) promotes free and open communication.*
4.4	**Job motivation:** *Degree to which an employee is motivated and interested in his/her job or role; and, communicating with others.*

FINAL VERSION OF CAMI METHOD

Factor #	Factor / Process	Definition / Description	Maturity Levels				Current	Desired
			1 — No Action	2 — Change of Action	3 — Change of Action & Attitude	4 — Continuous Adaption		
		ENVIRONMENTAL CATEGORY						
1.1	Legislation	*Degree to which the organization adheres to and is knowledgeable about the rules and policies that govern the way it should operate; typically for a specific activity (e.g., POPI, ECTA, Sarbanes-Oxley)*	We seldom think about them.	We somewhat know about them, but do not know how to apply them.	We know about them, but only apply them partially.	We regularly and continuously talk about them. We regularly adjust our business models and processes to align with them.	[ ]	[ ]
1.2	Standards	*Degree to which the organization adheres to and is knowledgeable about both business standards, such as ISO 9001, and IT standards, such as ISO/IEC 27002 and ISO/IEC 38500.*	We seldom think about them.	We somewhat know about them, but do not know how to apply them.	We know about them, but only apply them partially.	We regularly and continuously talk about them. We regularly adjust our business models and processes to align with them.	[ ]	[ ]
1.3	Best Practices & guidelines	*Degree to which the organization adheres to and is knowledgeable about both governance best practices, such as King III and OECD, and IT best practices, such as COBIT 5 and TOGAF.*	We seldom think about them.	We somewhat know about them, but do not know how to apply them.	We know about them, but only apply them partially.	We regularly and continuously talk about them. We regularly adjust our business models and processes to align with them.	[ ]	[ ]
1.4	Customers, services & products	*Degree to which the organization is knowledgeable and shares information about the needs and demands of customers, service and/or products.*	We seldom think about them.	We somewhat know them, and only reactively talk about them.	We know and proactively talk about them. Yet, we only partially align our business models and processes to them.	We regularly and continuously talk about them. We regularly adjust our business models and processes to align with them.	[ ]	[ ]
1.5	Technological developments	*Degree to which the organization is knowledgeable and shares information about the advances, improvements and alterations to technology in the market.*	We seldom think about them.	We somewhat know about them, and only reactively talk about them.	We know and proactively talk about them. Yet, we only partially align our business models and processes to them.	We regularly and continuously talk about them. We regularly adjust our business models and processes to align with them.	[ ]	[ ]

ORGANISATIONAL CATEGORY

#	Category	Description	Level 1	Level 2	Level 3	Level 4
2.1	**Business involvement in IT strategic planning**	*Degree business involvement during the strategic planning of the IT strategy.*	We do not involve them and do not think it is necessary.	We only involve them when IT asks for it to fulfill or enable specific processes. Their involvement is purely transactional.	We proactively involve them to learn from them, and to align and improve IT's processes. [ ]	We regularly and continuously involve them. The business and IT functions quickly and intuitively adapt their strategies and processes to align. [ ]
2.2	**IT involvement in business strategic planning**	*Degree IT involvement during the strategic planning of the business strategy.*	We do not involve them and do not think it is necessary.	We only involve them when municipal management asks for it to fulfill or enable specific processes. Their involvement is purely transactional.	We proactively involve them to learn from them, and to align and improve the municipal processes. [ ]	We regularly and continuously involve them. The business and IT functions quickly and intuitively adapt their strategies and processes to align. [ ]
2.3	**Management style**	*Degree to which the organization understands how it can change the management style (e.g., command and control, consensus-based, results-based, profit/value-based, relationship-based) to achieve clear communication.*	We seldom think about it.	We somewhat know about it, but only change it to correct mistakes.	We know and proactively talk about it. We often change it to achieve clear communication. [ ]	We regularly and continuously talk about it. We intuitively change it to achieve clear communication processes regularly. [ ]
2.4	**Perception of the role and strategic use of IT**	*How the board and executive management view IT's contribution to the organization (e.g., the cost of doing business, an asset, a fundamental enabler, a fundamental driver, a business partner)*	They view IT as purely a cost of doing business.	They view IT as a fundamental enabler of municipal processes. IT's role remains purely transactional and reactive.	They view IT as a fundamental driver for change. Some inequality exists between the municipal and IT's functions' importance. [ ]	They view IT as a business partner and asset. The business and IT functions co-exist and align their processes regularly for maximum value. [ ]
2.5	**Corporate culture**	*Degree to which current values, beliefs and attitudes of the organization promote free and open communication; typically captured in the mission or vision statements.*	We have a 'them-and-us' culture. Each function looks purely after its own tasks and processes.	We encourage free and open communication, but we often fail to adhere to it.	We proactively seek and express free and open communication within our strategies and goals. [ ]	We assume free and open communication takes place as part of our corporate identity. It is an underlying assumption of delivering our services. [ ]
2.6	**Organisational structure**	*Degree to which the organization understands how it can change the organisational structure used to manage the business and IT functions (e.g., top-down, matrix, autonomous) to achieve clear communication.*	We seldom think about it.	We somewhat know about it, but only change it to correct mistakes.	We know and proactively talk about it. We often change it to achieve clear communication. [ ]	We regularly and continuously talk about it. We intuitively change it to achieve clear communication processes regularly. [ ]
2.7	**Reporting level of IT function head**	*At which management level the head of the IT function (e.g., Chief Information Officer - CIO) operates, and to whom s/he immediately reports (e.g., the CEO, CFO, etc.)*	We do not have a dedicated head of IT.	We view our head of IT as merely a technical position. S/he resides purely within the IT function.	We view our head of IT as a management position. We do not consider it equal to other executives, either the CFO or COO. [ ]	We view our head of IT as a business partner. We consider it equal to other executives, such as the CFO. S/he reports directly to the municipal manager. [ ]

#	Attribute	Description					☐	☐
2.8	The board & executive management's IT savviness	*Degree to which the board, executive managers and supporting management are knowledgeable about IT and exhibit digital leadership.*	They seldom think about IT and exhibit little to no digital leadership.	They somewhat know about IT, but only exhibit digital leadership when something goes wrong.	They know about IT and proactively exhibit digital leadership. Yet, they do not afford IT the same level of attention as other areas.	They regularly and continuously engage with IT and exhibit strong digital leadership skills. They view IT as important and often champion IT initiatives.	☐	☐
2.9	IT governance archetype (input rights to IT decisions)	*Degree to which the organization understands how it can change the combination of people who have either decision rights or input rights to IT decisions to achieve clear communication.*	We seldom think about it.	We somewhat consider the arrangement, but only change it when required.	We proactively consider the arrangement. We often change it to achieve clear communication.	We regularly and continuously consider the arrangement. We intuitively change it to achieve clear communication.	☐	☐
	BUSINESS-IT FUNCTION (TEAM) CATEGORY							
3.1	Leadership style	*Degree to which the business and IT leaders promote free and open communication when providing direction, implementing plans and motivating personnel.*	They follow an authoritarian leadership style; forcing their plans onto others.	They follow a transactional leadership style; reactively promoting free and open communication.	They follow a transformational leadership style; proactively promoting free and open communication.	They regularly and continuously promote free and open communication. It is intuitively part of their leadership roles and activities.	☐	☐
3.2	Function (Team) initiatives	*Degree to which the business functions drive IT initiatives and visa versa.*	Our business functions drive IT initiatives.	Our business functions mainly drive IT initiatives, but some spontaneous IT initiatives exist.	Our IT function(s) drive some business initiatives for change, but the business functions remain in charge.	Our functions drive each others' initiatives. We co-exist and align our initiatives regularly for maximum value.	☐	☐
3.3	Cooperation	*Degree to which cooperation exist between the business and IT functions.*	We solely look after our own tasks, but do not cooperate.	We only cooperate when they ask for it. Our cooperation remains transactional in nature.	We proactively cooperate to align and improve the results of our tasks.	We intuitively work together and share our thoughts and skills.	☐	☐
3.4	Communication style & ease of access	*Degree of ease with which the business and IT functions interact and how familiar they are with each others roles.*	Our communication is mainly driven from the business functions (one-way).	Our communication is emerging two-way between us, but remains formal, transactional and reactive.	Our communication is two-way between us. We proactively and somewhat informally talk with each other.	We communicate regularly and continuously among us. It is becoming quite flexible.	☐	☐
3.5	Liaison(s) breadth & effectiveness	*Degree to which business and IT liaisons (e.g., CIO's, IT oversight committee, IT steering committee) are used to effectively transfer knowledge between the business and IT functions and visa versa.*	We do not use them or only use them when needed.	We use them as our primary link between our personnel. Yet, they only help with knowledge transfer on a reactive basis.	We proactively and often use them to transfer knowledge between our personnel.	We continuously use them to build relationships and transfer knowledge between our personnel.	☐	☐
3.6	Cross-domain (mutual) understanding	*Degree to which the business functions understand the IT environment (e.g., its current and potential capabilities, systems, services, processes) and visa versa.*	We lack cross-domain (mutual) understanding and do not think it is necessary.	We have limited (mutual) understanding between us. Only our 'managers' understand both functions.	We have good (mutual) understanding between us. We proactively seek better understanding among us.	We have and encourage mutual understanding, and intuitively seek to improve it.	☐	☐

3-7	Knowledge sharing	*Degree to which there is knowledge sharing (intellectual understanding and appreciation of the problems/opportunities, tasks, roles, objectives, priorities, goals, direction, etc.) between the business and IT functions.*	We lack of knowledge sharing and do not think it is necessary.	We are sharing some knowledge between us. It remains structured and reactive in nature.	We proactively share knowledge between us. Still, it is mainly about key processes and little beyond that.	We regularly and continuously share knowledge. It has become intuitive to us.	[] []

PERSONNEL CATEGORY

4-1	Experience, skills & competence	*How often do employees receive training and attend workshops to improve their work experience, communication skills and build competencies.*	We do not receive such training or workshops, but do not think it is necessary.	Only if we ask for it; it remains mainly our duty to gain such skills and experience on our own.	We proactively seek and regularly receive such training and attend workshops. It is, however, still mostly our own duty.	We regularly and continuously receive such training and attend workshops. They form part of our competency evaluations.	[] []
4-2	Job Commitment	*Degree to which employees feel responsible for the mission and objectives of their function and the municipality; also, whether they are committed to communicating with others.*	We are aware of our commitment to the function and the municipality. Yet, we do not feel personally responsible for communicating with others.	We understand our commitment to the function and the municipality. Yet, we only feel somewhat responsible to engage and talk with others.	We do our jobs, and also proactively engage and talk with others.	We are permanently committed to our work and engaging with others. We intuitively encourage others to do the same.	[] []
4-3	Employee personality	*Degree to which the employees' distinctive character (e.g., their way of behaving, as well as their feelings, and their thoughts) promotes free and open communication.*	We each behave on our own accord, irrespective of its impact on communication.	We acknowledge our behaviors, feelings and thoughts. Yet, we only change them when required.	We proactively consider and change our own behaviors, feelings and thoughts. We ensure that they promote communication.	We continuously check and adapt our own behaviors, feelings. We ensure they always promote free and open communication.	[] []
4-4	Job Motivation	*Degree to which an employee is motivated and interested in his/her job or role; and, communicating with others.*	We have little motivation and interest. We only work and communicate out of fear.	We have some motivation and interest. Yet, we only work and communicate for rewards or to please others.	We have strong motivation and interest. We proactively work and communicate since it assists others (even for no reward).	We are intuitively motivated and interested. We continuously work and communicate, since it brings inherent joy to us and others.	[] []

CAMI METHOD SURVEY

Background Information

DISCLAIMER: Your participation in this exercise and your individual responses will remain confidential and anonymous. We will neither divulge such information to any outside party, nor identify it with you without your written permission.

Thank you for agreeing to take part in this exercise. It forms part of a Ph.D. project at the Nelson Mandela Metropolitan University. The aim is to gain insight into how an organisation can assess and improve its communication between the personnel residing in the business and any ICT-related functions (business/IT alignment).

Please try to answer all the questions in this survey to the best of your ability - given the matter at hand. Note that your individual responses will remain anonymous and highly confidential. We will solely use them to obtain your thoughts, views and perception of communication between the different functions in your municipality.

It will take approximately 20-30 minutes to complete this survey.

The survey has three parts:

- **Part 1:** Collects basic departmental information (we will use this solely to identify the specific function within which you operate)

- **Part 2:** Collects your thoughts, views and perception on the inter-departmental communication between your business function and ICT or vice versa within the municipality.

- **Part 3:** Collects your feedback on this survey, to help us improve its format and make it more understandable and usable in future.

Instructions:

1. Please carefully read and respond to each of the questions.

2. Several questions require you to select the current and desired maturity of a factor and/or process within your organisation. These selections depend on the maturity level descriptions found in the CAMI model (or grid). You should have received this model (or grid) separately. Please consult it before continuing with this survey.

3. To get further information or to deal with any questions, please contact the primary researcher Mr Jacques J. Coertze by email at Jacques.Coertze2@nmmu.ac.za.

Once we have received your response(s) and those from a few other colleagues, we will collate and analyse the findings, and then prepare a final report to management.

THANK YOU IN ADVANCE FOR YOUR PARTICIPATION!

Step 1: Please state (with a cross) whether you work predominantly closer in/with the business functions (e.g., tourism, finance, etc.) or ICT function(s) in your municipality?

Business	ICT
[ ]	[ ]

Step 2: Listed below is a list of 25 key factors, grouped into four categories. We have found that these factors may affect business/ICT-related communication in a municipality. Each of these factors have a definition / description and four maturity levels. These four maturity levels represent growth and ripeness. They range from a lowest level (1) all the way to the highest level (4). The lowest level represents an initial stage of no action. Meanwhile, the highest level suggests an advanced stage of continuous adaptation.

Using this list of factors, rate each factor's current and desired maturity. That is, state where you believe the municipality 1) currently resides and 2) should be in future. To complete the rating exercise, write-down the maturity level number(s) within the last two columns.

Please select the maturity levels from your own function's perspective.

Level of Influence	Factor #	Factor / Process	Definition / Description	Maturity Levels				Current	Desired
				1 No Action	**2** Change of Action	**3** Change of Action & Attitude	**4** Continuous Adaption		
1. Environment	1.1	Legislation	*Degree to which the municipality adheres to and is knowledgeable about the rules and policies that govern the way it should operate; typically for a specific activity (e.g., POPI, ECTA, Sarbanes-Oxley)*	We seldom think about them.	We somewhat know about them, and do not know how to apply them.	We know about them, but only apply them partially.	We regularly and continuously talk about them. We regularly adjust our business models and processes to align with them.	[ ]	[ ]
	1.2	Standards	*Degree to which the municipality adheres to and is knowledgeable about both business standards, such as ISO 9001, and ICT standards, such as ISO/IEC 27002 and ISO/IEC 38500.*	We seldom think about them.	We somewhat know about them, and do not know how to apply them.	We know about them, but only apply them partially.	We regularly and continuously talk about them. We regularly adjust our business models and processes to align with them.	[ ]	[ ]
	1.3	Best Practices & guidelines	*Degree to which the municipality adheres to and is knowledgeable about both governance best practices, such as King III and OECD, and ICT best practices, such as COBIT 5 and TOGAF.*	We seldom think about them.	We somewhat know about them, and do not know how to apply them.	We know about them, but only apply them partially.	We regularly and continuously talk about them. We regularly adjust our business models and processes to align with them.	[ ]	[ ]
	1.4	Customers, services & products	*Degree to which the municipality is knowledgeable and shares information about the needs and demands of customers, service and/or products.*	We seldom think about them.	We somewhat know them, and only reactively talk about them.	We know and proactively talk about them. Yet, we only partially align our business models and processes to them.	We regularly and continuously talk about them. We regularly adjust our business models and processes to align with them.	[ ]	[ ]

2. Organisation

#		Description					[ ]	[ ]
1.5	Technological developments	*Degree to which the municipality is knowledgeable and shares information about the advances, improvements and alterations to technology in the market.*	We seldom think about them.	We somewhat know about them, and only reactively talk about them.	We know and proactively talk about them. Yet, we only partially align our business models and processes to them.	We regularly and continuously talk about them. We regularly adjust our business models and processes to align with them.	[ ]	[ ]
2.1	Business involvement in ICT strategic planning	*Degree of involvement of the business function(s) during the strategic planning of the ICT strategy.*	We do not involve them and do not think it is necessary.	We only involve them when ICT asks for it to fulfil or enable specific processes. Their involvement is purely transactional.	We proactively involve them to learn from them, and to align and improve ICT's processes.	We regularly and continuously involve them. The business and ICT functions quickly and intuitively adapt their strategies and processes to align.	[ ]	[ ]
2.2	ICT involvement in municipal strategic planning	*Degree of involvement of the ICT function(s) during the strategic planning of the municipal strategy.*	We do not involve them and do not think it is necessary.	We only involve them when municipal management asks for it to fulfil or enable specific processes. Their involvement is purely transactional.	We proactively involve them to learn from them, and to align and improve the municipal processes.	We regularly and continuously involve them. The business and ICT functions quickly and intuitively adapt their strategies and processes to align.	[ ]	[ ]
2.3	Management style	*Degree to which the municipality understands how it can change the management style (e.g., command-and-control, consensus-based, results-based, profit/value-based, relationship-based) to achieve clear communication.*	We seldom think about it.	We somewhat know about it, but only change it to correct mistakes.	We know and proactively talk about it. We often change it to achieve clear communication.	We regularly and continuously talk about it. We intuitively change it to achieve clear communication processes regularly.	[ ]	[ ]
2.4	Perception of the role and strategic use of ICT	*How the council and municipal management view ICTs contribution to the municipality (e.g., the cost of doing business, an asset, a fundamental enabler, a fundamental driver, a business partner)*	They view ICT as purely a cost of doing business.	They view ICT as a fundamental enabler of municipal processes. ICT's role remains purely transactional and reactive.	They view ICT as a fundamental driver for change. Some inequality exists between the municipal and ICT's functions' importance.	They view ICT as a business partner and asset. The business and ICT functions co-exist and align their processes regularly for maximum value.	[ ]	[ ]
2.5	Corporate culture	*Degree to which current values, beliefs and attitudes of the municipality promote free and open communication; typically captured in the mission or vision statements.*	We have a 'them-and-us' culture. Each function looks purely after its own tasks and processes.	We encourage free and open communication, but we often fail to adhere to it.	We proactively seek and express free and open communication within our strategies and goals.	We assume free and open communication takes place as part of our corporate identity. It is an underlying assumption of delivering our services.	[ ]	[ ]
2.6	Organisational structure	*Degree to which the municipality understands how it can change the organisational structure used to manage the business and ICT functions (e.g., top-down, matrix, autonomous) to achieve clear communication.*	We seldom think about it.	We somewhat know about it, but only change it to correct mistakes.	We know and proactively talk about it. We often change it to achieve clear communication.	We regularly and continuously talk about it. We intuitively change it to achieve clear communication processes regularly.	[ ]	[ ]

	Item	Description				
2.7	Reporting level of ICT function head	*At which management level the head of the ICT function (e.g., CIO) operates, and to whom s/he immediately reports (e.g., the municipal manager, CFO, etc.)*	We do not have a dedicated head of ICT. [ ]	We view our head of ICT as merely a technical position. S/he resides purely within the ICT function. [ ]	We view our head of ICT as a management position. We do not consider it equal to other executives. S/he reports to either the CFO or COO. [ ]	We view our head of ICT as a business partner. We consider it equal to other executives, such as the CFO. S/he reports directly to the municipal manager. [ ]
2.8	The council & management's ICT savviness	*Degree to which the municipal council, manager and supporting management are knowledgeable about ICT and exhibit digital leadership.*	They seldom think about ICT and exhibit little to no digital leadership. [ ]	They somewhat know about ICT, but only exhibit digital leadership when something goes wrong. [ ]	They know about ICT and proactively exhibit digital leadership. Yet, they do not afford ICT the same level of attention as other areas. [ ]	They regularly and continuously engage with ICT and exhibit strong digital leadership skills. They view ICT as important and often champion ICT initiatives. [ ]
2.9	ICT governance archetype (input rights to ICT decisions)	*Degree to which the municipality understands how it can change the combination of people who have either decision rights or input rights to ICT decisions to achieve clear communication.*	We seldom think about it. [ ]	We somewhat consider the arrangement, but only change it when required. [ ]	We proactively consider the arrangement. We often change it to achieve better communication. [ ]	We regularly and continuously consider the arrangement. We intuitively change it to achieve clear communication. [ ]
3.1	Leadership style	*Degree to which the municipal and ICT leaders promote free and open communication when providing direction, implementing plans and motivating personnel.*	They follow an authoritarian leadership style; forcing their plans onto others. [ ]	They follow a transactional leadership style; reactively promoting free and open communication. [ ]	They follow a transformational leadership style; proactively promoting free and open communication. [ ]	They regularly and continuously promote free and open communication. It is intuitively part of their leadership roles and activities. [ ]
3.2	Function / Domain initiatives	*Degree to which the business functions drive ICT initiatives and visa versa.*	Our business functions drive ICT initiatives. [ ]	Our business functions mainly drive ICT initiatives, but some spontaneous ICT initiatives exist. [ ]	Our ICT function(s) drive some business initiatives for change, but the business functions remain in charge. [ ]	Our functions drive each others' initiatives. We co-exist and align our initiatives regularly for maximum value. [ ]
3.3	Cooperation	*Degree to which cooperation exist between the business and ICT functions.*	We solely look after our own tasks, and do not cooperate. [ ]	We only cooperate when they ask for it. Our cooperation remains transactional in nature. [ ]	We proactively cooperate to align and improve the results of our tasks. [ ]	We intuitively work together and share our thoughts and skills. [ ]
3.4	Communication style & ease of access	*Degree of ease with which the business and ICT functions interact and how familiar they are with each others roles.*	Our communication is mainly driven from the business functions (one-way). [ ]	Our communication is emerging two-way between us, but remains formal, transactional and reactive. [ ]	Our communication is two-way between us. We proactively and somewhat informally talk with each other. [ ]	We communicate regularly and continuously among us. It is becoming quite flexible. [ ]

3. Business/ICT Function (Team)

		Description	Level 1	Level 2	Level 3	Level 4				
3.5	Liaison(s) breadth & effectiveness	*Degree to which business and ICT liaisons (e.g., CIO's, ICT oversight committee, ICT steering committee) are used to effectively transfer knowledge between the business and ICT functions and visa versa.*	We do not use them or only use them when needed.	We use them as our primary link between our personnel. Yet, they only help with knowledge transfer on a reactive basis.	We proactively and often use them to transfer knowledge between our personnel.	We continuously use them to build relationships and transfer knowledge between our personnel.	[ ]	[ ]	[ ]	[ ]
3.6	Cross-domain (mutual) understanding	*Degree to which the business functions understand the ICT environment (e.g., its current and potential capabilities, systems, services, processes) and visa versa.*	We lack cross-domain (mutual) understanding and do not think it is necessary.	We have limited (mutual) understanding between us. Only our 'managers' understand both functions.	We have good (mutual) understanding between us. We proactively seek better understanding among us.	We have and encourage mutual understanding, and intuitively seek to improve it.	[ ]	[ ]	[ ]	[ ]
3.7	Knowledge sharing	*Degree to which there is knowledge sharing (intellectual understanding and appreciation of the problems/opportunities, tasks, roles, objectives, priorities, goals, direction, etc.) between the business and ICT functions.*	We lack of knowledge sharing and do not think it is necessary.	We are sharing some knowledge between us. It remains structured and reactive in nature.	We proactively share knowledge between us. Still, it is mainly about key processes and little beyond that.	We regularly and continuously share knowledge. It has become intuitive to us.	[ ]	[ ]	[ ]	[ ]
4.1	Experience, skills & competence	*How often do employees receive training and attend workshops to improve their work experience, communication skills and build competencies.*	We do not receive such training or workshops, and do not think it is necessary.	Only if we ask for it; it remains mainly our duty to gain such skills and experience on our own.	We proactively seek and regularly receive such training and attend workshops. It is, however, still mostly our own duty.	We regularly and continuously receive such training and attend workshops. They form part of our competency evaluations.	[ ]	[ ]	[ ]	[ ]
4.2	Commitment	*Degree to which employees feel responsible for the mission and objectives of their function and the municipality; also, whether they are committed to communicating with others.*	We are aware of our commitment to the function and the municipality. Yet, we do not feel personally responsible for communicating with others.	We understand our commitment to the function and the municipality. Yet, we only feel somewhat responsible to engage and talk with others.	We do our jobs, and also proactively engage and talk with others.	We are permanently committed to our work and engaging with others. We intuitively encourage others to do the same.	[ ]	[ ]	[ ]	[ ]
4.3	Employee personality	*Degree to which the employees' distinctive character (e.g., their way of behaving, as well as their feelings, and their thoughts) promotes free and open communication.*	We each behave on our own accord, irrespective of its impact on communication.	We acknowledge our behaviors, feelings and thoughts. Yet, we only change them when required.	We proactively consider and change our own behaviors, feelings and thoughts. We ensure that they promote communication.	We continuously check and adapt our own behaviors, feelings. We ensure they always promote free and open communication.	[ ]	[ ]	[ ]	[ ]
4.4	Motivation	*Degree to which an employee is motivated and interested in his/her job or role; and, communicating with others.*	We have little motivation and interest. We only work and communicate out of fear.	We have some motivation and interest. Yet, we only work and communicate for rewards or to please others.	We have strong motivation and interest. We proactively work and communicate since it assists others (even for no reward).	We are intuitively motivated and interested. We continuously work and communicate, since it brings inherent joy to us and others.	[ ]	[ ]	[ ]	[ ]

4. Personnel

FEEDBACK SURVEY

**The Business/IT Communication Alignment Maturity Improvement (CAMI)
Feedback Questionnaire**

Please complete the questions below for us to capture your thoughts, views and opinions on how usable and useful this survey was

1. In general, how difficult was it to understand the content of this survey?
   (Cross (X) one only)

☐	☐	☐	☐	☐	☐
0	1	2	3	4	5
Very Difficult					Very Easy

Comment (Optional):

_____

_____

2. Was there any aspect in the survey that you did not understand or that caused some confusion?
   (Cross (X) one only)

☐	☐
Yes	No

2.1. If *'yes'*, what in particular would you recommend should be improved?

_____

_____

3. Based on the maturity level descriptions provided in the survey, how difficult was it to score each factor's current and desired maturity?
   (Cross (X) one only)

☐	☐	☐	☐	☐	☐
0	1	2	3	4	5
Very Difficult					Very Easy

Comment (Optional):

_____

_____

4. Did the survey cause you to reflect on the level of communication between yourself and your colleagues (e.g., business vs ICT or vice versa)?
    (Cross (X) one only)

☐	☐
Yes	No

Comment (Optional):

_____

_____

5. To what extent did this survey affect your awareness of the importance of communication between yourself and your colleagues (e.g., business vs ICT or vice versa)?
    (Cross (X) one only)

☐	☐	☐	☐	☐	☐
0	1	2	3	4	5
No Impact					High Impact

Comment (Optional):

_____

_____

6. Are there any additional comments, suggestions or omissions that you would like to report?

_____

_____

_____

_____

_____

_____

_____

_____

ASSESSMENT REPORT

G.1 MATURITY SHEET — MATURITY ANALYSIS

Level	Factor	#	Overall (N=11)			Business (N=8)			IT (N=3)		
			Delta	Current	Desired	Delta	Current	Desired	Delta	Current	Desired
Environment	Legislation	1.1	1.36	2.55	3.91	1.50	2.38	3.88	1.00	3.00	4.00
	Standards	1.2	1.36	2.27	3.64	1.50	2.00	3.50	1.00	3.00	4.00
	Best practices & guidelines	1.3	1.00	2.82	3.82	1.00	2.75	3.75	1.00	3.00	4.00
	Customers, services & products	1.4	1.55	2.18	3.73	1.50	2.25	3.75	1.67	2.00	3.67
	Technological developments	1.5	1.27	2.55	3.82	1.50	2.50	4.00	0.67	2.67	3.33
	Total		1.31	2.47	3.78	1.40	2.38	3.78	1.07	2.73	3.80

Level	Factor	#	Delta	Current	Desired	Delta	Current	Desired	Delta	Current	Desired
Organisation	Business involvement in IT strategic planning	2.1	1.18	2.45	3.64	1.13	2.50	3.63	1.33	2.33	3.67
	IT involvement in municipal strategic planning	2.2	1.55	2.18	3.73	1.38	2.25	3.63	2.00	2.00	4.00
	Management style	2.3	1.45	2.09	3.55	1.63	1.88	3.50	1.00	2.67	3.67
	Perception of the role and strategic use of IT	2.4	1.45	2.27	3.73	1.38	2.38	3.75	1.67	2.00	3.67
	Corporate culture	2.5	1.82	1.82	3.64	1.88	1.88	3.75	1.67	1.67	3.33
	Organisational structure	2.6	1.55	2.27	3.82	1.38	2.38	3.75	2.00	2.00	4.00
	Reporting level of IT function head	2.7	0.91	2.55	3.45	0.63	2.75	3.38	1.67	2.00	3.67
	The board & executive management's IT 'savviness'	2.8	1.09	2.36	3.45	1.13	2.25	3.38	1.00	2.67	3.67
	IT governance archetype	2.9	0.91	2.45	3.36	0.88	2.50	3.38	1.00	2.33	3.33
	Total		1.32	2.27	3.60	1.26	2.31	3.57	1.48	2.19	3.67

Level	Factor	#	Delta	Current	Desired	Delta	Current	Desired	Delta	Current	Desired
Function (Team)	Leadership style	3.1	1.64	2.18	3.82	1.75	2.13	3.88	1.33	2.33	3.67
	Function (Team) initiatives	3.2	1.18	2.45	3.64	0.88	2.75	3.63	2.00	1.67	3.67
	Cooperation	3.3	1.00	2.73	3.73	0.88	3.00	3.88	1.33	2.00	3.33
	Communication style and ease of access	3.4	1.09	2.82	3.91	0.75	3.13	3.88	2.00	2.00	4.00
	Liaison(s) breadth & effectiveness	3.5	1.09	2.55	3.64	0.88	2.63	3.50	1.67	2.33	4.00
	Cross-domain (mutual) understanding	3.6	1.36	2.27	3.64	1.38	2.25	3.63	1.33	2.33	3.67
	Knowledge sharing	3.7	1.18	2.55	3.73	1.13	2.50	3.63	1.33	2.67	4.00
	Total		1.22	2.51	3.73	1.09	2.63	3.71	1.57	2.19	3.76

Level	Factor	#	Delta	Current	Desired	Delta	Current	Desired	Delta	Current	Desired
Personnel	Experience, skills & competence	4.1	1.64	2.09	3.73	1.88	1.88	3.75	1.00	2.67	3.67
	Job commitment	4.2	1.36	2.36	3.73	1.25	2.38	3.63	1.67	2.33	4.00
	Employee personality	4.3	1.82	2.00	3.82	1.75	2.00	3.75	2.00	2.00	4.00
	Job motivation	4.4	1.73	2.09	3.82	1.88	2.00	3.88	1.33	2.33	3.67
	Total		1.64	2.14	3.77	1.69	2.06	3.75	1.50	2.33	3.83

		#	Delta	Current	Desired	Delta	Current	Desired	Delta	Current	Desired
	Global		1.34	2.36	3.70	1.31	2.37	3.68	1.43	2.32	3.75

High maturity $0.0 \leq |x| \leq 1.0$

Moderate Maturity $1.01 \leq |x| \leq 2.00$

Low maturity $2.01 \leq |x| < 3.00$

G.2   SCORE SHEET — SCORE ANALYSIS

Category Score Mismatch

Level of Influence	Category #	Category	Difference (△)			
			Perception Mismatch		Expectation Mismatch	
Category	1	Environment	△ 2.29	✓	△ 1.63	✓
	2	Organisation	△ 3.50	✓	△ 1.96	✓
	3	Function (Team)	△ 3.96	✓	△ 1.83	✓
	4	Personnel	△ 1.17	✓	△ 0.92	✓
		Score:	△ 10.92		△ 6.33	
		Max:	△ 75.00		△ 75.00	

Detailed Score Mismatch Breakdown

Level of Influence	Factor #	Factor / Process	Perception		Expectation		Difference (△)			
			Business	IT	Business	IT	Perception Mismatch (Max: △3)		Expectation Mismatch (Max: △3)	
1. Environment	1.1	Legislation	2.38	3.00	3.88	4.00	△ 0.63	✓	△ 0.13	✓
	1.2	Standards	2.00	3.00	3.50	4.00	△ 1.00	✓	△ 0.50	✓
	1.3	Best practices & guidelines	2.75	3.00	3.75	4.00	△ 0.25	✓	△ 0.25	✓
	1.4	Customers, services & products	2.25	2.00	3.75	3.67	△ 0.25	✓	△ 0.08	✓
	1.5	Technological developments	2.50	2.67	4.00	3.33	△ 0.17	✓	△ 0.67	✓
		Score:					△ 2.29		△ 1.63	
		Max:					△ 15.00		△ 15.00	

Level of Influence	Factor #	Factor / Process	Perception		Expectation		Difference (△)			
			Business	IT	Business	IT	Perception Mismatch (Max: △3)		Expectation Mismatch (Max: △3)	
2. Organisation	2.1	Business involvement in IT strategic planning	2.50	2.33	3.63	3.67	△ 0.17	✓	△ 0.04	✓
	2.2	IT involvement in municipal strategic planning	2.25	2.00	3.63	4.00	△ 0.25	✓	△ 0.38	✓
	2.3	Management style	1.88	2.67	3.50	3.67	△ 0.79	✓	△ 0.17	✓
	2.4	Perception of the role and strategic use of IT	2.38	2.00	3.75	3.67	△ 0.38	✓	△ 0.08	✓
	2.5	Corporate culture	1.88	1.67	3.75	3.33	△ 0.21	✓	△ 0.42	✓
	2.6	Organisational structure	2.38	2.00	3.75	4.00	△ 0.38	✓	△ 0.25	✓
	2.7	Reporting level of IT function head	2.75	2.00	3.38	3.67	△ 0.75	✓	△ 0.29	✓
	2.8	The board & executive management's IT 'savviness'	2.25	2.67	3.38	3.67	△ 0.42	✓	△ 0.29	✓
	2.9	IT governance archetype	2.50	2.33	3.38	3.33	△ 0.17	✓	△ 0.04	✓
		Score:					△ 3.50		△ 1.96	
		Max:					△ 27.00		△ 27.00	

Level of Influence	Factor #	Factor / Process	Perception		Expectation		Difference (△)			
			Business	IT	Business	IT	Perception Mismatch (Max: △3)		Expectation Mismatch (Max: △3)	
3. Business/IT Function (Team)	3.1	Leadership style	2.13	2.33	3.88	3.67	△ 0.21	✓	△ 0.21	✓
	3.2	Function (Team) initiatives	2.75	1.67	3.63	3.67	△ 1.08	🟡	△ 0.04	✓
	3.3	Cooperation	3.00	2.00	3.88	3.33	△ 1.00	✓	△ 0.54	✓
	3.4	Communication style and ease of access	3.13	2.00	3.88	4.00	△ 1.13	🟡	△ 0.13	✓
	3.5	Liaison(s) breadth & effectiveness	2.63	2.33	3.50	4.00	△ 0.29	✓	△ 0.50	✓
	3.6	Cross-domain (mutual) understanding	2.25	2.33	3.63	3.67	△ 0.08	✓	△ 0.04	✓
	3.7	Knowledge sharing	2.50	2.67	3.63	4.00	△ 0.17	✓	△ 0.38	✓
		Score:					△ 3.96		△ 1.83	
		Max:					△ 21.00		△ 21.00	

Level of Influence	Factor #	Factor / Process	Perception		Expectation		Difference (△)			
			Business	IT	Business	IT	Perception Mismatch (Max: △3)		Expectation Mismatch (Max: △3)	
4. Personnel	4.1	Experience, skills & competence	1.9	2.7	3.8	3.7	△ 0.79	✓	△ 0.08	✓
	4.2	Job commitment	2.4	2.3	3.6	4.0	△ 0.04	✓	△ 0.38	✓
	4.3	Employee personality	2.0	2.0	3.8	4.0	△ 0.00	✓	△ 0.25	✓
	4.4	Job motivation	2.0	2.3	3.9	3.7	△ 0.33	✓	△ 0.21	✓
		Score:					△ 1.17		△ 0.92	
		Max:					△ 12.00		△ 12.00	

G.3 ACTION REPORT — FACTOR PRIORITY ANALYSIS

		Perception		Expectation		Difference (△)		
Factor #	Factor / Process	Business	IT	Business	IT	Perception Mismatch (Max: △3)	Expectation Mismatch (Max: △3)	Overall Mismatch (Max: △6)
3.3	Cooperation	3.00	2.00	3.88	3.33	△ 1.00 ✓	△ 0.54 ✓	△ 1.54 ⬤
1.2	Standards	2.00	3.00	3.50	4.00	△ 1.00 ✓	△ 0.50 ✓	△ 1.50 ⬤
3.4	Communication style and ease of access	3.13	2.00	3.88	4.00	△ 1.13 ⬤	△ 0.13 ✓	△ 1.25 ⬤
3.2	Function (Team) initiatives	2.75	1.67	3.63	3.67	△ 1.08 ⬤	△ 0.04 ✓	△ 1.13 ⬤
2.7	Reporting level of IT function head	2.75	2.00	3.38	3.67	△ 0.75 ✓	△ 0.29 ✓	△ 1.04 ⬤
2.3	Management style	1.88	2.67	3.50	3.67	△ 0.79 ✓	△ 0.17 ✓	△ 0.96 ✓
4.1	Experience, skills & competence	1.88	2.67	3.75	3.67	△ 0.79 ✓	△ 0.08 ✓	△ 0.88 ✓
1.5	Technological developments	2.50	2.67	4.00	3.33	△ 0.17 ✓	△ 0.67 ✓	△ 0.83 ✓
3.5	Liaison(s) breadth & effectiveness	2.63	2.33	3.50	4.00	△ 0.29 ✓	△ 0.50 ✓	△ 0.79 ✓
1.1	Legislation	2.38	3.00	3.88	4.00	△ 0.63 ✓	△ 0.13 ✓	△ 0.75 ✓
2.8	The board & executive management's IT 'savviness'	2.25	2.67	3.38	3.67	△ 0.42 ✓	△ 0.29 ✓	△ 0.71 ✓
2.6	Organisational structure	2.38	2.00	3.75	4.00	△ 0.38 ✓	△ 0.25 ✓	△ 0.63 ✓
2.2	IT involvement in municipal strategic planning	2.25	2.00	3.63	4.00	△ 0.25 ✓	△ 0.38 ✓	△ 0.63 ✓
2.5	Corporate culture	1.88	1.67	3.75	3.33	△ 0.21 ✓	△ 0.42 ✓	△ 0.63 ✓
4.4	Job motivation	2.00	2.33	3.88	3.67	△ 0.33 ✓	△ 0.21 ✓	△ 0.54 ✓
3.7	Knowledge sharing	2.50	2.67	3.63	4.00	△ 0.17 ✓	△ 0.38 ✓	△ 0.54 ✓
1.3	Best practices & guidelines	2.75	3.00	3.75	4.00	△ 0.25 ✓	△ 0.25 ✓	△ 0.50 ✓
2.4	Perception of the role and strategic use of IT	2.38	2.00	3.75	3.67	△ 0.38 ✓	△ 0.08 ✓	△ 0.46 ✓
3.1	Leadership style	2.13	2.33	3.88	3.67	△ 0.21 ✓	△ 0.21 ✓	△ 0.42 ✓
4.2	Job commitment	2.38	2.33	3.63	4.00	△ 0.04 ✓	△ 0.38 ✓	△ 0.42 ✓
1.4	Customers, services & products	2.25	2.00	3.75	3.67	△ 0.25 ✓	△ 0.08 ✓	△ 0.33 ✓
4.3	Employee personality	2.00	2.00	3.75	4.00	△ 0.00 ✓	△ 0.25 ✓	△ 0.25 ✓
2.9	IT governance archetype	2.50	2.33	3.38	3.33	△ 0.17 ✓	△ 0.04 ✓	△ 0.21 ✓
2.1	Business involvement in IT strategic planning	2.50	2.33	3.63	3.67	△ 0.17 ✓	△ 0.04 ✓	△ 0.21 ✓
3.6	Cross-domain (mutual) understanding	2.25	2.33	3.63	3.67	△ 0.08 ✓	△ 0.04 ✓	△ 0.13 ✓

G.4 THE GRAPHS

G.4.1 Overall Delta (Blip) Chart

Overall Communication Score Alignment (Δ Chart)

Legend: ■ Perception ■ Expectancy

Factors:
- 1.1 Legislation
- 1.2 Standards
- 1.3 Best practices & guidelines
- 1.4 Customers, services & products
- 1.5 Technological developments
- 2.1 Business involvement in IT strategic planning
- 2.2 IT involvement in municipal strategic planning
- 2.3 Management style
- 2.4 Perception of the role and strategic use of IT
- 2.5 Corporate culture
- 2.6 Organisational structure
- 2.7 Reporting level of IT function head
- 2.8 The board & executive management's IT 'savviness'
- 2.9 IT governance archetype
- 3.1 Leadership style
- 3.2 Function (Team) initiatives
- 3.3 Cooperation
- 3.4 Communication style and ease of access
- 3.5 Liaison(s) breadth & effectiveness
- 3.6 Cross-domain (mutual) understanding
- 3.7 Knowledge sharing
- 4.1 Experience, skills & competence
- 4.2 Job commitment
- 4.3 Employee personality
- 4.4 Job motivation

Vertical axis (Δ Difference): 3.00, 2.00, 1.00, 0.00, -1.00, -2.00, -3.00
ICT (Lower) / Business (Lower)

Ideal result is a straight-line; any deviations (colour bars) represent either current or desired score misalignment between business or IT.

G.4.2 *Radar Charts*

G.4.2.1 *Environment Factor Category*
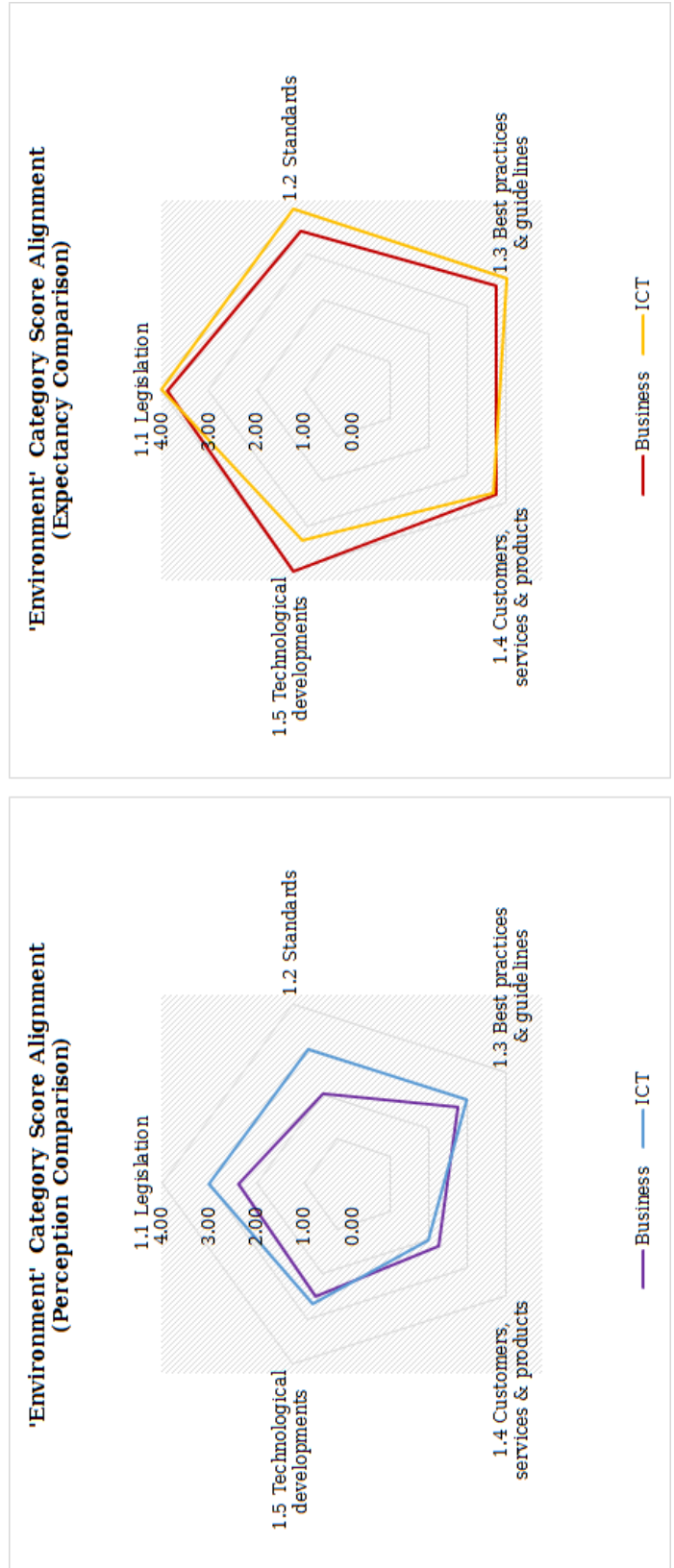
Current maturity scores shown on left, desired maturity scores shown on right.

G.4.2.2 *Organisation Factor Category*

'Organisation' Category Score Alignment
(Expectancy Comparison)

'Organisation' Category Score Alignment
(Perception Comparison)
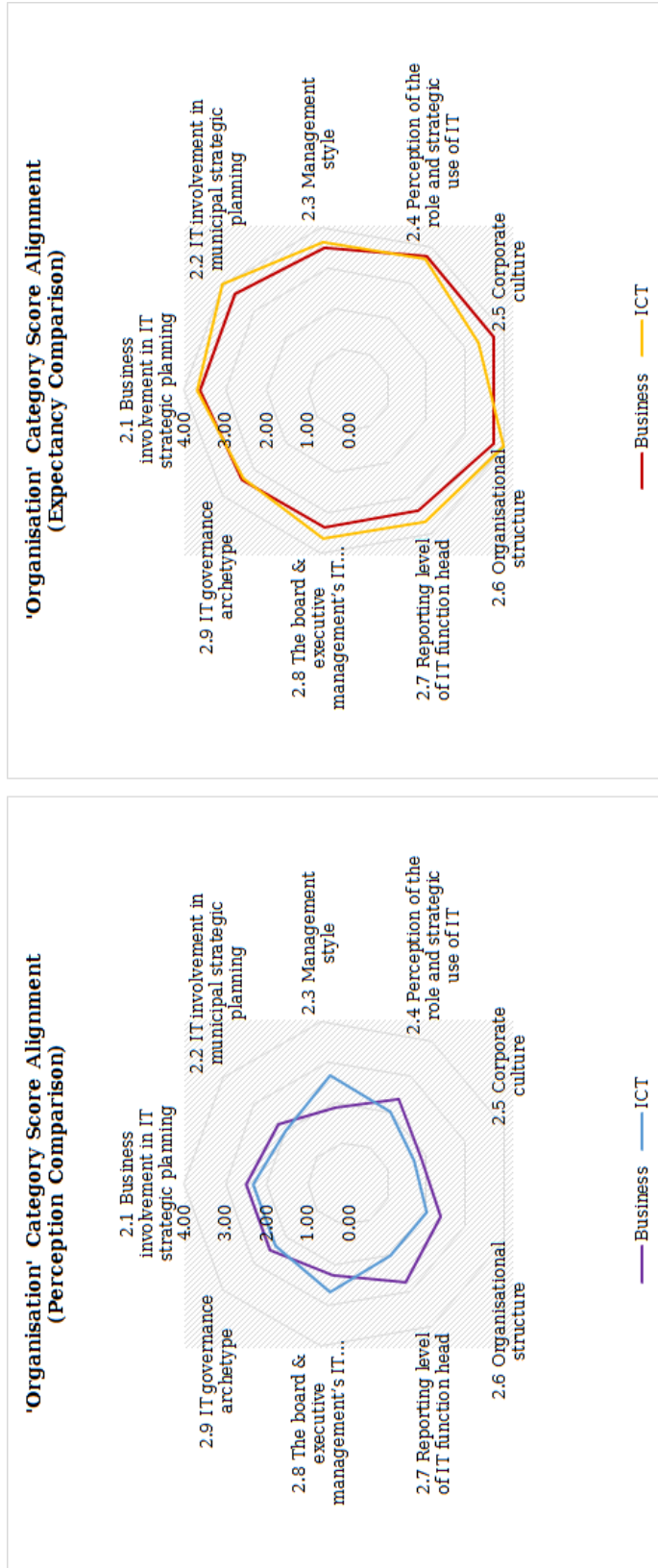
Current maturity scores shown on left, desired maturity scores shown on right.

G.4.2.3 *Function (Team) Factor Category*

'Function (Team)' Category Score Alignment (Perception Comparison)

'Function (Team)' Category Score Alignment (Expectancy Comparison)
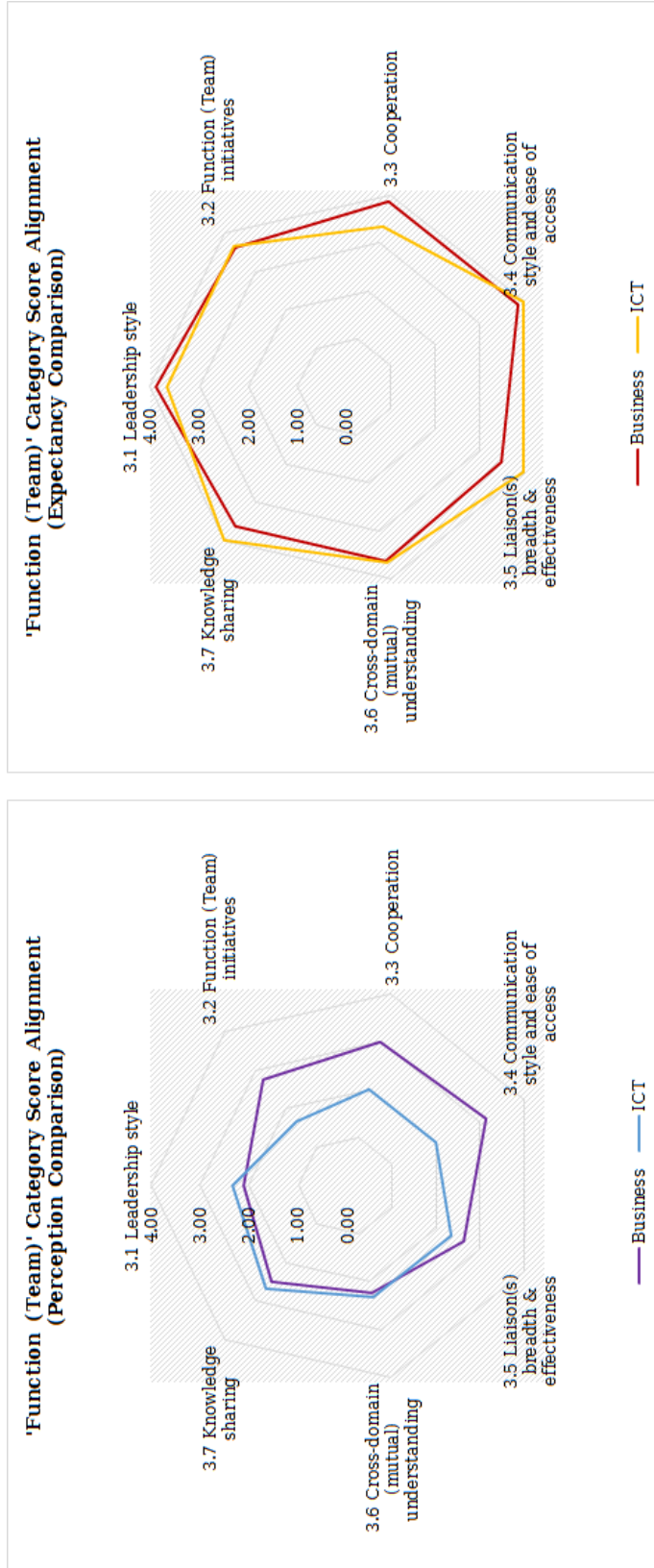
Current maturity scores shown on left, desired maturity scores shown on right.

G.4.2.4   *Personnel Factor Category*

'Personnel' Category Score Alignment (Expectancy Comparison)

'Personnel' Category Score Alignment (Perception Comparison)
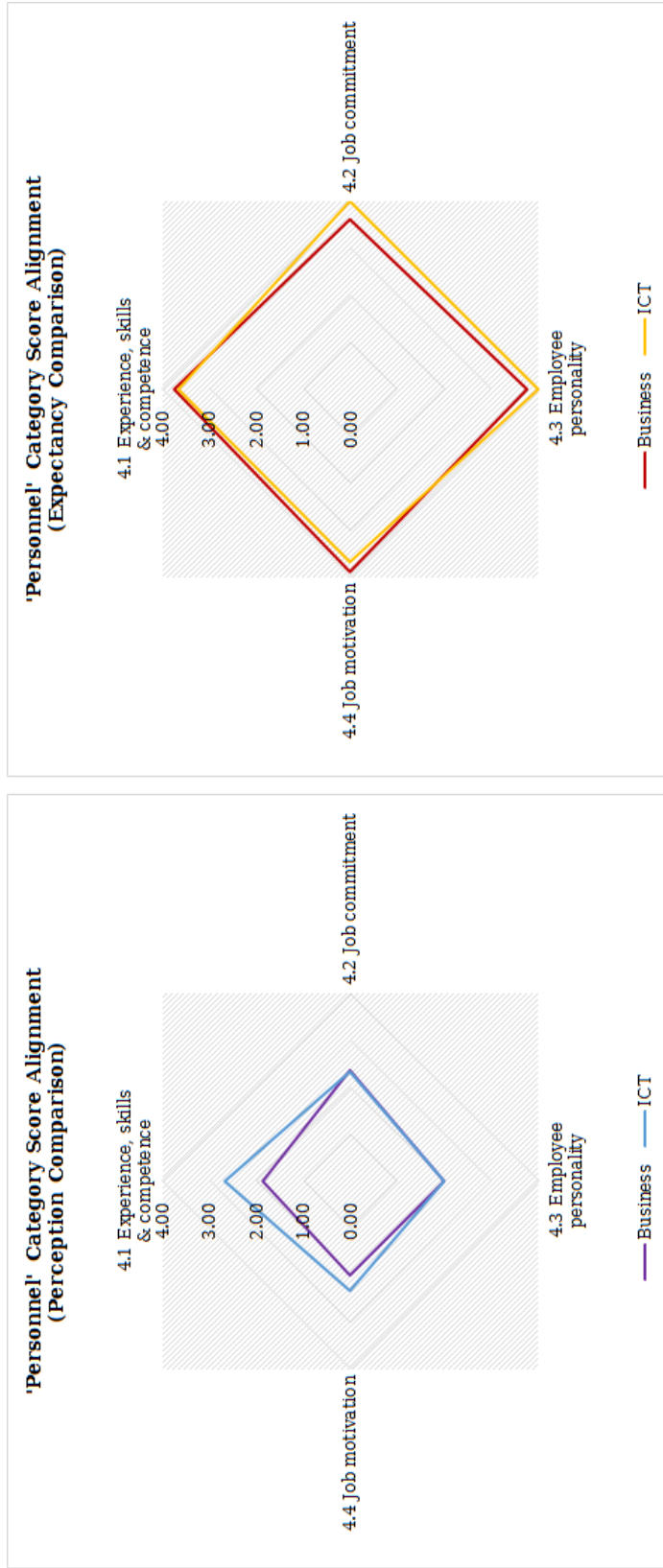
Current maturity scores shown on left, desired maturity scores shown on right.

BIBLIOGRAPHY

Abraham, G. (2006). Successful Organizational Leadership: Effective Execution through Strategic Management. Retrieved November 28, 2015, from http://www.refresher.com/Archives/agaaexecution.html

Alter, S. (2003). Sidestepping the IT artifact, scrapping the IS silo, and laying claim to "systems in organizations". *Communications of the Association for Information Systems*, *12*(1), 494–526.

Ang, I. (1996). *Living Room Wars: Rethinking Media Audiences for a Postmodern World*. London: Routledge.

Argyris, C. & Schon, D. (1978). *Organizational learning: A Theory of Action Perspective*. Reading, Mass: Addison Wesley.

Argyris, C. & Schon, D. (1996). *Organizational learning II: Theory, Method and Practice*. Reading, Mass: Addison Wesley.

Austin, J. (1962). *How to Do Things with Words*. Clarendon.

Austin, S., Baldwin, A., Hammond, J., Murray, M., Root, D., Thomson, D., & Thorpe, A. (2001). *Design Chains: A Handbook for Integrated Collaborative Design*. Loughborough: Amec.

Avison, D., Jones, J., Powell, P., & Wilson, D. (2004, September). Using and validating the strategic alignment model. *Journal of Strategic Information Systems*, *13*(3), 223–246. doi:10.1016/j.jsis.2004.08.002

Baker, E. (2004). Leading alignment. *CIO Insight*, *1*(45), 19–20.

Balhareth, H., Liu, K., & Manwani, S. (2012). Achieving Business and IT Alignment from Organisational Learning Perspectives. In *Proceedings of World Academy of Science, Engineering and Technology* (pp. 864–867).

Bandura, A. (1977). *Social Learning Theory*. New York: General Learning Press.

Barbour, R. (2008). *Doing Focus Groups. Thousand Oaks*. CA: Sage.

Bateson, G. (1987). *Steps to an Ecology of Mind*. San Francisco: Chandler Publishing.

Baxter, P. & Jack, S. (2008). Qualitative case study methodology: Study design and implementation for novice researchers. *The Qualitative Report*, *13*(4), 544–559.

Beer, S. (1984). The viable system model: Its provenance, development, methodology and pathology. *Journal of the Operational Research Society*, *35*(1), 7–25.

Bertalanffy, L. (1968). *General Systems Theory*. Harmondsworth, UK: Penguin.

Bloor, M. (1997). Techniques of Validation in Qualitative Research: A Critical Commentary. In *Context and Method in Qualitative Research* (pp. 37–50). London: Sage Publications.

Booth, A. (1986). *Communications Audits: A UK Survey*. London: Taylor Graham.

BrainyQuote. (2015a). Albert Einstein Quotes. Retrieved November 28, 2015, from http://www.brainyquote.com/quotes/quotes/a/alberteins109019.html

BrainyQuote. (2015b). Bill Gates Quotes. Retrieved November 28, 2015, from https://www.brainyquote.com/quotes/quotes/b/billgates173262.html

BrainyQuote. (2015c). Charles Eames Quotes. Retrieved November 28, 2015, from http://www.brainyquote.com/quotes/quotes/c/charleseam169187.html

BrainyQuote. (2015d). Franklin D. Roosevelt Quotes. Retrieved November 28, 2015, from http://www.brainyquote.com/quotes/quotes/f/franklind122780.html

BrainyQuote. (2015e). Jacques Derrida Quotes. Retrieved November 28, 2015, from http://www.brainyquote.com/quotes/quotes/j/jacquesder298019.html

BrainyQuote. (2015f). Paul Rand Quotes. Retrieved November 28, 2015, from http://www.brainyquote.com/quotes/quotes/p/paulrand169748.html

Brodbeck, A., Rigoni, E., & Hoppen, N. (2009). Strategic alignment maturity between business and information technology in Southern Brazil. *Journal of Global Information Technology Management*, *12*(2), 5–32. doi:10.1080/1097198X.2009.10856489

Brotby, K. (2008). *Information Security Governance: Guidance for Information Security Managers*. IT Governance Institute.

Brotby, K. (2009). *Information Security Governance: A Practical Development and Implementation Approach*. Honoken, New Jersey: Wiley & Sons.

Brown, C. & Magill, S. (1994). Alignment of the IS functions with the enterprise: Toward a model of antecedents. *MIS Quarterly*, *18*(4), 371–403.

Budd, R. (1972). The encounter group: An approach to human communication. In R. Budd & B. Ruben (Eds.), *Approaches to Human Communication* (pp. 75–96). New York: Spartan.

Burrell, G. & Morgan, G. (1979). *Sociological Paradigms and Organizational Analysis*. Heinemann.

Calhoun, K. & Lederer, A. (1990). From strategic business planning to strategic information systems planning: The missing link. *Journal of Information Technology Management*, *1*(1), 1–5.

Campbell, B., Kay, R., & Avison, D. (2005). Strategic alignment: A practitioner's perspective. *Journal of Enterprise Information Management*, *18*(6), 653–664. doi:10.1108/17410390510628364

Caroselli, M. (2000). *Leadership Skills for Managers*. WI, US: McGraw-Hill.

Chan, Y. & Reich, B. (2007). IT alignment: What have we learned? *Journal of Information Technology*, *22*(4), 297–315. doi:10.1057/palgrave.jit.2000109

Chan, Y., Sabherwal, R., & Thatcher, J. (2006). Antecedents and outcomes of strategic IS alignment: An empirical investigation. *IEEE Transactions on Engineering Management*, *51*(3), 27–47.

Chen, L. (2010). Business-IT alignment maturity of companies in China. *Information and Management*, *47*(1), 9–16. doi:10.1016/j.im.2009.09.003

Chiesa, V., Coughlan, P., & Voss, C. (1996). Development of a technical innovation audit. *Journal of Product Innovation Management*, *13*(2), 105–136.

Clancey, W. (1997). *Situated Cognition*. Cambridge: Cambridge University Press.

Coertze, J. & Von Solms, R. (2013a). The Board and CIO: The IT Alignment Challenge. In *Proceedings of the 47th Hawaii International Conference on System Sciences*. IEEE.

Coertze, J. & Von Solms, R. (2013b). The Board and IT Governance: A Replicative Study. *African Journal of Business Management*, *7*(34).

Coertze, J. & Von Solms, R. (2014). The Murky Waters of IT Governance. In *Proceedings of the Information Security for South Africa Conference*. IEEE.

Coertze, J. & Von Solms, R. (2015a). A Maturity Grid-Based Assessment Method for Communication in Business-IT Alignment. *MIS Quarterly*. Submitted on *15 October 2015*.

Coertze, J. & Von Solms, R. (2015b). Towards a Cybernetics-Based Communication Framework for IT Governance. In *Proceedings of the 48th Hawaii International Conference on System Sciences*. IEEE.

Collis, J. & Hussey, R. (2009). *Business Research: A Practical Guide for Undergraduate & Postgraduate Students*. Basingstoke: Palgrave Macmillan.

Cook, T. & Campbell, D. (1979). *Quasi-experimentation: Design and Analysis Issues for Field Settings*. Rand.

Coughlan, J., Lycett, M., & Macredie, R. (2005). Understanding the business–IT relationship. *International Journal of Information Management*, *25*(4), 303–319. doi:10.1016/j.ijinfomgt.2005.04.003

Cragg, P., King, M., & Hussin, H. (2002). IT Alignment and firm performance in small manufacturing firms. *Strategic Information Systems*, *11*(2), 109–132.

Creswell, J. (2007). *Qualitative Inquiry & Research Design: Choosing among Five Approaches* (2nd). Sage.

Crosby, P. (1979). *Quality is Free: The Art of Making Quality Certain*. New York, NY: Penguin.

Crosby, P. (1996). *Quality is Still Free: Making Quality Certain in Uncertain Times*. New York, NY: McGraw-Hill.

Cross, N. (2001). *Design Science Research: Developing a Discipline*.

Crotty, M. (2003). *The Foundations of Social Research: Meaning and Perspective in the Research Process.* Crows Nest NSW: Allen & Unwin.

Curry, A. & Moore, C. (2003). Assessing information culture: An exploratory model. *International Journal of Information Management*, *23*(2), 91–110.

Cybulski, J. & Lukaitis, S. (2005). The Impact of Communications and Understanding on the Success of Business–IT Alignment. In *Proceedings of the 16th Australasian Conference on Information Systems*.

Dalsgaard, P. (2014). Pragmatism and design thinking. *International Journal of Design*, *8*(1), 143–155.

Dance, P. (1970). The concept of communication. *Journal of Communication*, *20*(2), 201–210.

De Haes, S. & Van Grembergen, W. (2005). IT governance structures, processes and relational mechanisms: Achieving IT–business alignment in a major Belgian financial group. In *Proceedings of the 38th Hawaii International Conference on System Sciences* (Vol. 00, *100*, pp. 1–10).

Delia, J. (1977). Constructivism and the study of human communication. *Quarterly Journal of Speech*, *63*(1), 66–83.

Deloitte. (2006). *What the Board Needs to Know about IT: Phase I*. Deloitte Touche Tohmatsu. Brisbane, QLD.

Department of Public Service and Administration. (2012). *Public Service Corporate Governance of ICT Policy Framework*.

Dewett, T. & Jones, G. (2001). The role of information technology in the organization: A review, model, and assessment. *Journal of Management*, *27*(3), 313–346. doi:10.1177/014920630102700306

Donnelly, S. (2010). *Unlocking the Value of IT Governance*. Antwerp, Belgium: Deloitte.

Douglas, J. (1976). *Investigative Social Research: Individual and Team Field Research*. Beverly Hills: Sage Publications.

Easterby-Smith, M., Thorpe, R., & Lowe, A. (1991). *Management Research*. London: Sage Publications.

Eckert, C., Maier, A., & McMahon, C. (2004). Communication in Design. In *Design Process Improvement: A Review of Current Practice* (pp. 232–261). Springer.

Emerson, R. (1981). Observational field work. *Annual Review of Sociology*, *7*, 351–378.

Emmanuel, M. (1995). Auditing communication practices. In *Inside Organisational Communication*. NY: New York: Longman.

Ernst & Young. (2009). *Outpacing Change: Ernst & Young's 12th Annual Global Information Security Survey*.

Feeny, D., Edwards, B., & Simpson, K. (1992). Understanding the CEO–CIO relationship. *MIS Quarterly*, *16*(4), 435–448.

Feld, C. & Stoddard, D. (2004). Getting IT right. *Harvard Business Review*, *82*(2), 72–81.

Figueroa, M., Kincaid, D., Rani, M., & Lewis, G. (2002). *Communication for Social Change: An Integrated Model for Measuring the Process and its Outcomes*, The Rockefeller Foundation.

Fiske, J. (1990). *Introduction to Communication Studies* (2nd). New York: Routledge.

Fraser, P., Moultrie, J., & Gregory, M. (2002). The use of maturity models/grids as a tool in assessing product development capability. In *Proceedings of IEEE International Engineering Management Conference (IEMC)*. Cambridge, UK.

Gaffikin, M. (2008). *Accounting Theory Research, Regulations and Accounting Practices*. Pearson Education Australia.

Gallagher, J. (2010). Technological Advances that Changed and Shaped the World. Retrieved April 21, 2013, from http://voices.yahoo.com/technological-advances-changed-shaped-the-5696548.html

Gibson, J. (1966). *The Senses Considered as Perceptual Systems*. Boston: Houghton Mifflin.

Goldhaber, G. & Krivonos, P. (1977). The ICA communication audit: Process, status, critique. *Journal of Business Communication*, *15*(1), 41–55. doi:10.1177/002194367701500104

Gopinath, C. (2008). Taking a Systems View. In *Globalization: A Multidimensional System* (Chap. 3). SAGE.

Gould, S. & Vrba, E. (1982). Exaptation: A missing term in the science of form. *Paleobiology*, *8*(1), 4–15.

Grant, G. (2010). Reconceptualizing the concept of business and IT alignment: From engineering to agriculture. *European Journal of Information Systems*, *19*(6), 619–624. doi:10.1057/ejis.2010.50

Graziano, A. & Raulin, M. (2000). *Research Methods: A Process of Inquiry*. Pearson Education Company: USA.

Gregor, S. & Hevner, A. (2013). Positioning and presenting design science research for maximum impact. *Management Information Systems Quarterly*, *37*(2), 337–355.

Griffin, E. (2012). *A First Look at Communication Theory* (8th). New York, NY: McGraw-Hill.

Guion, L., Diehl, D., & McDonald, D. (2011). *Triangulation: Establishing the Validity of Qualitative Studies*. Florida Department of Family, Youth & Community Sciences. Gainesville, FL.

Hargie, O. & Tourish, D. (2009). *Auditing Organizational Communication: A Handbook of Research, Theory and Practice*. Routledge.

Henderson, J. & Venkatraman, N. (1993). Strategic alignment: Leveraging information technology for transforming organizations. *IBM Systems Journal*, *32*(1), 472–484.

Hevner, A. (2007). A three cycle view of design science research. *Scandinavian Journal of Information Systems*, *19*(2), 87–92.

Hevner, A. & Chatterjee, S. (2010). *Design Research in Information Systems: Theory and Practice*. New York, NY: Springer.

Hevner, A., March, S., Park, J., & Ram, S. (2004). Design science in information systems research. *MIS Quarterly*, *28*(1), 75–105.

Hommes, B. J. & Van Reijswoud, V. (2000). Assessing the quality of business process modelling techniques. In *Proceedings of the 33rd Annual Hawaii International Conference on System Sciences* (10–pp). IEEE.

Hovorka, D. (2009). Design science research: A call for a pragmatic perspective. In *Proceedings of the SIGPrag Workshop*.

Hsu, C. & Sandford, B. (2007). The Delphi technique: Making sense of consensus. *Practical Assessment, Research & Evaluation*, *12*(10), 1–8.

Hunter, G. (2010). The chief information officer: A review of the role. *Journal of Information, Information Technology, and Organisations*, *5*(1), 125–143.

Hymes, D. & Gumperz, J. (1972). *Directions in Sociolinguistics: The Ethnography of Communication*. New York: Holt, Rinehart and Winston.

IEEE 1220. (2005). *Standard for Application and Management of the Systems Engineering Process*.

Inspirational. (2015). James Thurber Quotes: About Chance. Retrieved November 28, 2015, from http://www.inspirationalstories.com/quotes/james-thurber-a-pinch-of-probability-is-worth-a/

Institute of Directors in Southern Africa. (2009a). *The King Code on Corporate Governance for South Africa*. Parklands, SA.

Institute of Directors in Southern Africa. (2009b). *The King Report on Corporate Governance for South Africa*. Parklands, SA.

ISACA. (2012a). *COBIT 5: Enabling Processes*. Rolling Meadows, IL.

ISACA. (2012b). *COBIT 5: Framework*. Rolling Meadows, IL.

ISO/IEC 27002. (2005). *Information Technology: Code of Practice for Information Security Management*. Switzerland: International Organization for Standardization (ISO).

ISO/IEC 38500. (2008). *Corporate governance of IT*. Switzerland: International Organization for Standardization (ISO).

IT Governance Institute. (2005). *IT Alignment: Who is in Charge?* Rolling Meadows, IL.

Johnson, A. & Lederer, A. (2006). The impact of communication between CEOs and CIOs on their shared views of the current and future role of IT. *Information Systems Management*, 24(1), 85–90. doi:10.1080/10580530601038246

Johnson, D. (1975). Cooperativeness and social perspective taking. *Journal of Personality and Social Psychology*, 31(2), 241–244.

Johnson, P. & Duberley, J. (2000). *Understanding Management Research: An Introduction to Epistemology*. London: Sage Publications.

Jones, D. (2002). The interpretative auditor: Reframing the communication audit. *Management Communication Quarterly*, 15(3), 466–471.

Jordan, B., Aronson, M., Bishop, L., Cefkin, M., Lawrence, N., Preston, C., & Sullivan, L. (2006). *Reflections on a Journey of Transformation: Learning, Growth and Change*. Xerox Corporation.

Juiz, C. (2011). New Engagement Model of IT Governance and IT Management for the Communication of the IT Value at Enterprises. In *Digital Enterprise and Information Systems* (pp. 1–15). Springer. doi:10.1007/978-3-642-22603-8_13

Kaplan, R. & Norton, D. (1996). *The Balanced Scorecard*. USA: HBS Press.

Kashanchi, R. & Toland, J. (2008). Investigating the social dimension of alignment: Focusing on communication and knowledge sharing. In *Proceedings of the Australasian Conference on Information Systems*.

Khaiata, M. & Zualkernan, I. (2009). A simple instrument to measure IT–Business alignment maturity. *Information Systems Management*, 26(2), 138–152. doi:10.1080/10580530902797524

Krueger, R. & Casey, M. (2009). *Focus Groups: A Practical Guide for Applied Research*. London: Sage.

Lazarsfeld, P., Berelson, B., & Gaudet, H. (1944). *The People´s Choice*. New York: Columbia Press.

Le Ray, J. (2007). The Communicational Circuit of Translation. Retrieved November 28, 2015, from http://www.proz.com/doc/1448.

Lederer, A. & Mendelow, A. (1989). Coordination of information systems plans with business plans. *Journal of Management Information Systems*, *6*(2), 5–19.

Leonard, J. (2008). Sharing a vision: Comparing business and IS managers' perceptions of strategic alignment issues. *Australasian Journal of Information Systems*, *15*(1), 95–111.

Luftman, J. (2000). Assessing business–IT alignment maturity. *Communications of the Association for Information Systems*, *4*(14), 1–51.

Luftman, J. (2003). Assessing IT–business alignment. *Information Systems Management*, *20*(4), 9–15. doi:10.1201/1078/43647.20.4.20030901/77287.2

Luftman, J., Ben-Zvi, T., Dwivedi, R., & Rigoni, E. (2010). IT governance: An alignment maturity perspective. *International Journal on IT/Business Alignment and Governance*, *1*(2), 13–25. doi:10.4018/jitbag.2010040102

Luftman, J. & Brier, T. (1999). Achieving and sustaining business–IT alignment. *California Management Review*, *42*(1), 109–122.

Luftman, J. & Derksen, B. (2012). Key issues for IT executives 2012: Doing more with less. *MIS Quarterly Executive*, *11*(4), 207–218.

Luftman, J. & Kempaiah, R. (2007). An update on business–IT alignment: "A line" has been drawn. *MIS Quarterly Executive*, *6*(3), 165–177.

Luhmann, N. (1986). The Autopoesis of Social Systems. In F. Geyer & J. V. Zeuwen (Eds.), *Sociocybernetic Paradoxes: Observation, Control and Evolution of Self-Steering Systems* (pp. 165–185). London: Sage.

Luhmann, N. (1995). *Social Systems* (J. Bednarz, Trans.). Suhrkamp: Frankfurt amMain.

Maier, A. (2007). *A Grid-Based Assessment Method of Communication in Engineering Design* (Doctoral Thesis, University of Cambridge).

Maier, A., Eckert, C., & Clarkson, J. (2004). A communication audit for engineering design. In *Proceedings of the 5th Integrated Product Development Workshop (IPD)*.

Maier, A., Eckert, C., & Clarkson, P. (2005). A meta-model for communication in engineering design. *CoDesign*, *1*(4), 243–254. doi:10.1080/15710880500478353

Maier, A., Eckert, C., & Clarkson, P. (2006). Identifying requirements for communication support: A maturity grid-inspired approach. *Expert Systems with Applications*, *31*(4), 663–672. doi:10.1016/j.eswa.2006.01.003

Maier, A., Moultrie, J., & Clarkson, P. (2011). Maturity Grids as Tools for Change Management. In *The Changing Paradigm of Consulting: Adjusting to the Fast-Paced World* (pp. 371–397). Information Age.

Malik, F. (2003). *Systemisches Management and Evolution Selbstorganisation Grundprobleme: Funktionsmechanismen und Losungsansatze fur Komplexe Systeme* (3rd). Wien: Paul Haupt.

March, S. & Smith, G. (1995). Design and natural science research on information technology. *Decision Support Systems*, *15*(4), 251–266. doi:10.1016/0167-9236(94)00041-2

Marchand, D. (2007). Realizing IT value: A shared responsibility between senior managers and the CIO. *Perspectives for Managers*, (147), 1–4.

Martin, N., Gregor, S. D., & Hart, D. N. (2005). The social dimensions of business and IS/IT alignment: Case studies of six public-sector organisations. *Australian Accounting Review*, *15*(3), 28–38.

McCann, D. (1993). *The Pacing Partnership: Influencing Skills for Successful Outcomes.* Gwent Holdings.

McElheran, K. (2012). Decentralization versus centralization in IT governance. *Communications of the ACM*, *55*(11), 28. doi:10.1145/2366316.2366326

McKeen, J. & Smith, H. (2003). *Making IT Happen: Critical Issues in IT management*. Chichester, Hoboken, NJ: Wiley.

Mendling, J. & Strembeck, M. (2008). Influence factors of understanding business process models. In *Business Information Systems* (pp. 142–153). Springer.

Merten, K. (1977). *Kommunikation: Eine Begriffs und Prozessanalyse*. Westdeutscher.

Millar, G. (2009). *The Viable Governance Model (VGM): A Theoretical Model of IT Governance within a Corporate Setting* (PhD Thesis, University of New South Wales).

Mingers, J. (2001). Combining IT research methods: Towards a pluralist methodology. *Information Systems Research*, *12*(3), 240–59.

Moray, N. (2000). Culture, politics and ergonomics. *Ergonomics*, *43*(7), 858–868. doi:10.1080/001401300409062

Morgan, D. (1993). Qualitative content analysis: A guide to paths not taken. *Qualitative Health Research*, *1*(3), 112–121.

Morgan, G. & Smircich, L. (1980). The case for qualitative research. *Academy of Management Review*, *5*(4), 491–500.

Moultrie, J. (2004). *Development of a Design Audit Tool to Assess Product Design Capability* (Ph.D. thesis, University of Cambridge).

Myers, M. (1997). Qualitative research in information systems. *MISQ Discovery*, *21*(2), 241–242.

Nolan, R. & McFarlan, F. (2005). Information technology and the board of directors. *Harvard Business Review*, *83*(10), 96–106.

Nunamaker, J. & Chen, M. (1990). Systems development in information systems research. *Journal of Management Information Systems*, *7*(3), 89–106.

O'Brien, E. & Robertson, P. (2009). Future leadership competencies: From foresight to current practice. *Journal of European Industrial Training*, *33*(4), 371–380. doi:10.1108/03090590910959317

Odiorne, G. (1954). An application of the communication audit. *Personnel Psychology*, *7*(2), 235–243.

Okoli, C. & Pawlowski, S. (2004). The Delphi method as a research tool: An example, design considerations and applications. *Information & Management*, *42*(1), 15–29. doi:10.1016/j.im.2003.11.002

Olivier, M. (2009). *Information Technology Research: A Practical Guide for Computer Science and Informatics* (3rd). Pretoria, South Africa: Van Schaik.

Orlikowski, W. & Iacono, C. (2006). *Desperately Seeking the 'IT' in IT Research: A Call to Theorizing the IT Artifact*. John Wiley.

Patton, M. (2001). *Qualitative Research and Evaluation Methods* (3rd). California, CA: Sage.

Paulk, M., Weber, C., Curtis, B., & Chrissis, M. (1995). *The Capability Maturity Model: Guidelines for Improving the Software Process*. Boston, MA: Addison-Wesley.

Peffers, K., Tuunanen, T., Gengler, C., Rossi, M., Hui, W., Virtanen, V., & Bragge, J. (2006). The design science research process: A model for producing and presenting information systems research. In *Proceedings of the 1st International Conference on Design Science Research in Information Systems and Technology* (pp. 83–106).

Peffers, K., Tuunanen, T., Rothenberger, M., & Chatterjee, S. (2007). A design science research methodology for information systems research. *Journal of Management Information Systems*, *24*(3), 45–77. doi:10.2753/MIS0742-1222240302

Peppard, J. & Ward, J. (1999). 'Mind the gap': Diagnosing the relationship between the IT organisation and the rest of the business. *Journal of Strategic Information Systems*, *8*(1), 29–60. doi:10.1016/S0963-8687(99)00013-X

Peppard, J. & Ward, J. (2004). Beyond strategic information systems: Towards an IS capability. *Journal of Strategic Information Systems*, *13*(2), 167–194. doi:10.1016/j.jsis.2004.02.002

Porter, L. & Roberts, K. (1976). Communication in Organizations. In M. Dunnette (Ed.), *Handbook of Industrial and Organizational Psychology* (pp. 1976–1553). Chicago: Rand McNally.

Posthumus, S., Von Solms, R., & King, M. (2010). The board and IT governance: The what, who and how. *South African Journal of Business Management*, *41*(3), 23–32.

Pozza, G. (2014). Communicating IT governance: Does it matter? *ISACA Journal*, *2*(10).

Price, J. (1972). *Handbook of Organizational Measurement*. Lexington, MA: D.C. Heath and Co.

Radice, R. A., Harding, J. T., Munnis, P. E., & Philips, R. W. (1985). A programming process study. *IBM Systems Journal*, *24*(2), 91–101.

Raggad, B. G. (1997). Information systems concepts: A guide for executives. *Logistics Management*, *10*(4), 146–153.

Reddy, M. (1979). Conduit metaphor: A case of frame conflict in our language about language. In *Metaphor and Thought*. Cambridge University Press.

Rees, J. (2010). Information security for small and medium-sized business. *Computer Fraud & Security*, *2010*(9), 18–19. doi:10.1016/S1361-3723(10)70123-8

Reich, B. & Benbasat, I. (1996). Measuring the linkage between business and information technology objectives. *MIS Quarterly*, *20*(1), 55–81.

Reich, B. & Benbasat, I. (2000). Factors that influence the social dimension of alignment between business and information technology objectives. *Management Information Systems Quarterly*, *24*(1), 81–113.

Robbins, S. & Judge, T. (2013). *Organizational Behaviour* (15th). Prentice Hall.

Roberts, W. (1924). Rhetorica. In W. D. Ross (Ed.), *The Works of Aristotle Translated into English*. Oxford: England: Clarendon Press.

Rockart, J., Earl, M., & Ross, J. (1996). Eight imperatives for the new IY organization. *Sloan Management Review*, *38*(1), 43–55.

Rolland, C., Prakash, N., & Benjamen, A. (1999). A multi-model view of process modelling. *Requirements Engineering*, *4*(4), 169–187.

Rollinson, D. (2008). *Organisational Behaviour and Analysis: An Integrated Approach*. Pearson Education.

Ross, J., Beath, C., & Goodhue, D. (1996). Develop long-term competitiveness through IT assets. *Sloan Management Review*, *38*(1), 31–42.

Sambamurthy, V. & Zmud, R. (1999). Arrangements for information technology governance: A theory of multiple contingencies. *MIS quarterly*, *23*(2), 261–290. doi:10.2307/249754

Sauer, C. & Yetton, P. W. (1997). *Steps to the Future: Fresh Thinking on the Management of IT-Based Organisational Transformation*. San Franciso, CA: Jossey-Bass.

Saunders, M., Lewis, P., & Thornhill, A. (2007). *Research Methods for Business Students*. London: Prentice Hall.

Scheibe, M., Skutsch, M., & Schofer, S. (1975). Experiments in Delphi Methodology. In H. Lindstone (Ed.). M. Turoff (Ed.), *The Delphi Method: Techniques and Applications* (pp. 262–287). Reading, MA: Addison-Wesley.

Schlosser, F., Wagner, H., & Coltman, T. (2012). Reconsidering the dimensions of business–IT alignment. In *Proceedings of the 45th Hawaii International Conference on System Sciences* (pp. 5053–5061). IEEE. doi:10.1109/HICSS.2012.497

Schoeneborn, D. (2011). Organization as communication: A luhmannian perspective. *Management Communication Quarterly*, *25*(4), 663–689. doi:10.1177/0893318911405622

Schwaninger, M. (2001). System theory and cybernetics: A solid basis for transdisciplinarity in management education and research. *Kybernetes*, *30*(9), 1209–1222.

Searle, J. (1969). *Speech Acts*. Cambridge University Press.

Shannon, C. (1948). A mathematical theory of communication. *Bell Systems Technology Journal*, *27*(379), 623–656.

Shannon, C. & Weaver, W. (1964). *The Mathematical Theory of Communication*. Urbana: University of Illinois Press.

Silvius, A., de Waal, B., & Smit, J. (2009). Business and IT alignment: Answers and remaining questions. In *Proceedings of the Pacific Asia Conference on Information Systems*.

Simon, H. (1996). *The Sciences of the Artificial* (3rd). MIT Press.

Skulmoski, G., Hartman, F., & Krahn, J. (2007). The Delphi method for graduate research. *Journal of Information Technology Education: Research*, *6*(1), 1–21. doi:10.1.1.151.8144

Skyttner, L. (2005). *General Systems Theory: Problems, Perspectives and Practices* (2nd). Massachusetts, MA: World Scientific.

Sledgianowski, D., Luftman, J., & Reilly, R. (2004). Identification of IT–business strategic alignment maturity factors: An exploratory study. In *Proceedings*

of the Americas Conference on Information Systems (AMCIS) (pp. 3717–3725). New York, NY.

Sledgianowski, D., Luftman, J., & Reilly, R. (2006). Development and validation of an instrument to measure maturity of IT–business strategic alignment mechanisms. *Information Resources Management Journal*, *19*(3), 18–33. doi:10.4018/irmj.2006070102

Sobh, R. & Perry, C. (2006). Research design and data analysis in realism research. *European Journal of Marketing*, *40*(11), 1194–1209.

Styhre, A. (2010). The concept of 'transduction' and its use in organization studies. *Emergence: Complexity & Organization*, *12*(3), 115–131.

Suchman, L. (1987). *Plans and situated actions: The problem of human-machine communication*. Cambridge, UK: University Press.

Taylor, J., Cooren, F., Giroux, N., & Robinchaud, D. (1996). The communication basis of organization: Between the conversation and the text. *Communication Theory*, *6*(1), 1–39.

Taylor-Cummings, A. (1998). Bridging the user-IS gap: A study of major information systems projects. *Journal of Information Technology*, *13*(1), 29–54. doi:10.1080/026839698344945

Teo, T. & Ang, J. (1999). Critical success factors in the alignment of IS plans with business plans. *International Journal of Information Management*, *19*(2), 173–185. doi:10.1016/S0268-4012(99)00007-9

Thomas, G. (2011). A typology for the case study in social science following a review of definition, discourse, and structure. *Qualitative inquiry*, *17*(6), 511–521.

Thomson, K. (2003). *Integrating Information Security into Corporate Culture* (Master's Dissertation, Port Elizabeth Technikon).

Tomhave, B. (2005). *Alphabet Soup: Making Sense of Models, Frameworks, and Methodologies* (Treatise, George Washington University).

Vaishnavi, V. & Kuechler, W. (2007a). Design research in information systems. *Journal On The Theory Of Ordered Sets And Its Applications*, *48*(2), 133–140.

Vaishnavi, V. & Kuechler, W. (2007b). *Design Science Research Methods and Patterns: Innovating Information and Communication*. Raton, FL, New York: Taylor & Francis Group.

Van Bon, J. (2011). *ITIL: A Pocket Guide*. Zaltbommel: Van Haren Publishing.

Van Grembergen, W. & De Haes, S. (2009). *Enterprise Governance of Information Technology*. Boston, MA: Springer.

Von Glasersfeld, E. (1989). Cognition, construction of knowledge, and teaching. *Synthese*, *80*(1), 121–140.

Von Solms, R. & Von Solms, S. (2006). Information security governance: Due care. *Computers & Security*, *25*(7), 494–497. doi:10.1016/j.cose.2006.08.013

Von Solms, S. & Von Solms, R. (2008). *Information Security Governance* (1st). Johannesburg, SA: Springer.

Weiss, J. & Thorogood, A. (2006). A diagnostic for exploring IT alignment as a strategic weapon. In *Proceedings of the 39th Annual Hawaii International Conference on System Sciences (HICSS)*. IEEE. doi:10.1109/HICSS.2006.8

Weiss, J., Thorogood, A., & Clark, K. (2007). Three IT–business alignment profiles: Technical resource, business enabler, and strategic weapon. *Communications of the Association for Information Systems*, *18*(1), 676–691.

Whitman, M. & Mattord, H. (2012). *Principles of Information Security* (4th). Course Technology.

Willke, H. (1994). *Systemtheorie II: Interventions Theorie*. Stuttgart/Jena.

Willke, H. (2000). *Systemtheorie I: Grundlagen*. Stuttgart: UTB.

Wilson, J. (2002). Communication artifacts: The design of objects and the object of design. In *Design and the Social Sciences: Making Connections*. London: Taylor & Francis.

Witkin, B. & Altschuld, J. (1995). *Planning and Conducting Needs Assessment: A Practical Guide*. Thousand Oaks, CA: Sage Publications.

Yayla, A. & Hu, Q. (2009). The impact of IT–business strategic alignment on firm performance: The role of environmental uncertainty and business strategy. In *Proceedings of the Americas Conference on Information Systems*.

Yin, R. (2013). *Case Study Research: Design and Methods* (5th). California, CA: SAGE Publications.