

**A FRAMEWORK FOR BEST PRACTICES IN THE FUNCTIONING OF EFFECTIVE
VIRTUAL TEAMS IN ORGANISATIONS WITHIN THE TECHNOLOGY INDUSTRY OF
SOUTH AFRICA**

by

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PROMOTOR: PROF H. NIENABER

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PREFACE

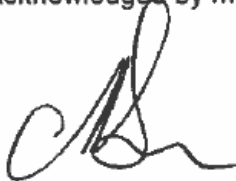
*You will never do anything in this world without courage. It is the greatest quality of the mind
next to honour –*

Aristotle (384 BC–322 BC).

DECLARATION

Student number: 44849842

I declare that the thesis, "**A framework for best practices in the functioning of effective virtual teams in organisations within the technology industry of South Africa**", is my own work, and that all the sources I have used or quoted have been indicated and acknowledged by means of complete references.

A handwritten signature in black ink, appearing to be 'A. J. de Bruyn', written in a cursive style.

Signature

A. J. de Bruyn

30 July 2014

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SUMMARY

A FRAMEWORK FOR BEST PRACTICES IN THE FUNCTIONING OF EFFECTIVE VIRTUAL TEAMS IN ORGANISATIONS WITHIN THE TECHNOLOGY INDUSTRY OF SOUTH AFRICA

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DEGREE: D Com
SUBJECT: HUMAN RESOURCE MANAGEMENT
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Business need required a holistic and focussed framework for best practices in the functioning of effective virtual teams, despite the fragmented nature of empirical studies in this field. This study endeavoured to explore the best practices in the functioning of effective virtual teams against four prominent and unique themes linked to purpose, processes, people and technology. The value of this study does not vest in the existence of virtual teams, but in their orderly operation, in terms of best practice and the value proposition of effectiveness.

Following an exploratory qualitative strategy, the research was conducted according to the interpretivist branch of the phenomenological tradition, with a transcendental orientation in the social research field.

A qualitative multi-case research design for the empirical study was selected, resulting in a non-probability sample within the software sector of the technology industry in South Africa.

An original and pre-tested Lime Survey 2.0+ electronic questionnaire instrument was utilised as the instrument to collect information within a cross-sectional time horizon, to work in synchronisation with the collaborative asynchronous electronic architecture of virtual teams. Content analysis was applied to analyse data.

The main findings indicated that effective virtual teams purposefully orientate themselves toward excellence through electronic management systems, a specific value system, with a knowledge seeking focus, and a seamless linkage in electronic infrastructure, applications, and platforms which contribute to the functionality of the effective virtual team.

The main recommendations were that a pre-existing, functional, collaborative, integrated, electronic management system is regarded as the primary step in founding an effective

virtual team. The focus of organisational leadership should be to embrace a holistic value system approach encapsulating specific elements of excellence, such as trust and independence. Human networking practices pursuing and sustaining knowledge are regarded as the key enabler for functioning of effective virtual teams. Lastly, a focussed seamless interface between the various electronic applications, platforms and infrastructures is recommended.

KEY TERMS:

Virtual teams, purpose, process, people, technology, qualitative research, developing country, technology industry

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CHAPTER 1

RESEARCH ORIENTATION

1.1. INTRODUCTION

This chapter presents a scientific orientation to the study according to the guidelines suggested by Mouton (2001:44-58) and Trafford and Leshem (2008:11-32). It provides the research context by identifying the research gap in the current knowledge and the fit of this study into the broader theoretical community. From current theoretical perspectives, the research questions were developed which are supported by the research statement, research aim and objectives it wishes to address in this study. The intended type of study to investigate the research problem will be discussed in the research design. Expected limitations, assumptions and the main ethical considerations observed in this study will also be noted. A brief overview of the research process will explain how information will be collected during the literature and empirical phases. The selection of cases, data analysis and interpretation will also be addressed. The chapter concludes with an outline of the study.

1.2. BACKGROUND AND RATIONALE

1.2.1 The overall business challenge

The growth and expansion of traditional economies, which mainly focused on agriculture and mining towards production, increasingly changed present day economies into becoming more service oriented (Kanter, 2011:66-80). This transformation from a traditional to service economy was mainly driven by developments in Information Communication Technology (ICT) (Hitchcock, 2012:98-101). Subsequently, countries across the world were obliged to embrace ICT as a mode to be part of the global economy to remain relevant as a global player.

In countries all over the world, the shift from a mining/agriculture/production driven economy to a service driven economy, lead to a skill shortage of people, with the knowledge to utilise ICT in their particular field of expertise in order to implement and support these changes (Kanter, 2011:66-80). As a result, the concept of a knowledge worker evolved to enable sustainable business and growth within a competitive global economy (Drucker, 1954; Gold, 2012:41-57; Smith, 2012:1-156). However, knowledge workers are not always physically

stationed at a particular site where their services are needed (Laihonen, Jääskeläinen, Lönnqvist & Ruostela, 2012:1-10).

Business today are confronted to devise organisational designs and approaches to obtain the services of these highly sought after knowledge workers by breaching the physical distance and sometimes time barriers between organisational team members, through the assistance of ICT (Archibald & Brood, 2012:41-54; Bigliardi, Dormio, Galati, & Schiuma, 2012:36-51). From this global orientation, and within the boundaries of the operational requirements of the employer, flows the growing necessity to engage in flexible work practices, which contributed to the new world of work (Lewis, Lim & Ling, 2012:101 – 118; Sugerman, Scullard & Wilhelm, 2011:101). Flexible work practices in the new world of work resulted in the founding and rapid growth of organisational design type; namely virtual teams (McWhorter, 2010: 623-631).

Like any face-to-face team, a virtual team consists of a group of people who interact to complete interdependent tasks and work towards a common goal (Nemiro, Beyerlein, Bradley, & Beyerlein 2008:1-50). However, instead of meeting in the same office, the team or group members work in different places (or spaces), often at home, and in different time zones. These team members may never meet their co-workers face-to-face. Working in a virtual team may sound simple enough until one realises that geographically dispersed members wholly dependent on technology, making true collaboration a difficult undertaking in any circumstance. Today more than a quarter of a billion people are involved as members of a virtual team (Bergiel, Bergiel & Balsmeier, 2008:99-110).

There is a proliferation of various academic studies, theoretical perspectives, definitions, elements of the virtual team phenomena throughout literature. It is; therefore, certainly not a new phenomenon. With more than three new items placed every second on non-academic search engines such as Google, it is evident that virtual teams are a relevant topic. However, certain gaps in the literature are still noticeable, such as:

- An integrated implementation framework based on best practices within a particular industry which are not training, simulation or manufacturing related, are still lacking (Kirkman, Rosen, Gibson, Tesluk, & McPherson, 2002:67–79; Powell, Piccoli, & Ives, 2004:1; Wade, 2006:6-39).
- Despite an attempt by Lurey & Raisinghani (2001:523-544) amongst eight companies providing professional services through technology in the agricultural

industry, best practices on leadership in virtual teams, a focused research on the best practices in the functioning of effective virtual teams within the technology industry, are still lacking, signalling another gap in virtual team literature.

- There is a dire scarcity of virtual team literature internationally on empirical research of the integration of various dimensions or themes of best practices in the functioning of effective virtual teams on the African continent and in developing economies such as South Africa (Beranek & Clairborne, 2012:1-13; Ebrahim, Ahmed & Taha, 2009: 2653-2669; Guzmán, Ramos, Seco & Esteban, 2011:1-12; WorldBank, 2012). In South Africa, “very little literature exists on virtual teams”, (Louw-Potgieter & Nunez 2007:755-770; Mogale & Sutherland 2010:7-24). A study of best practices in the functioning of effective virtual team in South Africa is needed to “close this gap” (Chimhanzi 2012).

These three overlapping voids signal the gap in the current knowledge and suggest an area where the research problem of this study will position itself in the broader virtual team theory.

For the purpose of this study, the following understanding of virtual teams will be utilised:

- Virtual teams consist of geographically dispersed team members who use computer-mediated communication systems. Other than typical face-to-face teams, its membership is not always definable and limited at a particular point in time. Although the members share in the particular team function independently, the team has a shared purpose and strategy, which was known from the time that a team member joined the team. The team members are jointly responsible for the outcome reached. In a face-to-face team, a particular manager is responsible for managing the relationships in the team, whereas in virtual teams, each member is jointly accountable for managing relationships within the team (adapted from Berry, 2011:186-206).
- Virtual teams have advanced from a simple short term project team to fully fledged permanent virtual team structures consisting of virtual strangers working together as members of a team and team leads located throughout the globe (Berry 2011:186-206). The single most important challenge facing virtual team management is to manage virtual teams towards effectiveness (Ebrahim *et al* 2009:2653-2669). Effectiveness in virtual teams will be discussed in more detail in section 2.7. Three main risks signal areas of opportunity for virtual team

management to intervene towards the sustainability and growth of these teams (Bowers & Cannon-Bowers 2014:301-323). These areas include:

- Issues related to the organisational practices (such as knowledge sharing and its relationship to the task or process) and the design of virtual teams (such as time and distance barriers, demography, the availability of professional skills) (Van der Kleij, Schraagen, Werkhoven, Carsten & De Dreu, 2009:411-423, Zimmerman, 2011:59-78; Gressgård, 2011:102-119)
- Issues related to the member and team practices may include: The blending of individual characteristics to that of the group characteristics, search for and appointment of members, socialising of team members, team intelligence, etc. (Akoumianakis, 2009: 317-345, Akgün, 2008:221-226).
- Issues related to virtual team leadership could reach from a strategic to implementation level (Muethel, Siebdrat & Hoegl, 2011:63-68). These include: Task formulation, selecting platforms for communication, decision-making, management of conflict, appraisal and award systems towards effectiveness, task and co-optation, creating a climate for innovation and trust, management of risk (Beraneck & Martz, 2005:200-213, Berry, 2011:9-28; Fuller, Marett & Twitchell, 2012:20-35; Furumo, 2009:66-73; Noll, Beecham & Richardson, 2010:66-78).

1.3. SIGNIFICANCE OF STUDY

This study will be valuable to the following:

- Management of virtual teams within the software sector of the technology industry as it present the main themes, which need to be addressed for the functioning of effective virtual teams (José, 2012; Lin, 2009).
- As previous research has mainly focussed on a specific element (such as Lurey & Raisinghani (2001:523-544)), this study will attempt to provide a more holistic approach by incorporating themes and its associated elements. Although this attempt is anticipated to increase the complexity of this study, it is expected to provide greater guidance for best practices in the functioning of effective virtual teams to address challenges inherent to working virtually.

- By considering the technology industry in South Africa (a developing economy), on the African continent, the lack of empirical studies will ease implementation of virtual teams in a growing market for prospective investors.
- Virtual teams and face-to-face teams (FTF), or conventional teams (CT), could share some best practices for the functioning of effective teams. However, with “more than a quarter of a billion people globally involved as members of a virtual team”, the phenomenon has grown from merely defining it to exploring best practices in functioning effectively in such a team (Bergiel *et al* 2008:99-110). It is postulated that the challenges that virtual teams face could be different or even vastly exaggerated, and should; therefore, be dealt with appropriately.
- The researcher endeavours that the contribution of knowledge as a result of this study, will not only create a better understanding of best practices in effective virtual teams in the software sector of the technology industry of South Africa, in the particular organisations selected as enabling factors to obtain a tangible return on investment, but also that some of the best practices could also transform a number of the current practices in these organisations. It was suggested by an examiner of this study to utilise the wording of “institution” instead of “organisation”. However, in literature the terminology of “organisations” is customary utilised in the “philosophy of management” (the knowledge of management) (Griseri 2013). For the purpose of this study, “organisations” refer to registered companies listed on a Stock Exchange.
- If other virtual teams could be introduced to some of the best practices in the broader software sector of the technology industry of South Africa, it could well be another step towards future best practices (Marshall & Rossman 2011:69-71; Richard & Morse 2013:52; Saunders, Lewis, & Thornhill 2012:49).

Because the researcher will not attempt to generalise the data in the study, general relevance of the findings could be applied to the greater software sector of the technology industry in South Africa, particularly where virtual teams are involved. The former also promotes analytical generalisation by comparing findings with theory.

Thus, this study seeks to investigate a framework for the implementation of best practices in the functioning of effective virtual teams in the technology industry of South Africa to address business needs and competitiveness pressures, by the utilisation of knowledge workers who are time and space dispersed within the appropriate organisational design of virtual teams. A discussion on organisational designs falls outside the ambits of this study.

1.4. PROBLEM INVESTIGATED

As noted in section 1.2.1, organisations need to devise means to overcome contemporary business needs and competitiveness pressures by utilising the organisation's technological ability to help satisfy these needs. Decision makers in knowledge organisations signalled a need to understand which best practices contribute towards the functioning of effective virtual teams (Kirkman *et al* 2002:67-79). In order to promote an understanding of best practices in the functioning of effective virtual teams, it is necessary to gain insight into the fragmented and underlying principal literature corpus on the subject, which will ultimately contribute towards a final framework of best practices. Effective virtual teamwork is deemed to contribute towards a sustainable and effective business where these teams exist (Ebrahim *et al* 2009:2653-2669).

The research problem investigated in this study is stated as:

Virtual teams are impacted upon by the lack of formal structure and governance adversely impacting on their effectiveness.

1.5. RESEARCH AIM AND ARGUMENT FOR THIS STUDY

The purpose of research is to explore, explain, describe or emancipate (Marshall & Rossman 2011:68-69).

In order to investigate the research problem (see section 1.3), the research aim of this study is stated as:

Explore and understand best practices, for the implementation and maintenance (functioning) of effective virtual teams in the software sector of the technology industry of South Africa.

The central argument of this study is stated as:

That effective virtual teams engage (to a greater or lesser degree) in best practices as embodied by the themes in the framework for best practices in the functioning of effective virtual teams (see figure 1.1).

It will also be discussed in greater detail in Chapter 3.

The themes are purpose, process, people and technology (see figure 1.1).

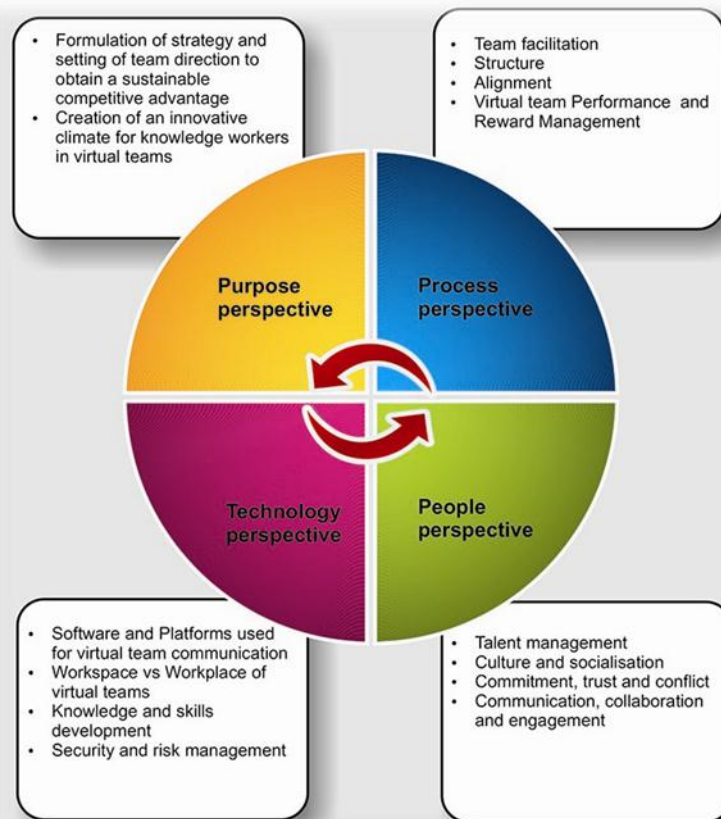


Figure 1.1: Framework for best practices in the functioning of effective virtual teams

1.6. RESEARCH OBJECTIVE

Attempting to understand best practices in the functioning of effective virtual teams is considered to be a critical topic of decision makers in organisations within the software sector of the technology industry of South Africa. There is no disputing of the fact that the retention of skilled staff remains a challenge for businesses (Meisinger 2007:12; Ready & Conger 2007:69-77 and Robert & Börjesson 2006:521-549).

Hence, the overall research objective of this exploratory study is stated as:

To combine the virtual team literature into a principal literature corpus and empirically explore the resulting theoretical framework relating to best practices.

The specific objectives of this research are set out as follows:

1.6.1 Primary research objective

The primary research objective is stated as:

To explore the best practices in the functioning of effective virtual teams in the software sector of the technology industry of South Africa according to a provisional framework.

1.6.2 Secondary research objectives

These were as follows:

- To review and expand the literature in order to develop concepts that will build the final framework consisting of themes of best practices in the functioning for effective virtual teams
- to explore the themes that play a role in establishing best practices for the functioning of effective virtual teams as informed by the literature study

1.7. RESEARCH QUESTION

From the research objective, the primary research question to investigate the research problem is as follows:

What are the best practices applied in the functioning of effective virtual teams in the software sector of the South African technology industry according to the four proposed themes of virtual teams (in figure 1.1)?

The specific investigative drivers associated with this question are as follows:

- To explore the literature on best practices in the functioning of effective virtual teams

- to utilise a questionnaire to explore whether these best practices are utilised (and if so, to what degree), in a virtual team in the South African software sector of the technology industry as highlighted
- to discover whether these best practices in the functioning of a virtual team contribute towards virtual team effectiveness. More specifically, to understand the difficulties of applying virtual team best practices

The specific investigative research questions associated with the primary research question are as follows:

- How do the primary questions (what, how, and why) contribute towards the unique purpose orientation of best practices in the functioning of effective virtual teams? (theme 1: purpose)
- In the light of some of the distinctive elements in the functioning of effective virtual team processes, how do elements influence the best practices in the functioning of processes in effective virtual teams? (theme 2: process)
- Which people practices contribute to effective virtual teams? (theme 3: people)
- With constant changes in technology, which best practices are considered as by virtual teams to remain effective in their functioning? (theme 4: technology)

1.8. RESEARCH DESIGN

In the conceptualisation of the study, the researcher followed an inductive approach. The inductive approach was chosen, as it required the researcher to describe and understand the themes – and the elements contained in the themes – regarding best practices. Following from the research strategy, a qualitative case study research design was chosen (Marshall & Rossman 2011:90; Saunders *et al* 2012:161). Since little research had been done in this industry in South Africa, the qualitative case study research design allowed the researcher to explore a phenomenon in greater depth.

From the research design and its associated epistemology and ontology follows the research strategy, which has a unique scope and particular procedures associated with it to achieve the research purpose (Saunders *et al* 2012:163, 173). In this study, the focus was to gain insight into how virtual team members understand best practices in the functioning of effective virtual teams across a selection of organisations.

1.8.1 Research approach

According to Trafford and Leshem (2008:97) researchers need to ask whether they want to test, examine, or develop theory. In order to investigate answers to the research problem (see section 1.4) and research question (see section 1.7), the researcher followed a qualitative research strategy. In the qualitative research strategy, four major elements regarding the research philosophy of this study (see section 4.4.2.), were addressed (Saunders *et al* 2012:137):

- The intellectual tradition of phenomenology was described, which clarifies the way (effective virtual teams) people (virtual team members) experience (best practices) social phenomena (virtual teams) in the world they live (in the software sector of the technology industry of South Africa).

Further, specific attention was given to the transcendental phenomenological orientation (insights collected from purposefully selected participants) towards the interpretivist research philosophy. According to Seymour (2012:28) and Henning, Gravett and Van Rensburg (2005), an interpretivist research philosophy denotes “understanding”, which holds that reality (knowledge) is a socially constructed phenomenon.

- An interpretivist method can be defined as an inquiry into understanding the experiences of participants and how they view reality (see section 4.2) (Creswell 2003). This study first investigated the fragmented multidimensional theoretical approach (Chapter 3) to make sense of it, before collecting data (Creswell 2003:9). It explored how the epistemology, ontology, design, strategy and method (set of steps) applied, and then fitted together in the methodology in this study (Jonker & Pennink 2010; Richards & Morse 2013:51–52; Trafford & Leshem 2008:143); and,
- finally, the researcher’s judgment of the processes in the study was rationalised (axiology).

1.8.2 Delimitations and assumptions of the study

The qualitative nature of this study allows and recommend for delimitations to be addressed at various points as they arise during the research journey. The original point of delimitation is produced in section 1.7.2.1. Further, delimitations were also addressed in section 4.7 and 8.2.

1.8.2.1 Delimitations

The delimitations of the literature and empirical study are as follows:

- Peer reviewed articles in English and Afrikaans (the latter being the researcher's native tongue) are included in the literature study.
- This study is confined to the software sector of the technology industry in South Africa only, as a non-probability (judgmental) sample.

1.8.2.2 Assumptions

It is assumed that all the organisations in the sample:

- Have virtual teams
- have knowledge workers
- apply best practices for the functioning of effective virtual teams (see figure 1.1) to a greater or lesser degree

1.9. RESEARCH METHODOLOGY

The research methodology used in this study describes how the research approach and methods will produce the most credible results in addressing the second part of the research question (see section 1.8).

This study was confined to the literature study (see Chapters 2 and 3) relating to management sciences, psychology, the technology disciplines in the social science field (Maggetti, Radaelli, & Gilardi 2012:1), as well as an empirical study (see Chapter 6).

In social research, the “voice” of the participants is required to be heard in a “shared space”, to deduce the research experience (Clough & Nutbrown 2012:63). The “shared space” in this

study is organisations, but specifically the people in those organisations who are members of virtual teams. In this instance, the availability of technological devices creates an opportunity for the “voice” of the “virtual community” (members of the virtual team) to be heard in its real-life social context.

1.9.1 Theoretical Conceptualisation

The specific investigative driver associated with the primary research question (see section 1.7) to address the research problem (see section 1.4), was stated as:

To explore the literature on best practices in the functioning of effective virtual teams (see section 1.4).

Following from this investigative driver a literature review was conducted in three phases; namely:

- The pre-study
- the general literature review
- a specific literature review focussing on the four themes in figure 1.1

1.9.1.1 Phase 1: Pre-study

A pre-study was conducted to determine flexible working practices (FWP) in the wider South African market in three main industries (technology, communication and finance), with the focus on the secondary step of virtual teaming (Grobler & De Bruyn 2011). This pre-study was necessary to determine the extent to which these three industries practised flexible working practices. It was determined that although FWPs were practised, they were not widely used. The technology industry in particular revealed the limited use of traditional FWPs such as overtime, but did indicate the use of virtual teams. The findings of the pre-study study convinced the researcher to further explore the use of virtual teams, in the technology industry.

Literature reviews

From the pre-study, the researcher continued to explore information on virtual teams. This was done as follows:

- The general literature review focuses on the virtual team definition, history of virtual teams, benefits and challenges facing virtual teams, types of virtual teams and the measurement of effective virtual teams. This will be discussed in more depth in Chapter 2.
- The literature review specifically focussing on the four themes in figure 1.1., which are purpose, processes, people and technology. This will be discussed in more depth in Chapter 3.

a. *Literature search strategy*

Two types of literature search strategies were available to the researcher; namely:

- General search engines available to the public
- academic search engines available to academic researchers

General search engines available to the public

Information on virtual teams is available but unstructured. If readers simply follow virtual team on search engines, such as Google (excluding Google Scholar), Baidu, Live Search and Yahoo, several “articles/documents” on virtual teams are uploaded every week. By February 2014 over 376 000 000 results (3 items every second) on the Google Website alone were uploaded. The above-mentioned search engines were not part of the researcher’s formal research strategy. According to Du and Evans (2011:299-306) these sources are generally not regarded as appropriate, trustworthy, scholarly reviewed academic sources of information in the broader academic society. However, the researcher evaluated these search engines as marginally informative because they are general sources where people outside the academic field can “forage” or search for information in a particular field. In the context this study, the latter sources were implicitly acknowledged by following the discussions found in them. The general research position on the significant academic status of sources such as Google may change in future research because it is surmised that many organisational leaders make decisions and take action based on these information sources instead of using empirically verified research. This could put their organisations at risk (Du & Evans 2011:299-306).

Academic search engines

Mouton (2001:52) suggest that the researcher choose academic search engines to conduct studies specifically for the scientific theories, methods and philosophies associated with published studies. The researcher chose the following search engines:

- WorldCat
- Sabinet – The following databases were selected: SA ePublications, Index to South African Periodicals and African Journal Archive
- EbscoHost – The following databases were selected: Academic Search Premier, Africa-Wide Information, Business Source Complete; PsycARTICLES, PsycCRITIQUES, PsycEXTRA, PsycINFO, SocINDEX with Full Text
- ProQuest – The following databases were selected: Applied Social Sciences Index and Abstracts, ABI/INFORM Complete, ProQuest Career and Technical Education, ProQuest Computing, ProQuest Psychology Journals
- Emerald Journals
- Theses and Dissertations (South Africa): Nexus and National ETD Portal. International: ProQuest The following databases were selected: ProQuest Dissertations & Theses: UK & Ireland, ProQuest Dissertations & Theses: Full Text, ProQuest Dissertations & Theses: Global
- Newspapers South Africa: SA Media; International: ProQuest Historical Newspapers (The Guardian (1821-2003) and the Observer (1791-2003))

For the purpose of this study, the literature corpus of virtual teams consisted of a borderless overlapping of a variety of scientific disciplines; in particular human resources, psychology, management, and technology. These fields; however, have a common denominator; namely the organisation. For the purpose of this study, virtual teams in the organisations were chosen. The literature that was chosen for this study, included research that could be considered essential and regularly quoted works, in the above-mentioned disciplines. Where available, citation indices were used to adjudicate the standing of significant researchers, particularly in international peer-reviewed journals.

Research in virtual teams has grown exponentially over the years and key contributions have been added to databases (see section 1.9.1). However, this exponential growth, on closer examination, has caused further complications in the research of virtual teams. The overlapping of the psychology, management, and technology fields, have become blurred with respect to virtual teams. Interlinking and synonymous use of virtual teams with

terminology such as open distance learning (ODL), collaboration, invisible organisations and distributed teams, globally distributed teams instead of virtual teams (Farmer 2008; Hansen 2011; Milhauser 2011). The implication of this interlinking and synonymous use of virtual teams with a number of other key words, obscures explicit best practices in virtual teams alone and thus required that the researcher filter relevant practices pertaining to virtual teaming which may be practised in similar terminology.

b. Literature search parameters

The following parameters were chosen:

- "Year":
- 1993-2013 (This specific period relates to the date on which virtual teams first appeared in academic literature until the date on which the literature study for this study was completed. The first date varies from database to database as the publication dates covered varies. (However, to accommodate the broader Wade 2006 database, which is one of the main contributors to theory contained in this study, the start date accommodates academic work in earlier centuries).
- "Publication type":
Books, Peer-reviewed and scholarly journal articles, where possible; Conference papers, Theses and Dissertations, Newspaper clippings (International and South African)
- "Keywords":
"Virtual teams" and "best practices". Both were searched as concepts, which imply that the two words appear next to each other in the literature. This improves the relevance of the references retrieved as it excludes articles where the terms appear out of context.

This search resulted in 14562 entries, with 1874 focusing on "best practices". Upon investigation, repeated citations of some studies were noted, signalling that such studies are important. These studies are contained in either the framework or the literature review (see figure 1.2).

The final selection of publications was based on the relevance of the content to the key words used for organising the database and whether it met the above inclusion criteria.

These publications helped the researcher not only to understand virtual teams better, but also to gain a broader understanding of the world of virtual work.

c. *Principal literature corpus underlying virtual team research*

The literature corpus for virtual team was reflected in research within the technology industry as:

- Literature frameworks (Wade 2006; Ebrahim *et al* 2009)
- literature reviews (Gaudes, Hamilton-Bogart, Marsch & Robinson 2007; Martins, Gilson, Maynard 2004:805-835; Powell, Piccoli, & Ives 2004:1, Schiller & Mandviwalla 2007)

These authors were referred to as the main or principal virtual team contributors.

The information contributed by the above authors was sorted according to an alphabetical list of the identified theory. In an integrated summary (Annexure "C"), the reader will explore overlapping between some of the theories of the main research contributors. Also, a number of contributions reflected merely as confirmation and an extension of previous research, and were listed under the fellowship heading. The fellowship heading implies that the researcher(s) concerned had expanded on an existing theory (which was also listed). The theory contained in this summary was utilised in the holistic approach of best practices in the functioning of effective virtual team for the purposes of this research. A précis of the main virtual team contributors as judged by the researcher of the current study is provided as follows:

- **Framework: Wade (2006): (1858-2006)**

The ICT field, unlike other scientific fields (such as psychology and business management), is relatively new as its existence was mainly driven by the developments in computers and the internet. The ICT scientific research field relies heavily on other scientific disciplines such as psychology and business management to inform the ICT research field on shared areas such as organisations and teams.

No specific parameters for this research field is currently available but guidelines suggested by Wade (2006). His comprehensive ICT website incorporate research which deal with the broader ICT environment, categorised by topics such as the theory appropriateness to ICT,

range and subject matter to build a strong foundation for ICT. Information from this comprehensive ICT website was updated until 2006. Since ICT is viewed as an enabling vehicle for effective virtual teams, theoretical perspectives contained on this website are considered by the researcher to be an integral part of the theory on virtual teams. The summary of the theories cited on the website is appreciated by the researcher as relatively accurate, and has been utilised in subsequent peer reviewed journal virtual team research. The website has a three-tier hybrid quality reviewing process based on:

- Editorial judgments
- citation statistical information
- peer review of international ICT scholars (although the website lacks a structured peer reviewing structure)

Application and appropriation of the database on best practices in virtual team relates to the use of ICT theory.

- **Framework: Ebrahim *et al* (2009)**

The application and appropriation of the research relate to peer-reviewed articles published on virtual team research between 1999 and 2007, which were summarised and categorised into three main perspectives according to twelve key factors contributing to effective virtual team viewed from the technology, process, and people perspective.

- **Literature review: Martins *et al* (2004)**

The application and appropriation of the research relate to peer-reviewed articles published on virtual team research between 1958 and 2006, which were summarised and categorised into identified constructs such as team inputs, team processes, team outcomes, and moderators of team performance in virtual teams. In general, with the no sharing of contributing theorists, Ebrahim *et al* (2009) followed the same theoretical trend as Martins *et al* (2004).

- **Literature review: Powell *et al* (2004)**

The application and appropriation of the research relate to peer-reviewed articles published on virtual team research between 1991 and 2002, which were summarised and categorised

into the 15 theoretical perspectives contributing to best practices in virtual teams such as unity of purpose, team control, and work processes.

- **Literature review: Schiller and Mandviwalla (2007)**

The application and appropriation of the research relate to peer-reviewed articles published on virtual team research between 1993 and 2004, which were summarised and categorised according to ontological basis, pattern of use, and frequency, which differ from the review of Powell *et al* (2004).

- **Literature review: Gaudes *et al* (2007)**

The application and appropriation of the research relate to peer-reviewed articles published on virtual team research between 1999 and 2007, which were summarised and categorised according to the effectiveness indicators in virtual team theories in the following five categories: individual, team, leader, organisation, project and technology. Although the research was generated in the same year as that of Schiller and Mandviwalla (2007), the focus of the study and the additional research period contributed to virtual team research.

Hence, the work of the above-mentioned six studies forms the basis of the theory of best practices in virtual teams (figure 1.2).



Figure 1.2: Summary of the main theoretical frameworks and literature reviews contributing to best practices in virtual teams

d. *Integration of principal literature corpus for best practices in the functioning of effective virtual teams*

To confine and integrate the literature corpus into one, the theories from the summary (Annexure "C") were re-categorised by themes and the themes were then compared to the framework that was all-encompassing; namely that of Ebrahim *et al* (2009).

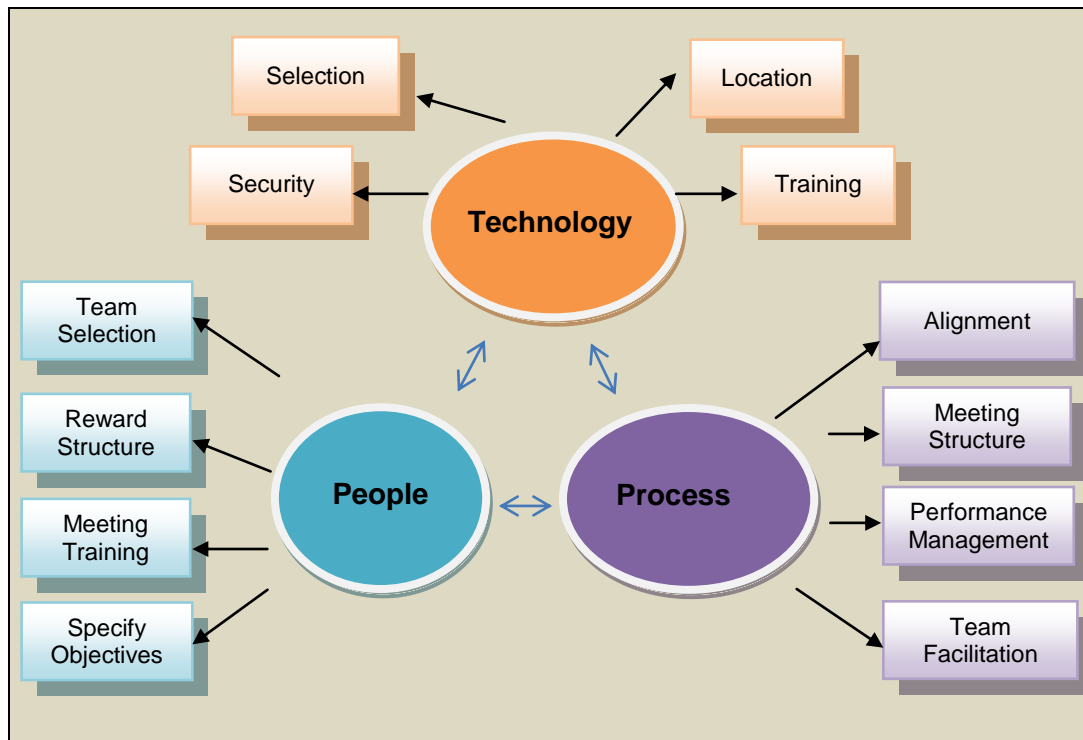


Figure 1.3: Model for effective virtual teamwork by Ebrahim *et al* (2009:2653-2669)
(Source: Adapted from Bal and Gundry (2000))

In Addition, an in-depth study was required by Ebrahim *et al* (2009:2653-2669) because their model was confined to a random sample of small and medium enterprises in the Malaysian and Iranian manufacturing sectors. Furthermore, they suggested that research into various virtual team activities would give broader insight into the practicalities of virtual teams.

In essence, the review of Ebrahim *et al* (2009:2653-2669) considers the research of 18 contributing peer-reviewed academic articles for the period 1999 to 2008. The contributions of these articles were then reorganised into a matrix according to the main topic of the particular research, and the twelve key factors contributing to virtual working evolved. These twelve key factors were originally suggested by Bal and Teo (1999, 2001). Although not explicitly stated, their work followed a pattern of “people-process-task”, in which they omitted the task and utilised technology as an enabler. The “people-process-task perspective” combines the work of earlier researchers. Firstly, Kiesler, Siegel and McGuire (1984) suggested an “inputs-processes-outcomes (I-P-O) model”, which describes the flow of data into a system in some form, that is, input, process, output, storage. Secondly, Giddens (1984) suggested the adaptive structuration theory (AST) from the structuration theory (ST) (1980), which explains the development of teams in particular situations where technology is utilised as the key communication enabler. The research of Kiesler *et al* (1984) and Giddens (1984) is commonly cited as research that is part of a greater body of knowledge which

presents an overlap of research in the technology industry and virtual team (Martins *et al* 2004; Powell *et al* 2004; Wade 2006; Schiller & Mandviwalla 2007; Gaudes *et al* 2007). If one considers the work of Ebrahim *et al* (2009:2653-2669), they hardly considered or even acknowledged the greater international body of knowledge on virtual teams at the time (such as Gaudes *et al* 2007; Martins *et al* 2006; Powell *et al*, 2004; Schiller & Mandviwalla, 2007).

For the purpose of this research, the hierarchy of Ebrahim *et al* (2009:2653-2669) was marginally adapted, because the researcher made a judgment call that the more logical chronological order of presenting best practices in virtual teams relate to:

- The purpose theme (Nemiro *et al* 2008:1-50)

In the following themes Ebrahim *et al* (2009:2653-2669) remained unchanged, but the elements were changed (see reasoning for changes in Chapter 3):

- The process theme
- the people theme
- the use of the technology theme as an enabling vehicle

The supporting research framework of Wade (2006) and the literature reviews of Martins *et al* (2004); Powell *et al* (2004); Schiller & Mandviwalla (2007) and Gaudes *et al* (2007) and their contributions to the perspectives described on this page will be explored and recategorised in Chapter 3, in order to extend the contribution of these theories towards a framework for best practices by Ebrahim *et al* (2009:2653-2669) (figure 1.1, is included again for ease of reference).



Figure 1.4: Framework for effective virtual team best practices

(Source: Adapted from Ebrahim *et al* (2009:2653-2669))

1.9.2 Research scope

It would be impossible to explore the whole technology industry population in South Africa because of practical, time, and budget constraints.

A non-probability (judgmental) sample (Salkind 2012:96-103; Saunders *et al* 2012:262-281) in the software sector of the technology industry of South Africa as listed on the Johannesburg Stock Exchange (JSE) was utilised for this study (Krippendorff 2013:120; Richard & Morse 2013:89 and Saunders *et al* 2003:125) (see section 4.6). A judgment call was made by the researcher to include the significant top three international software technology industry companies, as identified during October 2009 on the Forbes list (see

Table 4.1), and the listed local (South African) companies within the software sector of the technology industry companies as listed on the JSE (Annexure "B"). This combination of international and national role players resulted in Table 4.2.

This scope was chosen for the following reasons (see section 4.6.2.3):

- The value contribution of this study to the industry (José 2012; Lin 2009)
- the study refers back to the pilot study (Grobler & De Bruyn 2011: 63-78)
- the financial indicators shows that this is a growing industry (International BM 2011)
- the fragmented nature of the industry (i.e. how many organisations are represented) Gillwald 2012; James, Esselaar & Miller 2004:1-8)
- the shortage of skilled workers in the industry (Pandor 2007)
- the classification categories in the industry most likely to present results to answer the research question (Saunders *et al* 2012:262; Strydom 2011)

1.9.3 Data collection

The purpose of data collection from a phenomenon as in this study, was to gain plausible insights into the best practices in the functioning of effective virtual teams and apply particular techniques to generating and analysing data that are difficult to explore (Richards & Morse 2013:199).

The theoretical research for this study is available in Chapters 2 and 3. Subsequently, the empirical study (Chapter 4) relating to the best practices outlined in the literature study, in the effective virtual teams as experienced and perceived by their members will be discussed in Chapter 6.

[Although focus groups are normally associated with the research design of a study (qualitative), the best type of collaborative architecture for a particular virtual team needed to be chosen, and the researcher elected to work in the preferential manner as the virtual teams (Loch, DeMeyer & Pich 2006:252-253; Kreitner & Kinicki 2010:64; Salkind 2012:215)]. The researcher; therefore, deemed face-to-face focus groups to be unsuitable for the context of virtual teams. Data were collected mainly by means of web-based questionnaires (Saunders *et al* 2012:176,416).

1.9.3.1 *Data collection process*

The researcher endeavoured to understand the actions of the actors (virtual team members) which follow from a qualitative interpretivist strategy. However, the researcher did not only want to understand the actions of the actors, the researcher also wanted to expand on a framework of best practices to include academic theory after Ebrahim (2009). In the data-generation process, attention was focused on the negotiation of organisational access, informed consent and the right to self-determination (see section 4.8) (Beskow 2006:38–40; Saunders *et al* 2012:455).

Questionnaires are regarded as an economical way to generate data on standardised questions, making data easy to compare and providing the possible reasons for relationships (Saunders *et al* 2012:17). Following qualitative case study research design, the researcher conducted a self-completed web-based questionnaire selection by using the Lime Survey 2.0+ tool, which allowed her to design the questionnaire, electronically collect data from the participants, and to a limited extent, to facilitate simple analysis of data in the same software (Salkind 2012:156; Saunders *et al* 2012: 422). The questionnaire was used as the main independent qualitative data gathering technique (Annexure "F"). The Lime Survey 2.0+ provides an automatic precoding tool for each question, which promotes subsequent data generation (Saunders *et al* 2012:443).

Initially, entry to the identified organisations (table 4.2) in the South African technology industry was sought. The HR directors of the companies were contacted telephonically and their organisations' participation in the study requested. They also received an explanation about the rationale of the study and the definition of virtual team. The telephonic interview with the HR Director was threefold and qualitative in order to determine whether virtual teams were functioning in the organisation, to gain access to a virtual team and its leader and to obtain commitment to organisational participation. A letter of invitation was forwarded to the HR director with the electronic link to the survey. He or she could then distribute this to the virtual team leader and its members. If the members had no objection in participating, an electronic questionnaire was sent to the members of the virtual team for electronic completion and submission.

1.10. DATA ANALYSIS

The data analysing technique typically associated with case studies is "content analysis" (Richards & Morse 2013:207). This data analysis research technique is "replicable and valid

descriptions and interpretations of the written productions of a society or social group” (Krippendorff 2013:24; Marshall & Rossman 2011:161). Content analysis is a technique used to determine the presence of certain themes (purpose, process, people, and technology), words and concepts (best practices, functioning, effective virtual teams, and the software sector in the technology industry of South Africa) in text—such as the questionnaire—by coding the text in manageable sections (Annexure "G") (Krippendorff 2013:1-5). The outcome of the content analysis was used to make deductions about the meaning in the text with reference to the participants (chapters 6 and 7).

1.11 INTERPRETATION

After the data, categories and themes were analysed, the researcher will offer an integrative understanding of what was observed. Interpretation serves to bring “meaning and coherence to the findings”. This clarification of what has been learnt serves to make sense of the connection of the “themes, patterns categories”, context units and responses in the empirical study (Marshall & Rossman 2011:219). The responses of the participants will be considered in terms of their “usefulness” and “significance” (Marshall & Rossman 2011:219). If any response was repeated or similar meaning attached to it more than once, *theoretical sufficiency* (not *saturation*, since people's explanation of their experiences would be subjective) is deemed to be reached. The meaning will be labelled as a context unit, which will contribute to significance (Marshall & Rossman 2011:220).

1.12 RESEARCH ETHICS

In terms of a qualitative philosophy, this study dealt with the collection of “qualitative data which describes meaning and experience which is subjective, not value-free and inextricably linked to the goals of the researcher who may not be emotionally detached from the topic of enquiry” (Watts 2008:440-441). The basis of qualitative research lies in the interpretive approach to social reality and in the description of the qualitative research (Creswell 1998). The following principles were adhered to throughout this study (Salkind 2012:85-89):

- *Protection from harm.* The benefits and risks were minimised by the researcher, and the participants protected from possible psychological and physical anticipated harm. This study involved negligible or minimal risk to the participants.
- *Coercion.* Participants should never be forced to participate in research. In this study, the researcher informed the participants that they had the option not to

answer any question. The questionnaire also allowed participants to go back to questions and change their selected choice. At the end of the questionnaire, the participants were required to indicate whether they would like to go back and answer questions that they had initially elected not to answer.

- *Informed consent.* Each of the participants indicated that they understood and were willing to participate in the research. This was done at the beginning of the questionnaire where participants were allowed to read what was required for their participation. By clicking on the “next” button, participants confirmed that their participation was voluntary.
- *Confidentiality.* The researcher undertook to ensure that any information on the participants would be confidential and confined to a controlled situation. Participants were given the option to declare their user name, but the conditions under which they provided their user name were predetermined (only for clarification of data by the researcher).
- *Debriefing.* Participants were informed of the results as soon as possible after the study had been completed. They were also requested to name a preferred publication journal, which the researcher could pursue, if they wished to read more about the study.
- *Sharing benefits.* The researcher informed the participants that information of the results would be shared with the wider population concerned. This study was made public on the University of South Africa’s library repository.

The manner in which this study was confirmed was by using the original electronic questionnaires received back from participants. The electronic addresses from which the questionnaires were sent, were available after highly technical IT audits (but were kept confidential), and the contents of the questionnaires was kept for the purpose of peer-reviewed evaluation of this study only and not for public scrutiny.

In this research study, the questionnaire design elements, namely dependability, credibility, transferability, and confirmability ensured that the data and interpretations were valid (Marshall & Rossman 2011:41). These elements are discussed as follows:

- *Credibility.* This relates to an evaluation of the extent to which the data that are presented are trustworthy.
- *Transferability.* This refers to level of applicability of a study to other settings or situations, such as the questionnaire or research findings (Lincoln & Guba 1985).

- *Dependability.* This refers to the extent to which other researchers could duplicate the study and obtain similar results.
- *Confirmability.* This refers to the extent to which other researchers can *support* the findings in this study to ensure that the opinions and experiences of the participants are the truth.

1.13 EDITING AND REFERENCING

This section explains the editing of the thesis and the method used to acknowledge and record references or sources of information used as per University and Faculty guidelines.

1.13.1 Editing

An accredited language copyeditor was engaged to proofread this thesis. The accredited language copyeditor assisted to improve the language and writing style by correcting tenses, grammatical and style errors. (Annexure "I")

1.13.2 Referencing

This study used the Harvard reference technique because of its ease of referencing. The quotations and /or sources used in this study are acknowledge and indicated by the surname of the author or the name of the institution or government that authored the document or title of the document, followed by the date or year of publication, colon and if it was a direct quote the page number(s) from which the quotation is extracted (for example, Mouton 1996:1).

The Bibliography which list all the sources consulted is arranged alphabetically according to the authors' surname, name for name of the institution or government that authored the document, the date or year of publication, the title of the document, place of publication and name of the publisher.

1.14. CHAPTER LAYOUT

This section briefly indicates the contents of each chapter in this study and serves as a roadmap (Saunders *et al* 2012:603) culminating in final layout in Chapter 8.

Chapter 1	Sets the research context by providing the background to the research. It also deals with the research scope and context in relation to the software sector in the South African technology industry. This chapter expands on the research problem, design and process.	Research context
Chapter 2	Provides a pre-amble to literature review of virtual teams and includes the origins and history of these teams as well as theoretical perspectives.	Theoretical framework
Chapter 3	Contains a description of best practices categorised into four main themes (purpose, process, people, and technology) followed by a summary of the main theoretical indications further empirical research under each theme.	
Chapter 4	Outlines the research methodology to address the research objectives and the way in which data were collected by means of questionnaires. It includes a discussion on the research methodology and its intended application in the study, the research approach (inclusive of the justification for qualitative research and the research philosophy) and the research design (inclusive of a discussion on case studies). It discusses the research context (inclusive of the population and sample); the data making process (inclusive of the data instrument); measurement, and brief discussions on the analysis and interpretation of the results.	Research method
Chapter 5	Discusses the pre-testing of the questionnaire and its pre-liminary findings.	
Chapter 6	This chapter serves as a linkage chapter between Chapters 5 and 7. A comprehensive overview is presented regarding the researcher's experiences while obtaining data from the responding participants in the companies; how the challenges were bridged, and contain revisions made following the pre-testing of the questionnaire.	Research sense making
Chapter 7	Presents the actual findings of the participants' responses on each of the questions. It provides an analysis of the findings and the interpretation of the findings.	

Chapter 8	Presents the main and secondary emerging factual, conceptual and knowledge findings and conclusions, critiques the research approach and methodology; and present recommendation. It explains how the knowledge gap was filled, the extent to which the limitations was bridged and the scholarly contribution of this study to the literature corpus of research on virtual teams. It identifies the implications of the best practices identified and suggests possible future research areas.	Findings, analysis, conclusions, recommendations and contribution.
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1.15 CHAPTER SUMMARY

Chapter 1 placed the study into context by providing the background to the research. The changing business landscape and the contribution of globalisation towards the changing world of work were highlighted. The applicability and necessity of this research study was argued. The virtual team research questions and objectives were explained and the research perspective presented. The research methodology and research scope were also outlined. In conclusion, the chapter layout was highlighted.

In the next chapter the literature review of virtual teams, the origins and history of these teams as well as theoretical perspectives will be expanded upon. Chapter 3 contains a description of best practices categorised into four main themes (purpose, process, people and technology).

CHAPTER 2

MAPPING THE VIRTUAL TEAM LANDSCAPE

2.1 INTRODUCTION

This chapter presents a scientific background on virtual teams suggested by Mouton (2001:87) and Trafford and Leshem (2008:79). In this chapter, a general overview of the virtual teams will be presented:

- An orientation to the literature research background
- impact of technology on the world of work
- a discussion on virtual working and the organisational design of virtual teams
- the definition of a virtual team
- virtual team history
- benefits and challenges facing virtual teams
- virtual team types
- the measurement of virtual team effectiveness
- a chapter conclusion will be presented

Chapter 2 serves as a pre-amble for the literature review contained in the ambit of Chapter 3. In the next chapter, a description of best practices categorised into four main effectiveness themes (purpose, process, people and technology) will be presented.

2.1.1 Purpose of mapping the virtual landscape

The theoretical position of a study serves a number of purposes, as highlighted as follows (Trafford & Leshem 2008:79):

- It influences the research topic and methodological approach and associated data collection methods of the study such as the qualitative case study research design
- it confirms the knowledge currently available and the gap in that knowledge
- it limits the scope of the research—in this study—the software sector of the South African technology industry
- it provides a platform for the data analysis where an understanding of the participants' opinions and experiences is considered
- it justifies the results and contribution of the study

- it informs the design, processes and conclusions of the study

2.2 BACKGROUND

2.2.1 The need for virtual teams

Three main influences for the development of virtual teams were noted in literature:

a. Changes in the world of work

Technological advances have taken place throughout the development of humankind and stimulated the way business has adapted and changed. Technology may be regarded as “an interdisciplinary, multidimensional collective noun displaying the seamless character of the Internet society and its marginality with different degrees of inclusion, which is evident in at least six broad categories of current-day life...” (Bijker *et al* 2012:1-12; Wong & Komlodi, 2012). These six categories are as follows:

1. Communication ICT (information computer technology), sometimes abbreviated as IT (information technology) or simply and hardware (e.g. the iPad)
2. transportation (vehicles)
3. entertainment (television, PSP gaming)
4. household appliances (microwave ovens and fridges)
5. energy equipment (machinery and equipment)
6. personal devices (health care devices)

In this study, the focus will be on communication ICT and the sometimes-abbreviated synonym IT, particularly software. ICT’s recognisable independence from other disciplines in science can be linked to the foundation and subsequent growth of the digital or information age (Schultze 2012:108-109). Carlopio (2011:67-77) identified at least three phases of technological development; namely:

- “Depended machines (bucket elevators)
- semi-automatic machines (Jacquard loom)
- automatic machines (*continuous process technologies*)”

The way people interact with the networks of data and their associated hardware, transpiring from technology interventions (*continuous process technologies*), is one of the key issues in

business today. Technology has made it possible to work in teams and render a service (and goods), in which—due to technology—all team members, all consumers and clients may not be in one another's physical proximity ("out of sight"). The umbrella term of this "out of sight" method of working is referred to as "virtual working" and has heralded the information age with the interface of ICT and people as crucial to achieving a competitive advantage and sustainable development (see section 1.2.1) for business (Denwar 2010; Dey, Hariharan & Ho 2007:46-64).

The era of embracing ICT—the information age—signalled the commencement of new strata of organisational design and practices relating to the management of teams, especially communication between people on electronic networks. These "networks of people" are becoming a more prominent feature of modern day organisations and specifically the way in which people interact with technology and each other (Lipnack & Stamps 1993:1-400). Because of on-going developments in IT, members of organisations have to embrace the use of technology and learn how to use their organisation's IT tools to utilise data resources for more effective and efficient operations across all areas. "IT cannot exist in isolation because it is integrated throughout the organisation, but need to have competent technological performance. According to Agrawal, Vilpin, Taylor and Tenkorang (2011:20-36) "organisations need an adequate supply of technologically skilled professionals", to align the IT skills necessary to support organisations facing completion.

Ratcliffe (2010:47-61) maintains that when organisations face up to competition, change and connect with changes in a positive way, people start to focus on the future again. One of these change drivers that increases competitive advantage within an organisation is technology that needs to be managed. Technology management presents challenges such as different "technology management strategies, predictions, availability and effective combinations of technology to ensure a maximum competitive advantage and high performance..." (Ratcliffe 2010:47-61). Therefore, despite the progression in Technology, it also presents challenges in global business.

b. Business developments in the global economy

In growing the global business network, knowledge workers with IT skills are highly sought after to gain a competitive advantage and promote sustainable development in business within a competitive global economy, in order to bridge "indirect secondary cost effects such as: the availability of expert knowledge despite distance and time, work-life balance, family responsibilities and flexibility requests, curbing of late-coming, stress caused by traffic and

workdays lost due to accidents” (Drucker 1954:63; Gold 2012:41-5; Pitt Bennit & Price 2012:277-288; Smith 2011:1-156; TomTom 2012). One of the organisational designs resulting from technology, which takes the business demands of a modern workforce into account, is virtual teams.

2.2.2 Virtual teaming in context with other organisational designs

To have a common understanding of virtual teams, it is necessary to explore virtual teams from their origin (general teams) (Boote & Beile 2005:3-15). The team in a workplace is generally accepted as stretching back as far back as members of human kind have been working together to reach a goal (Rahschulte 2011: 15-18). One of the contemporary team designs, which evolved resulting from technology intervention, is virtual teams. Some of the other alternative organisational designs, resulting from technology, include the following:

- Telework and telecommunicating. These are “partially or completely external of the main workplace with the aid of information and telecommunication services” (Martinez-Sanchez, Perez-Perez, De-Luis-Carnicer & Vela-Jimenez 2006:202-214).
- Virtual communities (VCs). These are “larger entities of distributed work in which members participate electronically, guided by common purposes, roles and norms”. Driven by sustainability and other organisational needs VCs normally do not form part of organisational design, but voluntary strategic (in an industry) collaboration between teams on knowledge work and activities could be shared in an on-line group for instance between academia in the human resources community. (Yaich, Boissier, Picard & Jaillon 2012: 217–223).
- Virtual customer integration (VCI). These are a “subgroup of virtual communities that explicitly concentrate on information exchange and social interactions around a specific topic of interest as well as the relationship between the motivations and the outcome of interest” (Bartl, Füller, & Mühlbacher 2012:1031-1046; De Valck, Langerak, Verhoef & Verlegh 2007:241-256).
- Collaborative networked organisations (CNOs). These are “complex entities whose proper understanding, design, implementation, and management require the integration of different modelling perspectives” (Camarinha-Matos & Afsarmanesh 2007:529-542).

It is clear from the preceding that a number of organisational designs, resulting from technology, are available for business leaders ranging from the most elementary

(teleworking) to the more complex organisational designs (CNOs). The virtual teams may position itself within each of these designs, as it will crystallise from the definition provided in the next section.

2.2.3 Virtual team description

Various definitions of virtual teams (Bergiel *et al* 2008:99–110; Lipnack & Stamps 1993:1–40, 1994:1–264, 1997:1-11; Lojesky & Reily 2008; Miles & Snow 1986: 62–73; Powel *et al* 2004:359-379) are available in literature. The research field of virtual teams as an organisational design is about 20 years old (from the first time the terminology had been used). Virtual teaming “was not innovated by an individual, but evolved due to technology advancement” (Bergiel *et al* (2008:99-110). In contrast to the findings of Ebrahim *et al* (2009:2653-2669), the researcher found a valuable selection of definitions to create adequate depth of the definition of the virtual team organisational design. The virtual team description is elaborated upon in the following.

Miles and Snow (1986: 62-73a) first described the phenomenon of virtual teams as a “type of small group where a group of people, stretched over space, time and organisations, which is an inherent component of a network of organisations interacting with one another”. Lojesky and Reily (2008) clarified the concept of distance and confirmed virtual teaming to be an organisational design. They differentiated between two types of distances: Operational distance which can be described as “growing out of workplace dysfunction (such as miscommunication via electronic written media)” which leads to affinity distance “the emotional barriers between team members regarding collaboration who are physically absent from each other”. Lipnack and Stamps (1993:1-40; 1994:1-264; 1997:1-11) added to the Miles and Snow (1986) definition that the team is “supported by computer and communication technology” which Piccoli *et al* (2004: 359-379) later termed differently: “information and telecommunication technologies”. Bergiel *et al* (2008:99-110) is in support of the study conducted by Piccoli *et al* (2004) and strengthened the findings by explaining that in working on a virtual team, members are wholly dependent on technology for collaboration and engagement. Cohen and Bailey (1997:239–290) added interdependency of team members “in their tasks, who share responsibility for outcomes, who see themselves and who are seen by others as an intact social entity embedded in one or more larger social systems, and who manage their relationship across organisational boundaries”. Piccoli *et al* (2004:359-379) fine-tuned the tasks as “one or more organisational tasks”. The unique place and tasks of virtual teams, were later confirmed as occurring in “multiple institutional contexts” (confirming various networks interacting), “tasks are interdependent” (confirming

the team approach) and the varying degrees of geographic dispersion (confirming the space and time possibilities) (Cudoba *et al* 2005; Lee-Kelley & Sankey 2008; Peters & Manz, 2007; Staples & Zhao, 2006).

Nemiro *et al* (2008:1-50) added a number of elements to the virtual team definition. They highlight the fact that virtual teams are an “organisational design” and added effectiveness and creativity as quality targets to obtain a particular purpose, goal, or direction. They confirmed the interdependence of tasks and add that team members may never meet face-to-face. They further to the Nemiro *et al* (2008) definition, indicating the virtual team’s dependency on (technology) to collaborate and engage as a broadening scope of methods used to accomplish goals (Peters & Manz 2007:117–129). Ebrahim *et al* (2009:1575–1590) contributed “small temporary” and “dispersed knowledge workers” to Nemiro *et al* (2008) definition, thereby identifying the type of worker and the continuity of virtual team members. Since then, a number of researchers have confirmed the educational and vocational superiority of virtual team members as well as another dimension; namely that they “exhibit professional maturity regarding work ethics in their field” (Gressgård 2011:102-119; Van der Kleij *et al* 2009:411-423; Zimmerman 2011:59-78). Siebdart *et al* (2009:63-68) clarify the debate on who is managing a team by adding, “all team members of the group are responsible for the success of the team, due to their respective expected contributions. However, the organisational team leader is assigned to deal with managerial issues such as obtaining of the resources, creating a co-operative environment, influencing creativity, and arranging for remuneration”. This concept was adapted from Berry (2011:186-206) which confirmed the changing leadership role in virtual teams and added, “team members become jointly responsible and accountable for the outcome reached, and this responsibility will be valid for the duration of the existence of the team. He adds that the “dynamics of the leadership role are different than in face-to-face teams”.

From the above, the analogy can be drawn that a virtual team has a different organisational design from the face-to-face team, based on its nature, which encourages the use of technology to promote its flexibility, rather than viewing it as an obstacle. Virtual teams leverage those elements that ordinary face-to-face teams view as barriers (such as distance, distant talent and task interdependency) to their advantage. Due to its flexible nature it has more options available, to adapt to situations which would be unattainable by face-to-face teams (such as quick access to professionals who are not physically located in the group). However, virtual teams may also display known face-to-face team characteristics (such as that they have to have a purpose and team dynamics). The virtual team is an organisational design. It enables team members across various institutional

contexts, which are highly qualified and emotionally mature knowledge workers, to professionally socialise and work together (people perspective). These members utilise processes that uniquely align the members and technological equipment and software with each other (process perspective) irrespective of physical barriers such as time zones, culture and distance. The people and process utilise an array of available technology strata (technological perspective) to accomplish a particular purpose (purpose perspective) of the team. Team members may work independently or dependently from each other, according to the task at hand (process perspective). Team leadership depends on the expertise of a member at a particular stage of knowledge acquisition in the team life cycle, while administrative management of the team may still be assigned to a dedicated organisational individual (process perspective). The nature and duration of a virtual team depends on the goal of the team. This definition extends the simpler adapted version of Berry's definition, which will be utilised as the guiding definition for this study and will be utilised as the guiding definition for this study:

Virtual teams consist of geographically dispersed team members who use computer-mediated communication systems. Other than typical face-to-face teams (FTFs) or conventional teams (CTs), virtual team membership is not always definable or limited at a particular point in time. Although the members share in the particular team function independently, the team has a shared purpose and strategy that was known from the time a team member joined the team and will be jointly responsible that the outcome is reached, and will be valid for the duration of the existence of the team. In a conventional FTF team, a particular manager is responsible for managing the relationship between team members, whereas in virtual teams, each member is jointly accountable for managing relationships within the team. Although the role of the team lead might, bear similarities to that of the FTF team manager, the dynamics of the position are different (adapted from Berry, 2011:186-206).

Based on the definitions of virtual teams, certain main risk areas and opportunities that constitute the themes or perspectives for best practices in the functioning of effective virtual teams this study can be identified (see figure 1.1). The development of virtual team knowledge will be divided into the following three major development areas for this study: the Trivium, Renaissance and Sustainability periods (see section 2.3).

2.3 HISTORY OF VIRTUAL TEAMS

The development of how virtual teams evolved from an organisational phenomenon to a fully-fledged organisational design, accepted worldwide as a method to increase organisational sustainability and growth, is divided for the purposes of this research into three main periods, which is graphically elaborated upon in Figure 2.1:

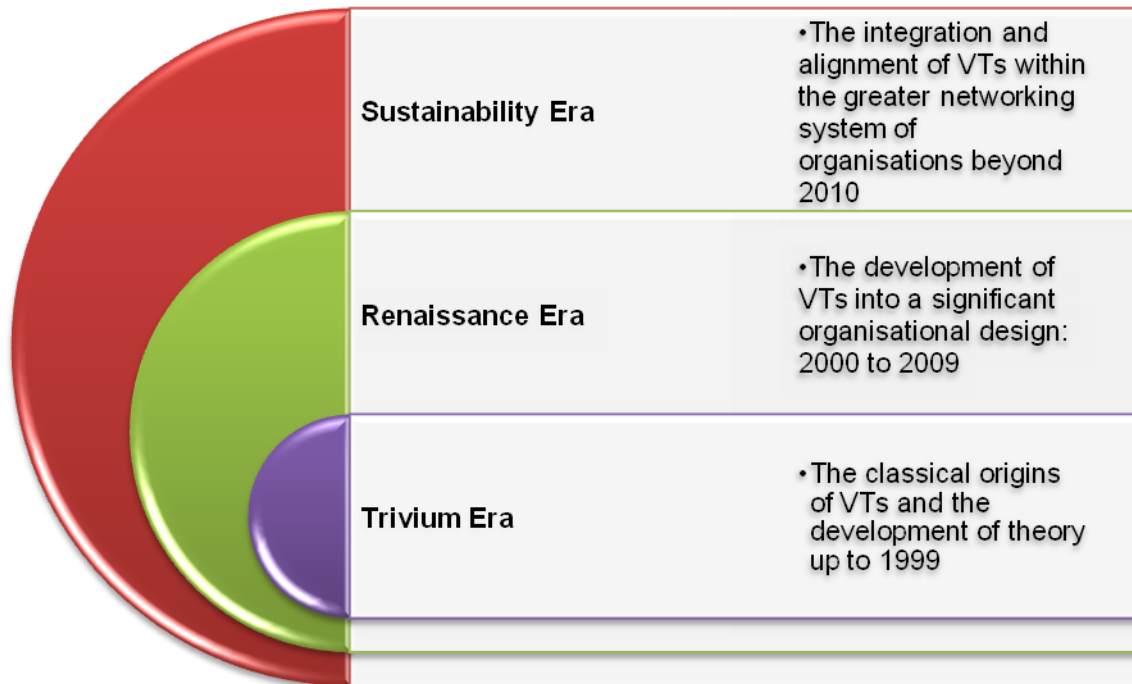


Figure 2.1: Compilation of the development phases of virtual team theory

2.3.1 Period: Virtual team trivium – the origins of virtual teams and the development of theory until 1999

This classical theoretical era, culminated from the three multi-disciplinary, predominant scientific fields of virtual teams (management, technology and social sciences), as the logical origin of the virtual team phenomenon with their related language use and rhetoric by means of theory compilation. This era also culminated from the following features, making it very complex:

- Face-to-face team functioning became the origin of the virtual team (Fiedler 1967:149).
- Most research was conducted in educational, laboratory and simulated working environments, and then generalised for virtual teams in other types of organisational groups such as sport and social groups (Lipnack & Stamps 1993:1-40; Kostner 1994).

- There was a debate about the use of the words “team” and “group” (Katzenbach & Smith 1993; Cohen & Bailey 1997:239–290). For the sake of consistency in this research, the researcher chose the word “team”, as being more purposeful and appropriate.
- The ISO9000 quality management series in context with regard to its application in teams was predominantly used (Pearlman & Chacko 2012:48-66).
- The composition of various “empowered or self-managing work teams” was explained (Park 2012:714-730).
- ICT and networks were introduced in this era, which left management in organisations vulnerable, and long-standing management practices had to be revised, specifically with regard to the lack of skills, complex environmental development and information sharing (Lipnack & Stamps 1993:1-40; Kostner 1994).
- The two main perspectives regarding virtuality in virtual teams stretching from 1990 to 1998, where at least 41 articles in peer reviewed journals were published with the main theme being face-to-face communication as compared with technologically mediated communication:
 - One perspective focused on the people interaction. “Virtual” was referred to as never meeting face-to-face (Jarvenpaa, Knoll & Leidner 1998; Davison & Ward 1999)
 - the other perspective focused on technology. “Virtuality” should rather focus on the variety of technology that makes communication possible (Townsend et al 1998; Young 1998)

Agreement between these two above perspectives returned, “virtual teams will be most effective where the technological communication media used are shaped by a team’s task and its context” (Maznevski & Chudoba 2000:474). It was acknowledged that both technology and relationships are fundamental to the existence of a virtual team. Technology serves as an enabling vehicle for the relationship to continue within the virtual team realm.

2.3.2 Period: virtual team renaissance – the development of virtual teams into a significant organisational design: 2000 to 2009

This expansion era signalled a revival of human resource practices with the integration of ICT. This era was characterised by the following:

- The greater majority of research conducted on virtual teams was in educational, laboratory and simulated working environments, with a limited amount of research in business organisations (Lurey & Raisinghani 2001:523-544; Robey, Khoo & Powers 2000; Van Ryssen & Godar 2000: 49-60).
- The existence of networks and the impact of ICT became a distinct feature of modern teams and organisations (Martins *et al* 2004); integrated global human resource practices featured to overcome globalisations (Kirkman *et al* 2002).
- Hindsight evaluation encouraged many organisations to introduce virtual teams by the mid-1990s (Walvoord Redden, Elliott & Coover 2008: 1884–1906).
- Debates on virtual teams focused on different perspectives on the effective integration of people and ICT, such as knowledge sharing between team members (Griffith, Sawyer & Neale 2003).
- Research into particular essentials related to virtual teams (such as the type of technology used and trust) (Ebrahim *et al* 2009; Gaudes *et al* 2007; Martins *et al* 2004; Powell *et al*, 2004; Schiller & Mandviwalla, 2007; Wade 2006).

The focus of theory in this era was driven towards the application of available theoretical views on virtual team (like comparisons between virtual team working and face-to-face working) instead of describing the phenomenon of virtual teams.

2.3.3 Period: the sustainability era – the integration and alignment of virtual teams within the greater networking system of organisations beyond 2010

Since 2010, against the background of the worldwide energy crisis, deteriorating traditional physical networks and infrastructure (such as roads), increasing environmental catastrophes, wars and a worldwide shortage of talented workers, a “fresh look at organisational designs and people resources which accommodate the influence of technology is needed. Greater emphasis is placed on the organisation to design environmentally friendly and sustainable work practices and integrate them with intelligent networking and partnerships. This concept was adapted from Farmer (2008: 125) in that former organisational designs and people management orientation may still be in use. However, influences of increased technology usage in organisations and the ability of people to network, through the integration of the visible and invisible organisation, are regarded as aspects that should be facilitated within organisational designs fit for the organisation.

Innovation is prevalent, particularly in the paraphernalia that blends into organisational

networks, contributes towards organisational adaptations, and accommodates change in the environment. Collaboration and employee engagement are signalled as the two key innovative tools to manage people with valuable skills (Akgün, Dayan, & Di Benedetto, 2008. 2008:221-226; Bergiel *et al* 2008:99-110). Thus, instead of developing virtual teams separate from or parallel to an organisation or within an organisation, an integrated approach in which virtual team function are aligned within the greater organisational network through best practices that relates to collaboration and engagement of its team members and the greater network as well. Implementing these best practices would assist virtual teams to contribute towards the effectiveness of organisations, as opposed to non-implementation.

2.4 BENEFITS AND CHALLENGES FACING VIRTUAL TEAMS

2.4.1 Benefits of virtual teams

Unlike with face-to-face teams, virtual team implementation does not only agree to flexibility, liquidity and quick response to global trends, it also allows for the benefits as set out in table 2.1 as follows (Edwards & Wilson 2004:15-17):

Table 2.1: Benefits of virtual teams

- “Extension of the availability of an organisation to consumers by yielding virtual team availability despite time zones
- Effective and rapid ability to adapt to changing markets and demands
- Flatter organisational structures leading to employee engagement and skills development
- Prospects to obtain expert skills within a comparatively short period
- Work life balance of team members to contribute to the team whilst attending to personal preferences and commitments
- Team members’ agility to respond for a particular purpose and period
- Seamless boundaries of teams beyond the teams life cycle
- Building of a repository of non-viable and best practices for solving certain problems
- Galvanising productivity by aligning it with technological progress.”

(Source: Adapted from Edwards and Wilson, 2004:15-17))

These benefits of virtual teams in the functioning of effective organisations, respond not only to filling the gaps created in face-to-face team functioning, but also to aligning organisations to a sustainable and competitive environment. However, the full benefits of virtual team working can only be maximised if its challenges can be successfully overcome.

2.4.2 Challenges facing virtual teams

With greater flexibility and the greater use of technology to perform work, increased challenges are faced by virtual team. In face-to-face teams, leadership needs to provide actual premises, workstations and the necessary tools for team members to conduct their work. In virtual teams, similar arrangements need to be made, but the dynamics, are different. Potential costs include tangible as well as intangible costs, which are summarised in table 2.2 as follows (Edwards & Wilson 2004:18):

Table 2.2: Tangible and quantifiable cost impacts of virtual team working and co-located working

Virtual working potential tangible costs	Face-to-face working potential tangible costs
<ul style="list-style-type: none"> • Training and development of team members in the relevant technology and communication software and hardware • upgrading ICT infrastructure capital and labour costs • creation of IC support service and labour costs • security infrastructure capital and maintenance costs • travel costs for relationship development meetings such as on-boarding meetings 	<ul style="list-style-type: none"> • Disturbance allowance • transnational living allowances • local tax assessment costs • travelling costs within temporary locations (subsistence allowances) • rents while on secondment • business erection and removal expenses • time-lost costs during travelling

(Source: Adapted from Edwards and Wilson, 2004:18))

Although virtual teams are designed to allow organisations increasing flexibility, and increasing financial savings, the predominant costs may not all be financial or immediately visible as financial costs. In particular, costs associated with HR such as team member intangible costs are critical for the effectiveness of these teams (Stanz & Greyling 2010). Factors such as varying commitment, people characteristics, and skills and knowledge might not be determined with complete accuracy. Some of the intangible costs that could be incurred in virtual teams as opposed to other organisational designs are reflected in table 2.3 as follows:

Table 2.3: Intangible and less quantifiable cost impacts of virtual team working and co-located working

Virtual working potential intangible costs	Face-to-face working potential intangible costs
<ul style="list-style-type: none"> • Challenges of communication between members, where team members have a permanent background social page open to socially chat with each other instead of professionally contributing to the work of the team • consideration of innovative techniques to encourage team spirit and identity such as sharing team victories or milestones reached • potential for misunderstanding, leading to reduced efficiency such as spread sheets with only space for data and no space for terminology clarification • time-zone constraints regarding the communication window such as finding an overlapping office working hour between two countries in different time zones • possible customer dissatisfaction relating to impaired data security such as frustration caused by forgotten passwords for accessing information • over-reliance on technology as opposed to interpersonal skills (avoidance of people interaction by sending emails, where telephone calls or Skype could have clarified a matter more efficiently) 	<ul style="list-style-type: none"> • Start-up insufficiency • inability of projects to have a team member working on them at any given period during a day • loss of flexibility to access all expertise • less opportunity to introduce experts even for short periods • less focus on communication and process interaction • time-lost costs during travelling (such as long flights)

(Source: Adapted from Edwards and Wilson 2004:19))

These cost and benefits apply to all virtual team irrespective of type. A discussion on the types of virtual teams follows next.

2.5 TYPES OF VIRTUAL TEAMS

Teams have different functions and configurations, and in different historical periods of development, the taxonomy of teams differs (Cohen & Bailey 1997; Devine, Plant, Amodio, Harmon-Jones & Vance 2002:835; Duarte & Snyder 2006; Hackman 1990; Wildman, Thayer, RosenSalas, Mathieu, & Rayne, 2012:97-129; Sundstrom 1999). Teams might share or deviate from one another in certain categories such as functionality, period of togetherness (seamlessness of membership), environmental complexity, and the fluidity of the team's membership. Thus, some overlap between the characteristics of a face-to-face team and that of a virtual team may exist.

Organisational teams may be categorised as functional, reciprocal, co-located and *ad hoc* (Grutterink, Van der Vegt, & Molleman 2012:1-23; Isenberg, Fisher, & Paul 2012: 689-702; Piña & Martinez 2008:7; Wildman *et al* 2012:97-129):

- **Functional teams** are described by Wildman *et al* (2012:97-129) as consisting of individuals with different functional expertise working together to reach a particular organisational goal to perform specific organisational functions.
- **Reciprocal teams** are described by Grutterink *et al* (2012:1-23) as consisting of individuals who collaborate or work within a network of people to achieve a common goal or purpose where membership is frequently changing. These teams may include virtual teams within an organisation or between more than one organisation.
- **Co-located teams** are described by Isenberg *et al* (2012:689-702) as having a “varied longevity” and are task-orientated, specialised teams to develop recommendations for an improvement in a process or system, and the team has a distinct membership. Depending on the team's purpose, it could be expected to evaluate task performance, problem identification, or propose solutions and alternatives. When teams are consultative, they are termed co-located, and parallel teams (Piña & Martinez 2008:7).
- **Ad hoc teams** are described by Isenberg *et al* (2012:689-702) as “impromptu teams” that are formed for a particular purpose only and share in the commitment of managing and achieving project business cases.

It transpires from the above that virtual teams may amalgamate in any of the above team types, should the team type contribute towards the effectiveness of the virtual team. Virtual team effectiveness is addressed next.

2.6 MEASUREMENTS OF TEAM EFFECTIVENESS

Team effectiveness contributes to a greater organisational competitive advantage and societal responsibility (section 1.2.1). It is; therefore, imperative that virtual teams should be effective to contribute to the greater organisation and society. Team effectiveness can be achieved through a flexible, multidimensional approach such as responsiveness (flexibility), organisational learning, and efficiency (adapted from Segal-Horn & Dean 2009:41-50,). By encouraging greater flexibility and constant learning, considering organisational designs (such as virtual teams), results that the competitive edge of organisations is enhanced.

Organisations might comply with quality standards and processes (efficiency), but these standards and processes may not be the best available option for the type of organisation or purpose that they seek to serve (efficiency and effectiveness). Effectiveness can be defined as the extent to which organisational processes and workers are aligned to achieve goals with emphasis on the quality and ability to meet pre-defined standards with least possible expenditure of resources, that is the creative method used to produce a desired result (Maynard *et al* 2012:342-365; Rahschulte, 2011:31).

A number of effectiveness models exist of which the majority are based on the input-process-outcome (IPO) the framework upheld by McGrath (1964), which has served as a valuable guide for researchers over the years (Ilgen, Hollenbeck, Johnson & Jundt 2005; Vandenberg, Park, DeJoy, Wilson & Griffin-Blake 2002.). It was later supplemented by other research (Cohen & Bailey 1997; Horwitz, Bravington & Silvis 2006; Kozlowski & Ilgen 2006; Mathieu, Heffner, Goodwin, Cannon-Bowers, & Salas, E. 2000:273-283; 2000; Mathieu *et al* 2008; Piña & Martinez 2008). Some of these models either focus on measuring a single construct (such as team performance or productivity), or a number of different dimensions (multi-dimensional) such as satisfaction, commitment, and trust (Piña & Martinez 2008; Klein & Kozlowski 2000).

The IPO framework explains that input factors (I) influence the process (P) which in turn influences the output (O) produced. A number of enabling and constraining factors influence effectiveness in the input phase such as information and resources. Processes (P) describe

how team inputs are transformed into outcomes and the following further broaden input phase factors (Horwitz *et al* 2006; Ilgen *et al* 2005):

- Individual team member characteristics (e.g. competencies, personalities)
- team-level factors (e.g. task structure, external leader influences)
- organisational and contextual factors (e.g. organisational design features such as whether the organisational structure supports the organisational vision and environmental complexity)

Outcomes (O) are the results and by-products of team activity that are valued by one or more constituencies (such as *performance* [e.g. quality and quantity] and members' *affective reactions* [e.g. satisfaction, commitment, viability]) (Mathieu *et al* 2000). Considering the framework approach of this study (figure 1.1), the above definition of effective teams indicates that teams have a particular objective, goal, purpose or direction. Furthermore, the extent to which it is achieved makes the team more (if the objective, purpose, goal or direction is achieved) or less effective (if the objective, purpose, goal or direction is not achieved), and this is the purpose perspective. Similarly, the culminating extent to which members exercise their roles and responsibilities, how tasks are approached, processes are aligned (process perspective), problems are solved, and team members interact, communicate and deal with differences (people perspective), all contribute to the extent of team effectiveness. In virtual teams, the extent to which technology influences teams would also influence team effectiveness (technology perspective). Virtual team effectiveness measurements should be considered for each perspective (multi- dimensional).

The approach that was followed in this study subscribed to the multidimensional effectiveness measurement approach (in support of similar research) (Horwitz *et al* 2006:472-494); however, also considered both attitudinal and behavioural constructs to determine the extent of effectiveness of best practices in the functioning of effective virtual teams.

2.7 CHAPTER CONCLUSION

This chapter present an understanding of the virtual team and an historic overview. It elaborated on the types of virtual teams as well as the challenges and benefits of these teams. Once an organisation becomes aware that it needs to adopt flexible working practices to facilitate its business needs, its leadership should investigate alternative

organisational designs such as virtual teaming. However, to be able to work together virtually—beyond their existent expert knowledge—both team members and team leaders should have extensive knowledge, and be empowered with the most effective tools. Factors that could disturb sensitive membership equilibrium need specific attention. In the next chapter, the foundational factors providing the basis for virtual team working will be discussed.

CHAPTER 3

THEORETICAL FRAMEWORK FOR VIRTUAL TEAMS

3.1 INTRODUCTION

During the investigation into the best practices in the functioning of effective virtual teams, a number of repetitive themes or perspectives were noted (see figure 1.1). The most prominent of these themes were encapsulated by the work of Bal & Teo (2000), which was extended by a literature framework of Ebrahim *et al* (2009) (see section 1.9.1). Both of these teams of researchers identified three themes (people, process, and technology) with the same 12 specific elements on which Ebrahim *et al* (2009) extended on with a literature survey. During this current study's investigation into the principle literature corpus, the three repetitive themes (process, people, and technology) were confirmed (see section 1.9). In addition, these studies pertained to different organisations in a variety and industries. Hence, it was understood that these three themes might be generalised across various organisations, using the virtual team organisational design. However, the fourth prominent repetitive theme of purpose, was observed from the works of Gaudes *et al* (2007); Maynard *et al* (2012:342-365); Nemiro *et al* 2008:1-50; Ortiz de Guinea, Kelley and Hunter 2005:55-79. Consequently, the current study included this theme, which in essence extended the Ebrahim model (see figure 1.1). For purposes of this study, the extended Ebrahim model thus covered all recurring themes, which are deemed the prominent themes relating functioning of effective virtual themes.

Chapter 3 provides a literature overview of the best practices categorised into four main effectiveness themes (purpose, process, people, and technology). This chapter provides the theoretical foundation for a pilot study that will be discussed in Chapter 4 as well as the empirical study in Chapter 7.

3.2 PURPOSE THEME

The themes and elements in virtual teams are intertwined, making it difficult to deconstruct. This intertwined tendency makes the theming in virtual teams very complex. The research will attempt to break these themes and elements into workable units.

In the Ebrahim *et al* (2009) model the identified elements associated with the people theme were: specify objectives, team selection, reward, and meeting training. To determine how

virtual teams uniquely address their purpose orientation by means of best practices, the theme to which Ebrahim *et al* (2009) assigned the “specify objectives” element (people) seems to be contradicting the face-to-face team approach (Gaudes *et al* (2007); Maynard *et al* (2012:342-365); Nemiro *et al* 2008:1-50 and Ortiz de Guinea *et al* (2005). In the study of the Ebrahim *et al* (2009), purpose was integrated in the “DNA” of the themes of virtual teams through “specific objects” under the people theme. In this empirical study; however, the evidence showed that purpose could be a separate theme in its own right. Therefore, the first research question was to explore distinctive features contributing towards the unique purpose orientation of best practices in the functioning of effective virtual teams (theme 1).

As virtual teams have been identified as a unique branch of teamwork in preceding sections of this study, it is probable that some of the teaming issues might overlap under the purpose theme. However, it is held that purpose in a virtual team is significantly influenced by the primary questions (what, how, when, where, and how), which give it a distinctive dynamic in virtual teams. Some overlapping of virtual teams and face-to-face teams regarding the purpose theme might exist, mentioned hereunder.

3.2.1 Mutual areas of purpose positioning in face-to-face teams and virtual team

All effective teams should have a purpose, known and supported by all members (Gaudes *et al* 2007). A number of factors influence the way tasks are assigned to the team to achieve its purpose (Lorange 2010:75-101):

- “The size of the organisation – bigger organisations tend to have greater administration requirements, whilst the simplicity of smaller organisations might need more personal involvement from the leader”. The size of the organisation and team may thus have an impact on the role of the leader.
- “Degree of complexity of the task and group – in smaller groups multitasking might be essential, whilst in very complex tasks either multitasking or sharing responsibility on the same task will be viable.”
- “Type of people employed for the team – this includes the right mix of people in terms of personalities, knowledge and experience.”

From the above, hardly any difference between face-to-face teams and virtual team is detected. However, flexibility, which is the inherent outstanding character of virtual teams, slightly too significantly influences how a virtual team formulates purpose, strategy,

implementation of the strategy and creates space to work effectively together as opposed to working in a face-to-face team.

3.2.2 Formulation of strategy and setting of team direction to obtain a sustainable competitive advantage

An organisation consists of teams, and for those teams to be considered effective, they should reach the intended purpose and contributes towards the greater organisational goal (Rahschulte 2011:31; Maynard *et al* 2012:342-365). The macro environment forces an organisation to adapt its internal functioning to fulfil the needs of customers and remain sustainable and profitable (Porter 1996). Porter (1996), suggests that the business strategy consisted of a unique set of choices made by leaders to direct the team members into a particular direction. Peng (2009) adopts a different approach and considers strategy as the organisational premise of successful competition. In these approaches, two elements come to the fore: What is the purpose that an organisation wants to achieve, and how the organisation will position itself to achieve that purpose (Child 2005:3). However, Lorange (2010:75) combines all these approaches as optimising the functioning of the organisation. Hence, the role of organisational leadership is to determine the most effective direction of the organisation, and focus on structuring and translating the organisational or corporate strategy, to achieve its purpose.

According to (Clemons & Kroth 2010 and Gaudes *et al* 2007), this would imply that organisational leaders should do the following:

- Consider the available strategies, which would probably be the most effective to attain the organisational purpose. This would be followed by either an individual or an integrated plan, to establish purpose and direction for the organisation, which implies role clarification of team members.
- Following the process of direction setting, the ideal organisational design, as evident in the structure of the organisation and the teams, should follow (Child 2005). This contains regular process reviews and improvements, discussed under the process theme, where elements such as individual and team performance should be measured and awarded. Due to its flexible and technologically aligned characteristics, the virtual team organisational design could be utilised in areas where that business functions.

- The functioning of the strategy needs to be regularly assessed so as to determine whether it effectively contributes towards the goal it intended to achieve.

Unlike face-to-face teams, the “infrastructure (technology use towards shared knowledge and collaboration use) and trust relationship” among the team members should first be on a functional level, which enables and “facilitates shared knowledge and restructures work without changing core needs” before “leadership addresses the actual team goal” (Carman & Lott 2000; Edwards & Wilson 2004:70; Gaudes et al 2003; Guinea *et al* 2005; Malhotra, Majchrzak 2004, Ortiz de Guinea *et al* 2005; Staples & Webster 2008; SynNovation 2012).

Virtual teams, like face-to-face teams, also need a purpose. However, some of the functions and focus areas of virtual team members might not be entirely clear, predictable or accurately definable. In virtual teams, greater emphasis is placed on an integrative and dynamic approach towards the reorganising of communications between colleagues to ensure focus on goals (Harrison-Broninski 2012). Because communication is the only lifeline between members, greater attention needs to be given to standardisation of the abbreviations used in communication, as well as housekeeping (document formatting, storage and retrieval protocol). Housekeeping is; therefore, an important element in virtual team purpose seeking.

3.2.3 Purpose theme element: The type of worker likely to work in a virtual team

Virtual team members generally consist of knowledge workers (Bergiel *et al* 2008:99-110). The nature of knowledge workers allows such team members to function, even if presented with the vaguest of directions and worst of organisational climates. However, if organisations value these knowledge workers, and expect them to effectively function together in a virtual team, a supportive organisational climate to attain the purpose, will be created to enhance their effective functioning, which is influenced by the other three perspectives (process, people and technology). Whereas in face-to-face teams, the narrow and set boundaries of goals are necessary to provide and measure progress, a more flexible approach towards goal or direction setting is more appropriate in virtual teams to allow the creativity of knowledge workers to inform the final product or service provided. Goal setting is; therefore, not separated in a virtual team, but merely expanded to allow for a greater degree of innovation.

3.2.4 Purpose theme element: relationship between innovation and knowledge work in virtual teams regarding purpose

Innovation generally refers to the introduction of new methods, creating more effective processes and renewing ideas or products (Oxford dictionary 2008:523). In virtual teams speciality to obtain purpose by creating innovation is; therefore, an ideal type of organisational design. However, Seymour (2013:7-8) explains that innovation may be based on “invention, research and development, creativity as well as the duplication or synthesis of current knowledge”. Seymour (2013:7-8) further explains that innovation may also be “radical, disruptive, incremental, sustaining and generated by individuals or groups of people”. The diffusion of innovations (DOI) theory and innovation diffusion theory (IDT) predicts “new ideas and technology spread cultures through the communication channels in the organisations' social system” (Lazarsfeld, Berelson, & Gaudet 1949). Asynchronous communication (see section 3.5.3), which is widely utilised in virtual teams, “creates a pathway to inspire innovation and performance as it allows for greater freedom and the spread of culture. Virtual team members work with less structure and this flexibility in structure, gives greater privilege of choices”, contributing towards the organisational cultural system as contained in its value system (Lanubile, Ebert, Prikladnicki & Vizcaino 2010:52-55). Hence, the value system of organisations employing virtual teams as an organisational design, should endorse a culture of innovation in all team processes. The perception towards certain aspects of the value system such as conflict could be realigned with the purpose of the organisation as it may “stimulate innovation, change and creativity” (see section 3.2.4) (Rahim 2011).

In the development of innovation in teams, the dynamics of creating an innovative climate, experienced by virtual team members is expected to be more complex than in face-to-face teams. This notion is due to members of virtual teams relying exclusively on collaboration technology and electronic communication to facilitate interactions between them, such as the creation of limitless concepts and words through learning and development; combining different domains of thought; mental coding of sensory experiences; and contemplation of things beyond what we can sense (abstract thought) (Tappeiner, Hauser, & Walde 2008). Innovation is fuelled by knowledge work (Nonaka, Toyama, & Hirata 2008). Knowledge work first emerged in literature in the work of Drucker (1969:65-76; 1996). Since then, a number of characteristics of knowledge workers have been identified (figure 2.3) as follows:

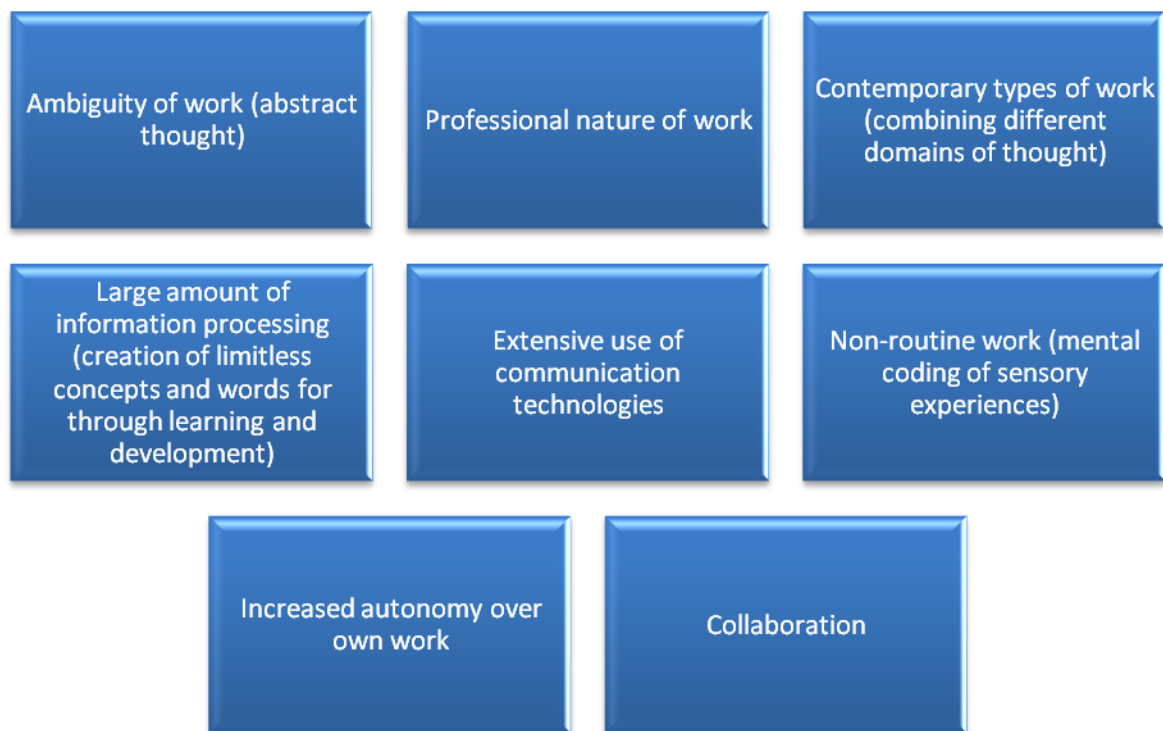


Figure 3.1: Intangible and less quantifiable cost impacts of virtual team working and co-located working (Source: Adapted from Teimone and Paloheimo (2011))

Projects conducted by these workers are typically “innovative and are drivers of the growth of knowledge and expertise for sustainable business practices. New and innovative organisational designs (such as virtual teams) can therefore be contributed to the fundamentals laid by knowledge working” (Nonaka & Takeuchi 1995). These workers spend at least thirty-eight percent of their time exploring information (McDermott 2005:15). In the process of fostering, the conditions where innovation flourishes among employees, the first step is to select and encourage the “right” people to work on innovation initiatives. Virtual team members typically exist of members who engage in knowledge work”, and organisations, which are driven by knowledge work, would have a preferred choice to pursue these people (Nembhard & Edmondson 2006; Staples, Greenaway & McKeen 2001). Jemielniak (2012) notes that knowledge workers come at a great cost and are regarded as the more expensive team workers to obtain, as salary alone is not enough to retain them (Also see rewards section 3.3.2.5). Furthermore, writing is not utilised by knowledge workers in the technology industry as an external memory store. Instead, writing is used as graphological act, which implies that important information is rephrased and condensed in

writing, while the person is hearing or see it, and a mental note made of it. Subsequently, notes and documents are seldom revisited (Kid 1994:187).

Theory-based best practices regarding the purpose in a virtual team can be summarised as:

- When acquiring members for a virtual team, the focus should be on obtaining knowledge workers.
- The availability of appropriate infrastructure (in particular technological infrastructure such as the leveraging of synchronous tools), should support the strategy and the organisational design of the virtual team as an integrative part of the organisation to ensure focus on goals and member interaction.
- Before exploring the team goal or direction, the communication infrastructure and trust relationship between team members should be functional.
- Virtual team members should be included in the direction setting and strategy of the virtual team.
- Specifically assigned role clarifications and accountabilities allow virtual team members to feel part of the decision-making process.
- Communication housekeeping should receive special attention.
- Clarify protocol requirements in the communication between team members.
- The virtual team design must effectively fit into the organisational strategy by ensuring that all organisational material, such as marketing material, is designed to be effectively utilised by virtual team members as well as to ensure that their engagement with and awareness thereof is sustained.
- Instead of only focusing on a goal, greater attention should be given to keeping all the parties involved. Involvement should be meaningful (qualitative) rather than regular (forced feedback meetings).
- Innovation should be entrenched in the virtual team DNA.
- The communication lines in virtual teams should allow for a variety of effective asynchronous tools facilitating the sharing of ideas between team members (see sections 3.4.4 and 3.5.3).
- Members in virtual teams should be allowed the freedom and flexibility to be creative.

3.2.5 Purpose theme synthesis

From the preceding discussion on purpose, it appears that a relationship between the formulation of strategy and setting of team direction to obtain a sustainable competitive advantage, knowledge work, and the creation of an innovative climate, can be deduced.

All teams need a goal to aspire to and a strategy to support that goal (Gaudes et al 2003; Porter, 1979). However, direction setting (Gaudes et al 2003; Majchrzak, Rice, Malhotra, King, & Ba 2000: 569-600; Peng 2009; Staples & Cameron 2005) for a virtual team where the majority of members are knowledge workers (Drucker 1969:65-76, 1996; Tappeiner, Hauser, & Walde 2008:861-874; Timonen & Paloheimo 2011), should stimulate (Nonaka 1991:356–375) the team and provide the flexibility to explore within an innovative climate setting on route to the course for the team.

From the preceding, it is evident that innovation is not a unique ability of virtual teams. However, what is a unique challenge, is the ability of virtual team members to bridge technological barriers, to create a space where ideas and concepts (in particular abstract concepts) can evolve, utilising the skills this class of people (knowledge workers) have acquired. A discussion on the processes to achieve purpose will follow in the next section.

3.3 PROCESS THEME

Intertwinement of the themes and elements in virtual teams makes it difficult to deconstruct. This intertwined tendency makes the theming in virtual teams very complex. The researcher will attempt to break these themes and elements into workable units.

Virtual teams were identified as a unique branch of teamwork in preceding sections of this study, meaning that some of the process teaming issues might overlap with face-to-face teams. Mostly the viewpoint is that processes in a virtual team are significantly influenced by its dynamics, such as its geographical dispersion, flexibility and unyielding communication technology dependence. It is important to explore the possibility of different approaches or different processes to achieve virtual team goals.

Under the process perspective, the relationship and influence of the four main contributing factors that are signalled in the literature to play a significant role in the unique process orientation in the functioning of effective virtual teams will be explored. In the Ebrahim *et al* (2009) model, the identified elements were facilitation, meeting structure, alignment, and

virtual team performance. Due to the influence of recent studies on the Ebrahim *et al* (2009) model, the researcher found the scholarly interest in the process (how to lead a team) theme has significantly changed, permitting the retention of the facilitation element with transformation and application to virtual teams. This implies that team facilitation might look different in virtual teams from face-to-face teams.

3.3.1 Process theme element: Team facilitation

In face-to-face teams, the team needs a leader to manage various interactions between members in the team, and interactions with the team. Some of these include the factors indicated in figure 3.2.



Figure 3.2: Integrative people interaction in virtual teams

The elements contained in figure 3.2 illustrate some of the various elements, which team leaders face in facilitating a team. Due to the intertwined nature of the themes and the people aspect, which team facilitators should manage is retained under the people theme. The purpose of the team leader was discussed in section 3.2.2. Under the process theme, team facilitation only considers the role of the team facilitator.

In virtual teams, knowledge and flexibility with regard to the vehicle of technology influence the role of what the face-to-face team leader or manager is. Virtual team management has evolved into a delicate balance between the traditional concepts of manager, leader, and facilitator. Roth (2012:146-148) suggests that virtual teams should be led through “facilitation”. Gratton and Ericson (2011:45-72) suggest four general categories of best practices of which leadership support, particularly executive, and human resources support in the team, plays a significant role. While technical differences and some overlaps exist between manager and leader (Nienaber 2011), the debate between these concepts seems to have little importance to virtual teams other than: Who gets the team together; who drives targets; who obtains resources; who does the performance reviews; who disciplines (hierarchical appointed manager); and who has the greatest knowledge of how the task-at-hand should be done (situational leader). Facilitation seems to be a balance between some of the functions of either a manager or leader and is situation based.

The demographics (gender, age, and race) of employees influence the manner of leading people in teams. Effective virtual team leadership needs to display qualities such as setting the direction and strategy discussed under purpose theme), character, and influence on the task and role to lead these virtual teams (Lyons, Priest, Wildman, Salas & Carnegie 2009:2-7). Direction for theory on virtual team leadership can be obtained from theory on team leadership (Ford, Harding & Learmonth 2008; Collinson, Bryman, Grint, Jackson & Uhl Bien 2011; Zoller & Fairhurst 2007).

However, in evaluating these theories, one needs to understand the limits of virtual leadership and its potential to expand the organisation’s ability to become more effective. Alvesson and Spicer (2012:367-390) suggest that it requires detailed and committed engagement from leadership. They further suggest that a “combination of switching between performance positions, (which largely accept present conditions and constraints) and critical positions, (which question existing conditions, emphasize independent thinking and aim for less constraining social relations)”.

The scarcity of studies in the fields of leadership in Africa imposes limitations on the generalisability of some arguments on the field (Kuada 2010:9-24). Internationally, leadership and the form of leadership exercised by the incumbent team leader are vital to team effectiveness” (Hannah, Walumbwa & Fry 2011:771–802). Lin (2009) states that in the decision-making process, team members need to exchange and process information. In virtual teams; however, leadership is situational and can change depending on the task-at-hand. The process of “Shared leadership”, where teams may have more than one leader at

any given time, is a century old visionary concept (Follet 1927: 249). To achieve effective teamwork, members need to develop team cognition to transact their respective roles and engage in collaboration regarding decision-making. Team members should consider each other's role in the team. The collective mind of the team is influenced by the quality of team decisions. The clearer the understanding team members have of the team goal, the better they can make decisions (Chang, Chen, Chou, & Lin 2012: 309-318).

Therefore, one can assume that whilst a dedicated initial team leader is assigned to ensure effective infrastructure and the founding of the team, task leader experts may rise as team leaders at various intervals of the existence of the team. For the purpose of this research, the distinction will be the executive team leader and the task leader expert. These two descriptions may overlap. Lyons *et al* (2009:8-13) suggest the following roles and responsibilities of the founding virtual team leader:

- “Establish team processes and member roles
- setting: culture, alignment, collaboration and conflict
- foster a team mentality and set team-centred goals that require teamwork
- communicate with team regularly and facilitate regular exchange of information
- develop information exchange control
- model desired team behaviour
- track team processes, events, and progress
- provide constructive and regular team feedback
- balance challenges between team members
- recognise and reward both individual and team performance”

To supplement the team facilitation purpose, the following best practices processes are associated with the implementation of virtual team facilitation:

- The effectiveness of a virtual team rests on the combined efforts of both the team leader and members, where each needs to contribute on a task (expert) and people frontier.
- Since flexibility and opportunity to influence the team are a natural consequence of working in a team with knowledge workers, the leadership style (transformational and continual) and traits of the dedicated hierarchically appointed team manager should be able to foresee and accommodate such occurrences within the team realm. Following Lowe and Gardner's (2000)

dimensional approach toward leadership (Annexure "D"), the management research field has become more focused and trends regarding categorisation of leadership theories have emerged along the lines of the major paradigm schools. This categorisation is still in a state of flux as is evident in some attempts at theorisation (Bolden & Kirk 2009). At this stage, the transformational leadership and the power/politics leadership approaches seem to have a bearing on the modern-day business management research focus. According to the transformational approach "the leadership phenomenon is considered to be socially real, irrespective of people's understanding of whether someone is a good or bad leader" (Kempster & Parry 2010:106–120).

- The team's processes needs alignment for certain functions, such as recruitment of team members, performance management, communication between the team and organisation, and tracking of team processes, events and progress.
- The purpose of the hierarchically and organisationally assigned individual to manage/lead/facilitate (this person is the virtual team leader) the virtual team, is to create culture. "In the absence of a virtual team leader, the team seems to dissipate as the team moves from the early stages (forming and storming) to the later stages (norming and performing) of team development" (Rennaker & Novak 2011:39). "The purpose therefore of the team leader is to influence team members and relationships in the team to develop their own history and own cultural embedding mechanisms." With proper leadership, the team will develop its own "secondary embedding mechanisms such as team rituals, systems, lingo, and team philosophy and creed unique to the team" (Schein 2004:246). The team leader may; therefore, use these unique team-embedded mechanisms to direct and enhance the team into the required direction. Further, these "mechanisms serve as a foundation to socialise new members to the team, stabilising and transmitting culture within the team" (MacMillan & Lopez 2001:19–34).
- Rennaker and Novak (2011:39) state that the "potential for a leader to create culture in virtual teams seems to dissipate as the group moves from the early stages (forming and storming) to the latter stages (norming and performing) of team development". They further suggest the reason for this phenomenon is that team members and relationships to the team, develop their own history, enabling the team to develop their own cultural embedding mechanisms. Over time, the team members will develop their own secondary embedding mechanisms such

as team rituals, systems, language and team philosophy and a creed unique to the team (Schein 2004:246). The team leader; therefore, may use these unique team-embedded mechanisms to direct and enhance the team in the required direction. Further, these processes serve as a foundation to socialise new members to the team, stabilising and transmitting culture within the team (MacMillan & Lopez 2001:19-34).

- The combination of knowledge workers of various expert levels in the team, suggests that both the team leader and team members should be recruited not only for knowledge and experience, but also for leadership potential and the capacity to learn, as both the convener/leader and members may from time to time explore themselves in team leader and member roles.

The team facilitation process is; therefore, determined on the nature of team and the specific task-at-hand. The team facilitation may change during the existence of the virtual team, and the empirical study should explore if team facilitation changes, and what are the contributors to the change.

3.3.2 Process theme element: Process alignment

From the preceding, hardly any difference between face-to-face and virtual teams can be detected with regard to processes. Team facilitation, structure, alignment, and performance management resulting in rewards are natural and prominent factors, which need attention in face-to-face teams as well. However, in the deviation between a face-to-face and virtual team from the strategy and purpose perspective, a number of subsequent decisions and actions are affected, which necessitate a distinctive alteration of processes between the two types of teams. The use of technology and the ability to be flexible, influences how processes are adapted for virtual teams, as discussed in the following:

An overview of the history of teams (section 2.3), shows that as the practices, modes and habits of some teams changed (*i.e.* extensively using technology networks), new directions for doing things (processes) evolved (and virtual teams emerged). New customs have necessitated devising new strategies for dealing with the challenges facing the organisation (section 1.2.1). Furthermore, the integrity of a team is influenced; *inter alia*, by the character, structure, and roots of teams. The consistency with which these customs was practised (constantly using technology networks for doing work), created a recognisable pattern of behaviour and character of the individuals, following that behaviour. Patterns also attracted

individuals with similar behavioural styles of doing their work, which created relationships in a particular virtual community. However, these changing practices (of working virtually) also created areas of conflict, such as a disharmony between face-to-face leadership practices versus exploratory leadership practices to fit a contextually changing community (such as virtual teams). It is not disputed that some process boundaries might be the same or blurred between face-to-face and virtual teams. It is suggested that the effective functioning of processes in virtual teams operate in a different reality, which results in different challenges to those facing face-to-face teams and discussed in the sub-sections following.

Knowledge management (KM) has become a key driver in organisation performance, which influences the alignment of a team's functions. KM strategies need to be aligned with the KM process in the organisation. Alignment involves continuous improvement with specific benchmarks to assess and evaluate alignment interventions. To achieve alignment, different enablers, such as the following, are necessary:

- Personalisation enablers (fitting individuals to a team), such as the creation of specialised groups, socialisation incentives, clarification of roles, personalisation of knowledge culture
- codification enablers (fitting the strategy with the team processes), such as semantic tagging, unified templates, integrated access to knowledge portals (Bosua & Venkitachalam 2013:331-346)

Further alignment in the organisation should take place in an integrated fashion at the three different levels in the organisation or virtual team:

- Top-down personalisation alignment (utilising the right people to encourage the flow of information)
- top-down codification alignment
- horizontal work group alignment

Traditional methods of managing and “fitting” people into an organisation or team may, to some extent, be unsuitable for virtual teams. “Organisations needed to gain exceptional return on the investment of training and development on employees, and the strategic fit of recruitment in an organisation” (Breagh, Macaon & Grambow 2008:45-82). Farmer (2008:13) who identified the need organisational leaders to consider various new forms of organisational governance to fit various organisational designs in synergy with each other in

the organisational network, supports the strategic fit in organisations. Members of the organisation (employees and management) constantly need to align their behaviour and relationships (such as those with the environment) with the vision of the organisation also known as environmental scanning. This alignment cultivates a high-performance culture (the company's *modus operandi*). Low success rates (ten percent) of culture change initiatives; however, indicate a gap between business strategy and effective implementation. This low percentage is indicative of an ineffective alignment between the arrangements with teams of people to address the consumer's needs. This implies that virtual teams should not only be implemented because of the nature of the task-at-hand, but due consideration should be given to making the virtual team fit in the operations of the organisations.

Because technology is used to fit virtual teams into organisation, technology creates several misalignments with the pre-existing structure and environment. Although technology will be discussed as a separate theme, for the purpose of the alignment element, the alignment of technology will be discussed under the process theme. Therefore, virtual teams need to adapt all three structures, that is: Technology, organisational environment, and team structures (Majchrzak *et al* 2000; Maznevski & Chudoba, 2001). The task-media-fit (TMF) theory suggests that the best practice in virtual teams should be to consider that the relationship between task and technology performance is more dependent on experience with technology and team membership than task type (Hollingshead, McGrath & O'Connor 1993). This approach is supported by the task-technology-fit (TTF) theory, which states that ICT is more likely to have a positive impact on individual performance and be used if the capabilities of the ICT match the tasks, which the user must perform (Goodhue & Thompson 1995).

Best practices associated with the alignment of the virtual team are as follows:

- Virtual teams should be integrated and fit in with the organisational design towards the strategy of an organisation. This implies that the strategy, processes, task, people, and technology of the team should be aligned to support each other (purpose theme overlapping).
- The alignment of the team should be flexible to accommodate changes in the external and internal environment.
- Personality fit should be avoided. The approach should rather align personality traits towards higher performance in the team. Unwanted personality traits

should be counteracted with supportive management facilitation and appointment of an array of members with different personality traits.

3.3.3 Process theme element: Team structure

Due to recent studies on Ebrahim *et al* (2009) model, the researcher found the scholarly interest in the process (how to) theme has significantly changed the concept of meeting structure. The element of meeting structure suggests a process of how virtual team members meet and what principles do they follow to reach agreement.

Four main elements evolved; namely:

- Team structure which will be discussed under this element and culture and socialisation element
- the commitment, trust, and conflict element and the communication
- collaboration, and engagement, which will be reviewed under the people theme but evaluated for specific process overlapping with the process theme during the empirical phase

One of the main concerns for the team leaders refers to the question: “How should I structure this team within a technologically mediated, asynchronous working environment?” (Volchok 2010:5-9). This question infers more than merely having the people and technology available. It represents a serious management dilemma on the practical construction and implementation of such a team. People prefer to see a hierarchical structure, which pinpoint where they fit in. However, in a networking environment, a fix structure is not always available.

Instead, as the majority of employees function within teams, an effective organisational design should support a unique high-performance culture, thereby employing high performance work practices (HPWPs) unique to individuals and teams within the effective organisation, resulting in a particular organisational design. A high-performance culture may be defined as an “organisational culture with deeply embedded organisational values for achieving the organisational goals by organisational individuals and teams” (Boxall & Macky 2009:2-23). High performance practices refer to “Human Resources practices bridging the unique equilibrium within an organisation to increase organisational performance such as productivity, flexibility, or quality of services rendered with contemporary HR practices such

as talent management-recruitment and selection, performance management, employee engagement” (Kepes & Delery 2007:385).

It is a challenge to human resource management (HRM) practitioners to assist management teams in aligning the HR management strategy with business strategy. This entails bringing about an organisational development strategy supporting the preferred unique business model of management. “The emerging organisational design should subsequently drive efficiency and business growth opportunities. The organisational design involves a process of investigation on how and where an organisation can increase its performance, examining all the functions, relationships and tasks associated with reaching its goal, and then lastly the job relationships and tasks are arranged according to the organisation’s goal, which is normally associated with an organisational structural chart. The subsequent hierarchical structure that follows represents the decision making authorities” (Bodwell & Chermack 2010:193-202). Factors such as financial and technical affordability of a mobile workforce, building a sustainable competitive advantage, and whether an organisation can accommodate and afford the financial layout for investing in the technological support for these teams, needs to be considered prior to the implementation of the virtual team organisational design. Further, the task plan, task demands, task duration, and task roles should be clarified (Martins *et al* 2004; Warkentin & Beranek 1999; Webster & Staples 2006).

Best practices associated with the implementation process of a virtual team structure are as follows:

- Efficiency, information, development of people, and authority should receive attention in making decisions about the direction and structure of an organisation, known as the theory of administrative behaviour (Simon, 1951), which may still be relevant today, making it an issue to investigate during the empirical study.
- Organisational design of virtual teams should support and be aligned to the goal and culture of the organisation (Boxall & Macky 2009:2-23).
- Perceived costs associated with erecting virtual team should be analysed and budgeted for (Martins *et al* 2004).

3.3.4 Process theme element: Virtual team performance and reward management

Due to recent study influence on Ebrahim *et al* (2009) model, the researcher found the scholarly interest in the process element “how to manage performance in the virtual team” differentiated from the original model. The performance element of on Ebrahim *et al* (2009) in contemporary literature is linked to reward management and will be addressed as such in this study (Hertel, Konradt, & Orlikowski 2004:1-28; Hoch & Kozlowski 2012).

Conventionally, work performance is measured for an individual rather than a team. Recognising outstanding achievements of virtual team members in a way that is consistent with team and organisational values, remain a challenge in measuring knowledge workers’ contribution. Concerns about available organisational strategies relating to equity compensation and tools available for reliable and accurate assessment to measure team member contributions, are constantly raised by concerned team leaders. Traditionally, performance appraisals are done either for an individual in a team or for the entire group. In virtual teams; however, the type of reward system irrespective of whether it is tied to individual performance or collaborative behaviour has no distinguishing effect on complex teams’ productivity or innovation (Gratton & Ericson 2011:45-72).

The development of trustworthy relationships in virtual team leads to better performance (Chudoba, Wynn, Lu & Watson-Manheim 2005). In later experiences, team performance has become more popular. Lurey and Raisinghani (2001:523-544) suggest the following tools be utilised to appraise team performance:

- “Measurement of the team’s productivity level *i.e.* the standard of quality, product/service generated or meeting the team’s budget
- Ability to learn and improve its functioning, thus sustaining itself such as the team’s ability to learn.”

However, Brown, Huettner and James-Tanny ((adapted by researcher - 2007:132-134, suggest, “an individual assessment be conducted for virtual team members as follows but within the policies of the organisation”, as shown in figure 3.3.



Figure 3.3: Proposed action steps for managing virtual team performance

(Source: Adapted from Brown *et al* 2007:161-163))

The researcher suggests that there is a fine balance between individual and team performance management, because the virtual team member is jointly accountable and responsible for performance of the team. Flexibility in the dynamics of the team, goal complexity, orientation of an organisation towards innovation, and organisational values–, which need to be achieved–could be contributing factors in the decision to adopt either types of performance management, or a combination of both. Performance also has cost implications for an organisation. The transaction cost theory suggests that different costs are associated with the acquisition of an asset, such as transaction costs (associated with the enforcement of an agreement); bargaining cost (to attain an agreement); and policing and enforcement cost (to oblige the party to perform within the agreement) (Coase 1937: 386-405). Any performance agreement also has transactional costs associated with it, as indicated. Therefore, it is imperative that organisations manage the performance of their team members, which includes virtual team members. According to the time, interaction and performance theory (TIP), “face-to-face team members have higher relationship links than virtual team members, resulting in good performance. However, no difference was observed in how team members exchanged information” (Warkentin, Sayeed & Hightower 1997; Warkentin & Beranek 1999; Warkentin, Massey, Montoya-Weiss, & Hung 2001). However, a follow-up study indicates, “no differences between virtual teams and face-to-face teams exist with relation to cohesiveness, performance and equality of participation” (Burke & Aytes 1998). Similarly, “face-to-face teams, then virtual teams and lastly global teams scored the highest in team performance. However, the complexity of a project and behavioural challenges were noted as reasons for lower performance in all three these teams” (McDonough, Kahn & Barczak 2001).

Regarding rewards for delivered performance, the labour market is comparable with the goods market in that the equilibrium point between supply and demand determines the

market price and rewards for efforts made by the individual or team. If, in “the goods market, the product is in high demand the price will go up and vice versa”. This will typically attract competitors, who will try to better the product; to also obtain a slice of the income pie. Individual characteristics of goods such as their quality and variety are only acknowledged by the market where it makes economic sense, where it will be evident in the price range. The greater the variety in supply, the more options are available for the buyer, and this greater supply will then assist in reducing the price of the product. Suppliers who cannot compete are expelled from the market. If an employee is high in demand, the price (remuneration) for that employee will increase (goods market). The talented people in virtual teams will typically attract competitive employers who are interested in the package of skills and knowledge these people have to offer. It is anticipated that these individuals will contribute towards the income of the organisation. However, it is generally accepted that the labour market functions as a monopsony. This implies that employees tend to be extradited to the employer (Dube, Lester & Reich 2012:1-28; Robertson 1969:215). According to Richardson, McBey and McKenna (2008:490-508), information about position specifications and responsibilities as well as non-organisational factors such as opportunities for spousal employment, also play an important role in the determination of a decision of a knowledge worker to accept a position. Thus, prospective employees do not conceptualise the recruitment process in terms of the two separate components of ‘job’ and ‘living conditions’. Instead, realistic recruitment has emerged as a holistic process, with each individual having his/her own differential weighting of the relative importance of different factors”.

Collective bargaining regarding remuneration, conditions of service and rewards (such as bonuses) for virtual knowledge workers are influenced by the virtuality of the position. The researcher believes that the general expert nature of virtual team members would normally preclude them from the underlying purpose, which collective bargaining would obtain; namely, betterment of basic working conditions of employment. It is envisaged that normal market conditions regarding the need for their expert skills enables these people to successfully negotiate and contractually manage their own conditions of employment, irrespective of current labour legislation. However, in the event that the skills and knowledge of some virtual team members become more general, the need to become part of a collective body to negotiate benefits is inevitable. The “dynamics of this form of working complements the already high degree of complexity inherent to the labour relations system, which includes its multi-level governance characterised by task-specific jurisdictions, many jurisdictional levels and a flexible design” (Ales & Dufresne 2012:95-105).

Performance and reward best practices process in virtual teams include the following:

- Regular honest feedback on negative as well as positive performance. The illusion of control (IOC) theory states that there is a natural tendency of people to overestimate their ability to control events. Feedback on successes alone enhances this illusion, whilst negative feedback decreases the effect. Therefore, there should be a balance in feedback. (Langer 1995). This is confirmed by the theory of planned behaviour (TPB), which states that people evaluate the suggested behaviour as positive (attitude), and if they think their significant others want them to perform the behaviour (subjective norm), this results in a higher intention (motivation) to perform (Ajzen 1991).
- “Intermediate goals as well as final goals, similar training for all team members, a clear structure and team maintenance activities/team building also contribute towards increased performance” (Kaiser, Tullar & McKowen 2000). However, it becomes critical, due to the distance between team members, to regularly celebrate or acknowledge successes and address failures and mistakes (Edwards & Wilson 2004: 173).
- Team leadership should give attention to team processes and member relations, as leadership has a stronger relationship to increased performance and satisfaction, than selection procedures. Executive leadership style is moderately related to performance and satisfaction (Lurey & Raisinghani 2001).
- Conditions of service, which include how reward is determined, are individualised and contractually prescribed.

3.3.5 Process theme synthesis

Extending the framework of the Ebrahim *et al* (2009) model their identified elements of facilitation, meeting structure, alignment, and virtual team performance have been adapted to accommodate contemporary scholars’ research. Virtual team facilitation, alignment, team structure, and performance and rewards management has replaced their process theme.

- From the virtual team facilitation element, it follows that particular hierarchical and organisational responsibility should be assigned to a dedicated individual to manage the smooth functioning, but opportunity given for experts to manage knowledge specific areas.
- Knowledge management (KM) is a key performance driver in virtual teams and the quality of the alignment between various process and functions influence the

flexibility and abilities of the virtual team.

- The structure of the virtual team should be flexible enough to accommodate network(s) of experts, and the recruitment process (which will be discussed in greater detail under the People theme under talent management), should accommodate the unique method in which these knowledge workers are engaging with the world around them.
- Performance and rewards are intrinsically interfacing and linkage; therefore, exists between the two concepts. Regular, honest feedback, and communication between the team member and team facilitator is needed. Team performance needs similar feedback and tracking to keep the team focussed and relationships strong. Milestones reached should be celebrated as it contributes towards team effectivity.
- Rewards should be formally, individually and contractually negotiated.

3.4 PEOPLE THEME

The third research question was to explore the people practices contributing to effective virtual teams (Theme 3). From the people perspective, those resource factors that support the effective internal workings of the virtual team, will be discussed. While these influences are represented as separate elements (see figure 1.1), there are in fact large overlaps between each of these influences. The objective of a team leader should be to balance these influences and focus the behaviour of team members on the goal at hand. This reasoning falls within the bounds of the punctuated equilibrium theory (Chidambaram 1996).

The findings were that in the Ebrahim *et al* (2009) model the identified elements associated with the people theme were: Specify objectives, team selection, reward and meeting training. Due to recent studies, the element “specify objectives” in the Ebrahim *et al* (2009) model was established to be a unique and independent theme, which was addressed in section 3.2.

Team member selection was already highlighted as an important aspect influencing the performance of a virtual team. The team selection process will be discussed under the new heading of talent management and reasoning provided for the change.

The reward element of Ebrahim *et al* (2009) was linked to performance management, moved as an integrated process to the process theme (see section 3.3.4) under the new heading of performance management and rewards and reasoning provided for the change.

The training element occurs on both the people and technology themes of the Ebrahim *et al* (2009) model. Hence, the training and development initiatives of the virtual team were deemed to be dealt with as an integrated item, and the element referred to the Technology theme where the researcher deemed the development of the people in the virtual team would be best addressed.

Under the process theme, the element of meeting structure suggested a process of how virtual team members meet and what principles do they follow to reach agreement. This theme will investigate the best practices, which contribute to how virtual team members socialise, commit in the team, trust, communicate, collaborate, engage with each other as well as how they deal with conflict in the team. The empirical study will ascertain best practices processes related to these.

3.4.1 People theme element: Team selection – Talent Management

There is no disputing the fact that literature on retention of skilled staff remains highly fragmented (Meisinger 2007:12; Ready & Conger 2007:69-77; Robert & Börjesson 2006: 521-549). Although innovation and knowledge working have already been addressed under the Purpose theme, this section specifically focuses on the individual team dimension.

It has become imperative for organisations to have more effective human resource development plans to obtain and retain the most qualified and valuable employees (Schein 1977:1). Recently, South Africa has experienced “losses of talented skilled people in the various industries, such as the technology industry” (Sake24 2009:12). External recruitment practices (particularly interviewing and competency analysis) of talented staff (especially the knowledge worker categories) have seen the greatest evolution in recent years (Farmer 2008:120). Oosthuizen and Nienaber (2010:41:47) support the claim that there is a tremendous skills shortage in the science, engineering/technology area. They believe that to retain talented and skilled people, particularly in technology, the industry will need extraordinary vision and an acceptance and understanding of the preferred way they can and want to work in, from organisational leaders”. A number of specific aspects to be addressed in recruiting for virtual teams were noted: A proficiency in both technological and technical skills and knowledge becomes vital (Nohria & Eccles 1992:304-305). External face-to-face methods of recruiting (advertising, executive search, virtual job fairs and referral bonuses) are no longer the most effective method of recruiting team members (Richardson *et al* 2008:490-508). These specific dilemmas in virtual team recruiting lead to specific suggestion made to recruit team members. Brown *et al* (2007:29-31) suggest that

team leaders of virtual teams would increase their chances of finding suitable candidates that fit into the virtual teams if they:

- “Network with colleagues like getting involved in professional organisations and chambers of commerce. They further suggest that these organisations would also be the best to explore the most suitable employment agency and recruiters to work with by referrals
- Consult business publications, which help virtual team leaders to identify possible opportunities and threats as well as provide ideas for strategy and processes related to particular industries
- Prioritise hiring checklists in what skills and knowledge are essential for team members to have, and which ones are optional
- Consider tracking resumes of candidates on internet social sites
- Depending on the position, the employer needs to fill, use work samples of previous projects. This also gives the new employer insight into the candidate’s value system and ethics.”

Technical skills and qualifications alone are no longer sufficient to be successful in a virtual team. Potential members should display personality and character traits that fit in with other team members. The following factors should be considered in recruiting team members in the technology industry in particular:

- “Thinking and learning styles
- investigation, communication, presentation skills
- cultural orientation
- personality types
- emotional intelligence
- self-management
- stress and time management
- team dynamics
- conflict management, negotiation and assertiveness
- ability to handle change
- relationship management
- characteristics such as curiosity, enthusiasm, proactiveness, responsiveness, self-motivation, flexibility, work ethics” (Brown *et al* 2007:37-40; Verwey & Du Plooy-Cilliers 2003:1-6)

Potential techniques that could be used during the interview are as follows (Brown *et al* 2007:39):

- In scheduling the interview, one should consider utilising the technologies that would be utilised by the team such as VOIP, web cams, emails. This could give the interviewer an indication of the interviewee's comfort with technology and how he or she handles a situation if technology fails.
- Regarding responses to difficult situations where behavioural and scenario-based questions are asked, these types of questions give the interviewer insight into how the candidate analyses a situation and what his or her priorities are.

A large body of research supports talent management in virtual teams. Wollstonecraft (in Shanley 2003:148-67) encourages employers to create non-discriminatory practices to support a healthy social order in teams. However, one should note that "females in virtual teams seem to be more verbal, influential and self-disclosing, which could be advantages for certain virtual team tasks" (Savicki, Kelley & Lingenfelter 1996; Berdahl & Craig 1996). The general systems theory (GST) proposes that the characters of people are unique and complex, and combined within the set-up of a group; they could have an even greater effect. The big five theory states that, because virtual team members are dispersed, personality may contribute more to the effectiveness of communication, compared to a face-to-face team (Balthazard, Potter & Warren 2004). A balance of characteristics in the group should; therefore, be maintained (Von Bertalanffy 1934). According to the social identity theory (SIDE), people categorise themselves as part of either the in-group or the out-group based on the characteristics of others in the group, which influences team performance (Cramton 2001; Jarvenpaa *et al* 1998; Scott & Timmerman 1999).

In the social comparison theory (SCT), it is noted that "people are continually comparing their opinions with those of others and adjusting their opinions in the direction valued by others through communication cues: Visual, verbal, and textual. However, communication among virtual team members is largely based on texts; for example, e-mails, rather than on visual images and verbal communications making comparison on unbalanced cues difficult" (Sia, Tan & Wei 2002).

Best practices in virtual team talent management process are as follows:

- Recruiters should review how virtual team members could be obtained from cutting-edge methods, as traditional methods may not be successful.
- The reasons why team members are selected differ from team to team, but the ability to work in a team, which is solely dependent on technology, provides ample direction about what should be considered.
- Interviewing techniques may need to be adapted to obtain the best possible fit for a team.
- Depending on the demands of the team, the expert level rather than the ability to work in a team, might be of greater value to the organisation.
- Although team leaders may acquire team members with differing personalities, balance between the different personalities should be maintained to increase team effectiveness.
- For certain tasks, a net link instead of a particular person could be recruited.

3.4.2 People theme element: Virtual team culture and socialisation

Culture is derived from the Latin word, *cultus*, which suggests the agrarian idea of cultivation or tillage (Rennaker & Novak 2011:33). According to Schein (1985), “cultures are powerful memories of intelligent rules. By following these rules in a natural fashion, chaos and mistakes are minimized”. Schein (2004:17) further defines culture as “basic assumptions which were learned by groups to help resolve problems of external adaption and internal integration that are working well and is considered to be valid and taught to new members of the group”. Thus, culture may be defined “as a set of shared symbols, norms, and values in a social collectivity thus serving as a filter for one's perception of the surrounding environment, as guiding behaviour, and as social interaction” (Chudoba *et al* 2005:279; Dongsong, Lowry, Lina & Xiaolan 2007:53–80). Culture defines the *modus operandi*. Kreitner and Kinicki (2010:64) derive three main components of culture; namely that culture is “passed”, “influences behaviour” and “operates on different levels”. Team culture has invited prolific research over the years.

Organisational culture “represents a set of common shared values, which govern and guide the behaviour of members in that organisation. This includes a pattern or system of rituals, values, practices, myths and symbols. The following dimensions capture the essence of an organisation's culture”:

- “Stability (The degree to which organisational activities emphasize the maintaining of the *status quo*)
- innovation and risk taking (The degree to which employees are encouraged to be innovative and to take risks)
- outcome orientation (The degree to which managers focus on the result or outcomes rather than on the techniques and processes used to achieve those outcomes)
- attention to detail (The degree to which employees are expected to exhibit precision, analysis and attention)
- aggressiveness (The degree to which people are aggressive and competitive rather than easy-going)
- team orientation (The degree to which work activities are organized around teams rather than individuals)
- people orientation (The degree to which management decisions take into consideration the effect of outcomes on people within the organisation)” (Bandura 1977; Chaneta 2014; Martins et al 2004; Powell et al 2004; Staples, Hurland, & Higgins 1998).

“The effect of leadership is dependent on cultural as well as personal values of followers indicating the need to consider individual factors in the process of managing virtual teams” (Gallenkamp, Picot, Welp, Wig & Riedl 2011). The socio-technical theory (STS) suggests that an organisational design should be representative of how people treat and respect each other (Cherns 1976). The theory of reasoned action (TRA) holds that a team member’s norms, attitudes and perceptions of how others will react, predict their behaviour (Fishbein & Ajzen 2000). Treatment and respect also influence future expectations of behaviour (Oliver 1977). The cognitive dissonance theory (CDT) suggests the “building of a particular belief system toward which individuals will guide their behaviour and reduce elements, which are in discord with that belief system” (Festinger 1957). Vessey (1991) states that people direct their behaviour to bring alignment between what they experience and their reality. Chaos theory has particular bearing on virtual teams in that “slight changes in initial conditions of dynamic teams, could render an unpredictable outcome” (Hartmanis & Stearns 1965; Lorenz 1993). However, in virtual teams, members cannot utilise the typical face-to-face (FTF) real-time meeting. They have to explore alternative means to socialise within the team. Oxford dictionary (2008:984) defines socialising as the informal, friendly, and welcoming talk and joining in activities with other people towards a team culture. Mark (2001) suggests that participation, team culture, and integrating remote work present key challenges for virtual

teams. According to the punctuated equilibrium theory, teams experience intense changes in behaviour that occur at the critical juncture of the halfway mark of a team's life. It is at this point that a team's equilibrium is shattered and a new level of activity and a different set of behaviours are established. Therefore, policy and procedure changes regarding possible areas of conflict should be introduced during periods of stability, because unexpected disruptions could lead to radical change (Eldredge & Gould 1972; Chidambaram 1996).

McDonough *et al* (2001) warn virtual team leaders should take cognisance of the influence of cultural differences between team members. Working in a globally distributed setting is affected by the combination of different cultural factors, including national culture, organisational culture, regional culture, and professional culture. These cultural factors are also intertwined with other factors, such as time zone differences and infrastructure, and have impacts on communication, coordination, and the relationship dynamics of globally distributed information technology work. In the process of constructing their identities and negotiating the cultural differences, global virtual team members not only draw from their national and organisational backgrounds, but also from their individual experiences. Moreover, some team members employ power relationships in their identity construction, such as core team/support team, outsourcer/outsourcee, and customer/service provider dynamics. Organisational practices should include cross-cultural training and leadership development. Hence, the use of a global delivery model and cultural liaisons should be employed to facilitate cultural diversity management (Huang 2009).

The concept of virtual team culture, according to Piccoli *et al* (2004) presents itself as follows:

- Cultural differences appear to lead to coordination difficulties” (This is supported by Johansson, Dittrich, & Juustila, 1999: 286-296).
- Culture creates obstacles to effective communication.
- Cultural and language differences are common in global virtual teams.
- There are differences among team members from different regions of the same country, which may be enough to negatively influence a virtual team (This is supported by Robey *et al* (2000)).
- The negative effect of cultural differences may be mitigated by an effort to actively understand and accept the differences. This is supported by Robey *et al* (2000) and Sarker & Sahay (2004).

- Project management challenges such as setting goals, budgets, schedules, resources, and identifying needs are more related to distance between members rather than to cultural differences. This is supported by McDonough *et al* (2001) and Robbins, Coulter and Stuart-Kotze (1996).

Best practices regarding virtual team cultural processes are as follows:

- Processes and procedures indicating how a virtual team should operate, should be introduced and agreed upon at commencement.
- Socialising between members through computer media should be encouraged.
- Leadership should practice the value system of the organisation.
- Culture and the reward system should be supported by information sharing (Suchan & Hayzak 2001).

3.4.3 People theme element: Building commitment, trust and managing conflict in the virtual team relationship

The greatest challenges in relationships are to trust, commit, and deal with conflict. This is no different in teams. In virtual teams, these challenges are concealed. In the absence of face-to-face clues, conflict might be latent for long periods and then suddenly explode. Trust and commitment is not only virtual team challenges. In organisations all over the world, leaders are confronted with the reality that some people cannot be trusted and not everybody is as committed to the cause or organisation as they would have preferred. Yet, in virtual teams, this general perception might be challenged due to the type of worker, the nature of the work, and the membership relationship.

Understandably, traditional team leaders have difficulty in managing people they cannot see. Contemporary team leaders who have significant exposure to technology understand that distance does not automatically result in “no work”. Instead, relationships need to be facilitated differently to build capacity for commitment and trust. Commitment theory notes that “team members who have a strong commitment towards the organisation can be trusted to use their discretion to carry out job tasks in ways that are consistent with organisational goals” (Schmidt, Montoya-Weiss & Massey 2001:575-600). This commitment to the team is furthered by cohesion decisions where the social exchange theory states that in “making decisions to join and stay in a team or network, people consider what are the costs and benefits associated with that decision, in comparison with available alternatives” (Homans

1958 597-606). Trust is considered an important “component in team development and team effectiveness” (Bestieler 2005:267-284). For a virtual team, trust becomes even more important than for face-to-face teams, due to “conditions of geographic dispersion, computer-mediated communication, and national diversity” (Muethel, Siebdrat & Hoegl 2011:31-46). “Trust acquisition is contingent on individuals' perceptions of others' ability, benevolence, and integrity, and one's own tendency to engage in trusting behaviour” (Christopher 2010:1-139). Trust in a virtual team setting can be defined as “the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other party will perform a particular action important to the trustor, irrespective of the ability to monitor or control the other party” (Mayer, Davis, & Schoorman 1995:712). Johnson, Suriya, Yoon, Berrett and La Fleur (2002) warn that “trust in virtual teams is built over multiple experiences with a person while observing both the causes and effects of their behaviour. Virtual team members tend to share specific information elements, which assist them in obtaining cues to assess the trustworthiness of a trustee”. Jarvenpaa *et al* (1998:29-75) identify “swift trust in the nature of virtual teams” and report trust to be temporary.

An organisation stands at great risk when employees cannot be trusted. Baracaldo and Joshi (2012:167-176) regard trust as a subjective expectation a person has about another's future behaviour based on the history of their encounters. An absence of trust could result in a negative reputation of the organisation, severe damage to projects and a decrease in productivity, which could lead to losses in revenue and clients. In particular, in virtual teams where members are geographically dispersed and working on “complex interdependent tasks”, projects become more vulnerable to the loss of trust between these members (Jarvenpaa & Keating 2011:786-798).

MacDuffie and Helper (2007), suggest that trust can be nurtured by the following:

- Where possible, choosing members of similarity in a particular trait, such as demography or culture
- creating shared experiences (especially positive experiences or successes)
- working on team cohesion
- allowing optimal use of information sharing and distribution
- creating avenues of spontaneous communication between members

Walther and Bunz (2005:828-846) further suggest, “consistent relationship could be enhanced by some rule or norm formulation”. This emphasises the role of socialisation in the

team (see section 3.4.2). Following these rules or norms reduces uncertainty and increases performance quality (see section 3.3.4).

Roth (2012:146-148) suggests that group members through the “facilitation of the team leader should build trust. It is further suggested that at the individual level, the level of trust depends on how much team colleagues trust each other and are willing to be vulnerable to one another to enable frequent and meaningful dialogue across all members of the group who are, together, accountable for a particular task”. This is aligned with previous team facilitation findings (see section 3.3.2).

Although Bandow, Asaka, Saito, Rao, Grigorian, Richter, & Eklund (1998: 3779) and Chudoba *et al* (2005: 279), first citation needs to be expanded) suggest that face-to-face interactions are crucial for trust building and cannot be replaced by any other means for dispersed team members. At the time of their theory formulation, the availability of video conferencing and Skype may not have been effectively utilised. Al-Ani, Trainer, Redmiles and Simmons (2012:97-106) suggest that “trust judgment(s) in culturally diverse teams are made from accumulated experiences that involve a sequence of cultural surprise, attribution, formulation of new expectations, and the application of adaptations in new situations. Individuals develop adaptations to avoid future surprises, which ultimately help them to improve their sense of trust towards others. Some of these adaptations include:

- Behavioural changes (where reparations to the relationship are specified)
- emotional changes (whereby negative energy in particular is reduced)
- cognitive changes (where a party changes their view of the situation *i.e.* what has already been achieved)

In the absence of trust, conflict will spiral. The role of the team leader in virtual teams is “not necessarily to resolve conflict, but rather to manage the conflict”. However, “certain conflict types may require specific action steps from the team leader such as in the case of discrimination” (Brown *et al* 2007:131-132).

According to the Oxford dictionary (2012), conflict can be described as a “severe disagreement or argument, typically a long-drawn-out one or a state of dissonance between mismatched or antithetical persons, ideas, or interests; or a clash”. Sun, Sun, Xia and Shen (2012) refer to conflicts as “situations in which concurrent operations are updating common objects in different ways” and states that this “notion of conflict is independent of application

semantics". Other researchers state that the typical understanding of people is that "conflicts of various kinds, are negatively related to outcomes" (DeDreu & Weingart 2003:741).

Conflict may create interpersonal tension and generate distress among team members as they do not tend to share their identity and context but rather share "work experience, education, age, language and competence" (Rusman, Van Bruggen, Sloep & Koper 2010:5; Guinea, Webster & Staples 2011). "Discussions on issues of conflict in the workplace might lead to better decisions, but it also takes time and other resources to resolve the conflict" (Anstey 2006:6). Rahim (2011) suggests other positives resulting from conflict:

- "Conflict may stimulate innovation, change and creativity.
- Organisational decision-making processes may be improved.
- Alternative solutions to a particular problem may be found.
- Conflict may lead to synergetic solutions to common problems.
- Individual and group performance may be enhanced.
- Individuals and groups may be forced to seek new approaches toward conflict.
- Individuals and groups may be required to articulate and clarify their positions."

Martínez-Moreno, Zornoza, González-Navarro and Thompson (2012:159-171) suggest that "early process conflict as well as the team communication medium influences the subsequent relationship and has an effect on team communication medium." Barnes's (1954) social network theory (SNT) (network theory, network analysis) suggests that organisations and people seek to explore an optimal route to building relationships and structures to their benefit, which in the case of virtual teams results in the net link of relationships (section 1.1).

Best practices in dealing with commitment, trust and conflict are as follows:

- Trust interventions should also be incorporated at team formation and reinforced at critical junctures when deadlines loom (Wilson, Straus & McEvily 2006:16-23; Mitchell & Zigurs 2009:61-83).
- Early conflict resolution processes should be established (Galvin & Ahuja 2001: 40-55).
- Quality feedback on work makes judgment of own work easier, reducing later conflict (Bandura 1977; Staples *et al* 1991).

- Combinations of different conflict-handling styles are advised (Rahim 1983:372; Rahim & Magner 1995; De Dreu & Beersma 2005; Paul, Seetharaman, Samarah & Mykytyn 2004).
- Individual trust between members should be encouraged by the team leader (Roth 2012:146-148) (see section 3.4.3).
- Communication technologies are effective in reducing task conflict. However, the team leader may also mitigate task conflict by assuming the role of a monitor. Likewise, process conflict may be abated in the virtual team as the leader performs coordinator activities. An effective virtual team leader exhibits specific roles to manage different types of conflict and the leader's response to conflict plays an important part in virtual team success (Wakefield, Leidner & Garrison 2008:434-455).
- Brown *et al* (2007:132-134) further suggest that virtual team leaders should consider the steps set out in figure 3.4 to prevent escalation of conflict.



Figure 3.4: Steps to prevent escalation of conflict

(Source: Adapted from Brown *et al* 2007:132-134))

Weiss and Hughes (2011:65-92) suggest that conflict should be viewed as an opportunity for coaching in collaborative teams. In the event of escalation of conflict, it should be resolved constructively, efficiently, and in ways, that model desired behaviours. Multi-tasking creates the opportunity for spiralling of conflict. Team leaders should facilitate appropriate processes, tools, method, and skills to deal with members' challenges (Hollingshead *et al* 1993; Majchrzak *et al* 2000). In the absence of a choice of team members, the effect of trust in work performance will be suppressed. Another aspect to consider is that team building increases knowledge about team members, but does not directly increase trust (Jarvenpaa *et al* 1998).

3.4.4 People theme element: Communication, collaboration and engagement

Brown (2011, see Chapter 9) states that organisational team members in general attempt to improve their communication and interpersonal skills as well as their people management skills. In achieving interpersonal competence, the organisation becomes effective. Certain interpersonal techniques are available to assist employees in their journey to becoming more empowered by obtaining certain skills. These include (non-inclusive list) the following:

- Employee empowerment
- training and development
- interpersonal style
- transactional analysis
- career-life planning
- stress management.

While it is important to have the most effective technologically collaborative tools and communication technologies available, the ability to communicate effectively surpasses the technology. The "ability to be technologically connected, does not automatically ensure that someone will communicate effectively. In virtual teams technology becomes the conduit for communication and collaboration as team members conduct their cross-boundary work, making technology imperative in the communication process" (Montoya, Massey & Lockwood 2011:451-476). Nohria and Eccles (1992:304-305) suggest that organisations cannot build a networked organisation on electronics alone, because that would imply the construction of an entirely new sociology of organisation.

Both the communication platform and the ability of communicator and receiver play a significant role in effective communication. In many organisations, leaders require teams to work more cross-functionally, reducing silos and excelling beyond the boundaries of a particular department or function. Generally, collaboration in organisations is perceived to be good for the organisation and its potential benefits are hailed as significant: transfer of best practices across the organisation, innovative process and product development, and increased revenue. However, collaboration does not automatically lead to these benefits and might even lead to dismal failures. Hansen (2011:2) found that greater collaboration could actually decrease benefits. Furthermore, this author notes that “novice teams initially learn from the advanced teams through collaboration. However, as the knowledge between the novice and advanced teams become more equal, the success rates of the two teams do not increase at the same rate, putting the organisation at risk. It was then found that questioning whether collaboration on a particular project will enhance the value of that project, rather than to question how people can work together better, contributed more to success of decision to collaborate or not”. In addition, it is suggested that “three factors will assist in determining when it will be constructive to collaborate and when rather not to collaborate. These factors include the costs of return, opportunities and collaboration. The cost of return relates to what financial benefits collaboration would produce if executed well. The cost of prospect relates to what opportunities will be gained or achieved by collaboration as opposed to not collaborating. The cost of working together as opposed to non-collaboration should be considered. By over or underestimating or ignoring these costs, tensions and risk areas are increased within the organisation. From that study one can; therefore, deduct that collaboration is not always suitable as a method of getting things done. Further that there are certain predictors that can assist team leaders to assess whether a type of work is more or less suitable for collaboration”. Collaboration between parties is normally established through an agreement or contract. Loch *et al* (2006: 68) suggest that “these contracts vary in contract form, risk allocation and content nature”. The forms of contracts include the following:

- Fixed price contracts allocate all costs to one party.
- In cost reimbursement contracts, the dominant party bears all the risk and pays for all the resources. The latter contract normally has a number of quality objectives and incentive bonuses associated with it to ensure progression from the delivering party carrying the least risk.
- The mixed incentive contract is probably the most complex of these contracts as it requires constant negotiations. The authors suggest that although contracts

are agreements between partners, these contracts have a certain chain of command (hierarchy) regarding issues such as decision-making, dispute resolution and processes and procedures. This chain of command influences the collaborators' response to residual risks.

All of the above forms can be classified as "independent contracts" in terms of current South African legislation. The reasons for becoming an independent contractor could be classified into motivational and situational factors (Valman 2010:1-9):

- Motivation includes escaping from corporate life, incompetent management, unchallenging careers, absence of career prospects, and attempts to gain more influence or respect from peers, increased remuneration, flexibility in life style and greater autonomy to choose assignments.
- Situational factors could include an expectation of change in environment or bad working conditions.

Loch *et al* (2006: 252-253) note that in choosing the best type of collaborative architecture for a particular team, team leaders need to consider the structuring and organising principles not only of the team, but also of the environment (such as the organisational network) in which the team must operate. The architecture of collaborative networks differs in the sum of members that are allowed in these networks. In addition, the degree and the governance to which the architecture allows for openness or closeness of participation, influences the team's quality of the networking. Decision-making plays an important role in selecting the best type of collaborative architecture. Furthermore, it is suggested that the power of network influence should not be underestimated. Loch *et al* (2006:252-253) also suggest that team leaders have indirect influence through others and naturally look for parties with direct and explicit power in the nature of team activity. Team members who are both connected with each other (a united front), their environment and others, are more flexible and able to cooperate well with each other. These teams tend to have access to diverse information and opportunities.

Collaboration and teamwork produce the most effective results when individuals who have a stake in the outcome are involved in the decision-making process. Teams divide labour, based on individual strengths, to achieve a common goal. Collaboration; therefore, produces the best results when employees who have a vested interest in an objective work together to achieve mutually satisfying results.

Gratton and Ericson (2011:45-72) suggest that “as teams become more virtual, collaboration declines”. They mention that complex collaborative teams, where highly educated specialists often generate huge value by drawing on a variety of deeply specialised skills and knowledge to devise new knowledge, are more likely to disintegrate into unproductive conflicts. They also suggest that group size has an impact on collaboration between team members. These authors found that natural cooperation between groups with more than 20 members’ decreases. In order to deal with the decrease in coordination, leaders should consider practices to strengthen an organisation’s ability to perform complex collaborative tasks and maximise the effectiveness of large diverse teams while minimising the disadvantages posed by their structures and composition.

Valman (2010:5-37) further suggests that companies increasingly consider hiring a flexible workforce because of the ageing population, outsourcing and globalisation, by means of independent contractors and thus associates consulting within the employment relationship. This type of non-traditional employment forces HR practitioners to adjust strategies to attract and attain the knowledge of this category of employee.

At the time that this research was conducted, the draft Labour Relations Bill had steered some debate on the concept of independent contractors and the position of labour brokers forwarding people to work on a contract basis for employers. A labour broker or “temporary employment service” is defined in section 198 of the Labour Relations Act (LRA) as a person who, for reward, provides another person to a client to work for that client for remuneration. Section 198 also provides that the temporary employment service (*i.e.* the labour broker) is regarded as the employer of the worker in question. Hence, the labour broker, not the client, is the employer of the worker.

This effectively allows the client to outsource all his or her labour requirements (including labour law problems) to the labour broker. The reason why this roundabout way of doing business has developed is due entirely to South Africa’s current labour legislation. The laws meant to protect workers create such an unnecessary and intolerable burden on employers that they prefer to pay labour brokers a fee to administer their staffing requirements and problems.

The proposal is that section 198 of the LRA should be repealed and replaced by the Employment Services Bill. According to a new, stricter definition of “employer” included in this proposed bill, no temporary employment service will be able to be the employer of any workers that it places in work, effectively bringing an end to labour broking.

There are several definitions of “employee”. In South African legislation, an employee in the Labour Relations Act 66 of 1995 (LRA) refers to “any person who is employed in a workplace, except a senior managerial employee whose contract of employment or status confers the authority to do any of the following in the workplace:

- *“Represents the employer in dealings with the workplace forum; or,*
- *determines policy and takes decisions on behalf of the employer that may be in conflict with the representation of employees in the workplace (section 78)”.*

Furthermore, section 200 of the LRA refers to an employee as:

- *“Any person, excluding an independent contractor, who works for another person or for the State and who receives, or is entitled to receive, any remuneration; and,*
- *any other person who in any manner assists in carrying on or conducting the business of an employer, and 'employed' and 'employment' have meanings corresponding to that of 'employee'”.*

This definition is also found in the Basic Conditions of Employment Act (BCEA), Employment Equity Act 55 of 1998, as amended (EEA), and the Skills Development Act 97 of 1998, as amended (SDA). However, virtual team members are not always permanent members of teams, and thus are not always permanent employees of the employer.

In many Western labour litigations and laws (such as in the USA), the definition of employees excludes “independent contractors”. This exclusion has been problematic, as it has in the past excluded this particular group of people from enjoying privileges and job security when doing work in virtual teams as “contract workers”.

Careful consideration thus needs to be given to the legal employment status of virtual team members and the presentation of the nature of the virtual team member relationship with the employer, within South African borders.

Employee participation is not always needed in all conditions. Thomas and Schmidt (1976: 315-318) and Kanter (1983) suggest that team work is not desirable under the following conditions:

- The work is structured in such a way that tasks are independent of other tasks.
- There are experts on a subject and those affected by the experts' decisions acknowledge and accept that expertise.
- There is an obvious correct answer or outcome.
- The task/problem is a normal part of an individual's regular job assignment.
- There is minimal or no interest in the issue.
- Neither the involvement, knowledge nor expertise of others will contribute to the issue.
- Individual rather than collective performance rewards are forwarded.
- There is little time for deliberations.
- Individuals are more content and productive alone.

From the above, a number of conditions are recognised under which individuals may not need to work together and can complete a task alone, yet they might still need to occasionally share information. For the sharing of information, they would then need good social skills (Brown 2011:285).

Despite many organisations' drive to increase collaboration, it might not add value for particular projects or tasks, and collaboration might actually achieve the exact opposite of the original intention. Organisations; therefore, need to carefully analyse and decide whether and to what extent team members are required to collaborate on tasks. Suchanand and Hayzak (2001) note that communication is the most important factor for team success, and it can be regarded as a strategic activity. On the balancing scale, collaboration is noted as one of the key characteristics of the knowledge worker, which is the typical virtual team member (Timonen & Paloheimo 2011). Accomplishing tasks through technology-aided communication in particularly creative situations and work, which requires a great deal of interactivity are difficult, and; therefore, team leaders' traits and styles, and demands of the situation should be carefully investigated before action is taken. This is known as the contingency theory of leadership effectiveness (Fiedler 1967). The challenge is how to assess favourable situations for virtual teams. Some factors (cultural differences, characteristics of tasks, availability of time and communication technologies) intensify communication, collaboration and coordination problems. These factors may not be easy to separate in order to analyse their effects (Kayworth & Leidner 2000; 2001-2002). Virtual teams that use a variety of communication methods are more satisfied and successful.

The innovation diffusion theory (IDT) suggests that “new ideas and technology spread cultures through the communication channels in the organisations' social system” (Lazarsfeld *et al* 1949). People reach agreements through reasoning, and reasoning takes place through communication (persuasion, debate, conversation, and dialogue), which is covered in the argumentation theory of Toulmin (1958). For virtual teams the dialogue theory of Buber (1958) and the research of Tan, Wei, Huang and Ng (2000) are of particular importance as they suggest the creation of an “empty place” to give all participants the necessary space to talk, and they reflect the communicator's ethic within the team. Collaboration in virtual teams takes place through social networks, which in turn increase productivity and create value for the team. This pertains to the social capital theory (Coleman 1973; 1988).

Welsch (2011:328-346) defines engagement “as a dynamic, changeable psychological state which links employees to their organisations, manifest in organisation member role performances expressed physically, cognitively and emotionally, and influenced by organisation-level internal communication”. Some issues that influence engagement in virtual teams are discussed next.

With regard to team size, “the greater the number of people who need to work together, the more influences need to be accommodated within the team which impacts on the team performance. Thus, team size influences the dynamics of a team such as their engagement with each other. Therefore also the relationship culture and trust between the team members” (Pratt 2010:91). As far as empowerment goes, team members need to be empowered to make decisions about their work. They also need to be held accountable and responsible for those decisions (Mathieu & Gilson 2006:97-108). Not all people in a team should be afforded equal decision-making. Decision-making power should be allowed to develop alongside a sense of pride by means of a structured delegation of authority process as part of the greater management technique for unleashing human potential in the team and organisation (Brown 2011:243). Social relationships influence virtual teams as follows: “People function within a network of social relationships and behavioural patterns of members (norms, roles and communication). This is also known as the psychosocial system. Virtual team members should be made aware of the boundaries in which they may make decisions, and also know the consequences should those decisions be erroneous (Welch 1993:86-93; Brown 2011:244).

Best practices in relationship processes of virtual team with regard to communication, collaboration and engagement are as follows:

- The perceived value that collaboration and communication will create, needs to be offset against the costs to attain them.
- The structuring of both the team and environment should be considered for a collaboration design.
- For a perceived longer-term virtual team, members should receive dialogue training to increase collaboration, thereby increasing outputs such as decision quality and satisfaction.
- The socialisation of team members should ideally be mentored through a structured programme (Suchan & Hayzak 2001).
- Due to the flexible nature of virtual teams, size should be determined by effective engagement, relationship culture, and trust rather than numbers.
- Team members need to be empowered to make decisions in their work, know the boundaries of their decisions, and be held accountable and responsible for their decisions.
- Virtual team should have a range of well-integrated communication tools available to be successful (Galegher & Kraut 1994).

3.4.5 People theme synthesis

Extending the framework of the Ebrahim *et al* (2009) model with contemporary research it was determined that “specify objectives” were established to be a unique and independent theme of purpose, which was addressed in section 3.2. The team selection process will be discussed under the new heading of talent management and reasoning provided for the change. The reward element of Ebrahim *et al* (2009) was linked to performance management, moved as an integrated process to the process theme (see section 3.3.4) under the new heading of performance management and rewards, and reasoning provided for the change. The training and development initiatives of the virtual team were referred to the Technology theme and dealt with as a comprehensive element. Under the process theme, the element of meeting structure; which was deemed to investigate the best practices which contribute to how virtual team members socialise, commit in the team, trust, communicate, collaborate, engage with each other as well as how they deal with conflict in the team; was moved to the people theme, and the human elements interfacing with the virtual team discussed.

The element of talent management revealed that the acquisition and retention of skilled staff remains key concerns for organisations. Unconventional and legal methods need to be incorporated, such as networking, to obtain the services of knowledge workers. Technical skills, qualifications, personality and character fit are considered to be the key elements to gain membership in a virtual team with specific mentioning of characteristics such as curiosity, independence, self-motivation, flexibility and work ethics.

The effect of the combination of different cultural factors including national culture, organisational culture, regional culture and professional culture is greatly exaggerated in the virtual team culture and socialisation. The reasons for this powerful effect is the time zone differences and infrastructure, which have impacts on communication, coordination and the relationship dynamics of the virtual team.

Due to the knowledge specialty of virtual team members, they are normally assigned to share complex interdependent tasks, but also work independently. In sharing of their responsibility commitment to the task at hand, trust that each member contributes as promised, becomes crucial elements for effective functioning. Similar conflict management processes as used in face-to-face teams were found in the literature, but the face-to-face intervention were utilised as last intervention. Formal contracts were found to reduce conflict.

Communication, collaboration, and engagement were found to be overarching elements across all the themes in this study. It influenced the purpose of encounters between members, the processes that members follow to obtain and share knowledge, and the type of technology they would utilise to do their work. The ability to communicate effectively surpasses the importance of technologically collaborative tools and communication technologies available. For effective sharing of information sharing, virtual team members need good social skills and will not share information, which they deemed to be trade secrets, unless the team has an established sharing culture. Virtual team members are highly committed to a team if the rest of the team members also collaborate in return. Team members need to be empowered to make decisions in their work, know the boundaries of their decisions, and be held accountable and responsible for their decisions.

3.5 TECHNOLOGY THEME

3.5.1 Theoretical foundation of technology in teams

Ebrahim *et al* (2009b:2661) maintain that that “mere information sharing between two points

is not sufficient for effective virtual team functioning". Their view is reinforced by the trustworthiness antecedents' schema (TWAN) of Rusman *et al* (2011), which states that "communication media in teams configure the collaborations, cohesiveness, trust and conflict in the team". Furthermore, perceived usefulness (PU) and perceived ease-of-use (PEOU) of Davis (1986) within his transactive memory theory, suggests, "team members' perception of new technology influences its use. The more difficult new technology is to use the greater possibility of non-use will be experienced". This user intention view of information systems is shared by Venkatesh, Morris, Davis and Davis (2003) in their unified theory of acceptance and use of technology (UTAUT), which confirms that "intentions and perceptions influence the consequent usage habits". The conclusion by Ebrahim *et al* (2009b) that "information richness should be considered as the most important measure for technology selection" is noted, but rejected by the researcher. Instead, the researcher maintains that the ability of information to be accessed from various media portals in the right quantity, context, and quality by users fit for the task or purpose that it is needed, is of greater user value than merely having a greater volume of information. The researcher; therefore, supports the earlier research of Hollingshead *et al* (1993) and Hollingshead (1996) regarding the task-media fit theory, which states that "media and task fit depends on choosing information and communication technology in virtual teams to optimise the relationship between task and technology which confirms that the performance of the team is more dependent on experience with technology and team membership rather than task type".

As the research question was to identify the best practices to stay conversant and relevant with latest technological changes to remain effective in its functioning (Theme 4), Ebrahim *et al* (2009) model; identified the relevant elements, which should be addressed as location, selection, training and security. Due to contemporary scholarly influence on Ebrahim *et al* (2009) model, the researcher retained location but replaced it with the scholarly wording of the workspace of virtual teams. Selection was retained but narrowed due to scholarly interest on around technology software and platforms. Training was retained as an element but dealt with as a comprehensive element to acknowledge knowledge and skill development in virtual teams as suggested under the People theme. Security was retained as an element but broadened as an element to acknowledge risk management.

Following the Evolutionary theory (The theory of natural selection) of Darwin (1859) as supported by Gould (2002) suggests that natural selection of the stronger beings of the species occurs naturally to counteract the demands of competition. The application of this theory in virtual teams suggests that stronger virtual teams would naturally create a greater competitive advantage. Social presence theory (SPT) and media richness consider the use

of different media channels. These theories concur that “the fewer the available channels in a medium, the less attention is paid by the users to the presence of other social participants’ interactions. Also, social presence declines as messages become more impersonal. They found that although communication and social presence in face-to-face teams may be socially more effective, no difference in performance or quality of work was found between virtual teams and face-to-face teams. Women are more satisfied, felt more included and greater team cohesiveness with the virtual teams’ experience than men. Less socio-emotional content is exchanged in virtual teams due to the lack of visual and social clues and is; therefore, perceived to be lacking normative reinforcement and being impersonal. Socialisation between team members; however, is still an area for further research, especially during the establishment and maintenance phases of the virtual team life cycle” (Burke & Chidambaram 1996; Lind 1999; Majchrzak *et al* 2000; Pauleen & Yoong 2001: 190-202; Walther & Burgoon 1992; Warkentin & Beranek 1999). A further contribution of the media richness theory (MRT) towards best practices in virtual teams suggests that “media vary in levels of richness according to the capacity for natural expression, the number of cues they are able to convey and the timeliness of feedback. The commonly used media are synchronous: face-to-face communication; phone; text; fax; e-mail; and videoconference for ambiguous tasks; managing conflicts; brainstorming; clarifying goals for routine tasks of analysis and project status. A face-to-face meeting early on created a shared language between members – this enabled ambiguous tasks to be completed later” (Zack & McKenney 1995:394-422; Majchrzak *et al* 2000). The progression in ICT in the first decade of its existence, which was examined by Zack (1994), has seen the advent of a number of new technologies, enabling new diverse uses not available at the time the research was first proposed. According to the Social Information Processing theory (SIP), the use of technology seems to restrain the pace of relationship development between team members in virtual teams due to a longer information exchange period (Chidambaram & Bostrom 1993; Chidambaram 1996; Walther & Burgoon, 1992; Walther 1994 & 1995; Walther 1997; Warkentin & Beranek1999). However, ICT technology in the last two decades has evolved dramatically, and the researcher; therefore, rejects the longer exchange period of information as a reason for why relationships do not form as quickly in virtual teams as in face-to-face teams. In fact, this seemingly slow pace of relationship development could even be considered as one of the benefits of virtual teams as opposed to face-to-face teams. SIP explores that “although cohesiveness is initially higher in forming stages of face-to-face teams, virtual teams soon surpass the face-to-face team’s cohesiveness, with the vehicle of technology actually reducing relationship conflict, and increasing greater inclusion, immediacy, affection and the communication of attitude”. SIP suggests little difference between face-to-face and virtual team with regard to task focus and decision quality.

However, if attention is not given to relationship building, virtual team becomes less task-oriented and less formal over time. The researcher supports the actor network theory (ANT) which states that “objects such as technology should be treated as part of the greater social networks to be effective” (Latour 1986).

3.5.1.1 Technology utilisation in virtual teams

Virtual team members function within a network society which is highly reliant on a technological information sharing network for both professional and social interaction (Daim, Ha, Reutiman, Hughes, Pathak, Bynum & Bhatla 2012:199-212). Virtual team members make use of a combination of synchronous and asynchronous communication tools to enable collaboration with team members and to complete tasks. These tools are part of a greater network of tools. The interaction between synchronous and asynchronous communication tools can be presented as set out in figure 3.5 (Lanubile *et al* 2010:52-55).

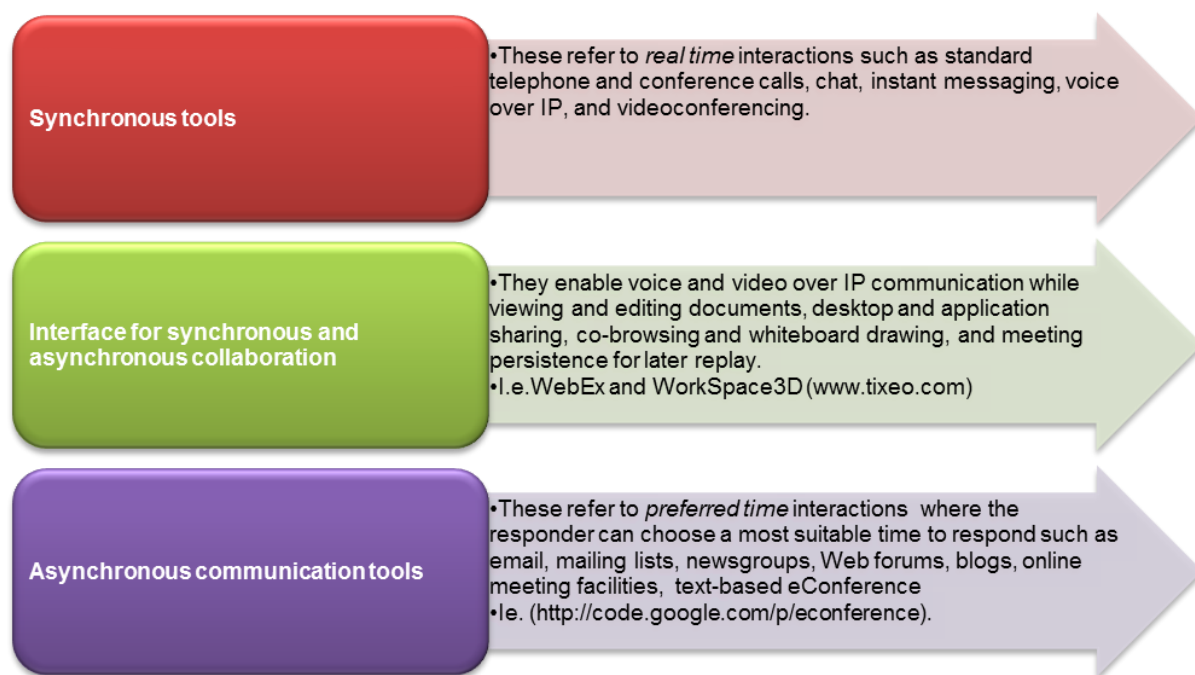


Figure 3.5: Mainstream communication technologies for virtual team interaction

(Source: Adapted from Lanubile *et al* 2010:52-55))

Daim *et al* (2012:199-212) warn that “communication through only synchronous tools may be influenced by excessive packet loss, delay and jitter. However, these can be buffered by the receiver/viewer, and may in some cases be retransmitted. Thus, networks supporting real-time communication place significant demands on IT to deliver consistent, low-latency performance”. Examples of synchronous communication are shown in figure 3.6.

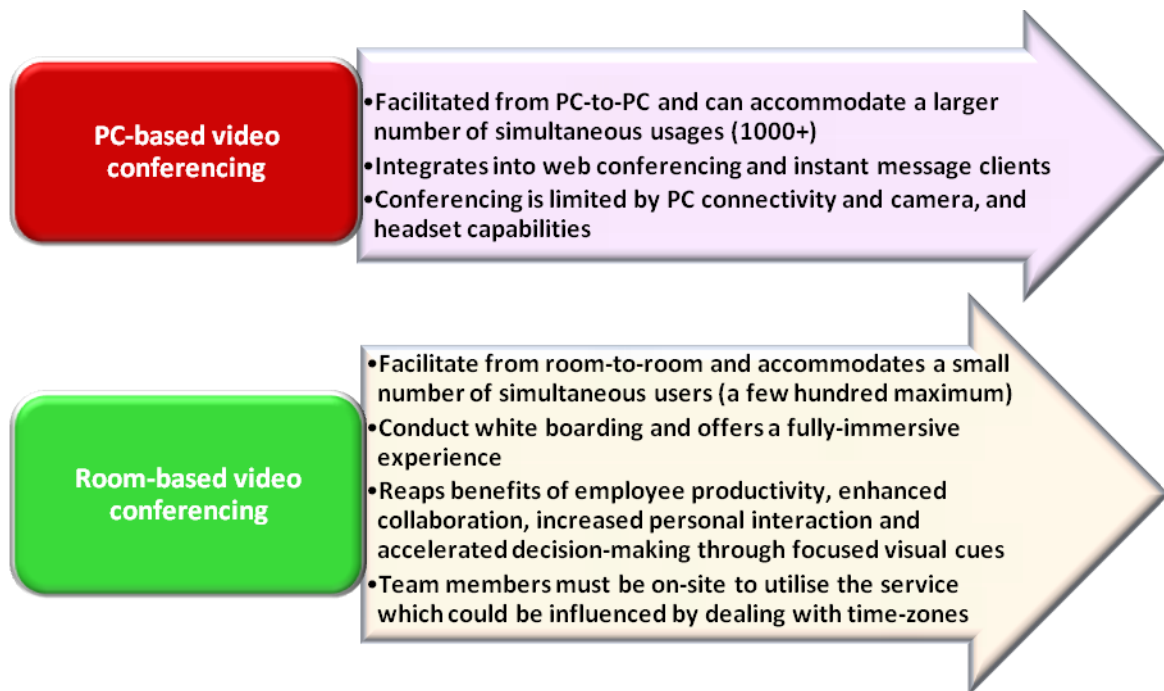


Figure 3.6 Mainstream communication technology for virtual team interaction

(Source: Adapted from Lanubile *et al* 2010:52-55))

These authors further suggest that “asynchronous communication allows for greater freedom, people work with less structure and this gives greater privilege of choices. Asynchronous communication creates a pathway to inspire innovation and performance (just-in-time) and consumers can choose just enough of what they need”. In addition to the above-mentioned direct and indirect communication tools, other collaboration tools are also available. Lanubile *et al* (2010:52-55) suggest a combination of synchronous and asynchronous communication unique to a team such as the example for a software building team shown as follows in figure 3.7:



Figure 3.7 Additional collaboration tools are also available

(Source: Adapted from Lanubile *et al* 2010:52-55))

Technology is not only used in professional deliberations but socialisation in the virtual team network could be greatly enhanced by social media between the various generations of web applications as shown in figure 3.8.

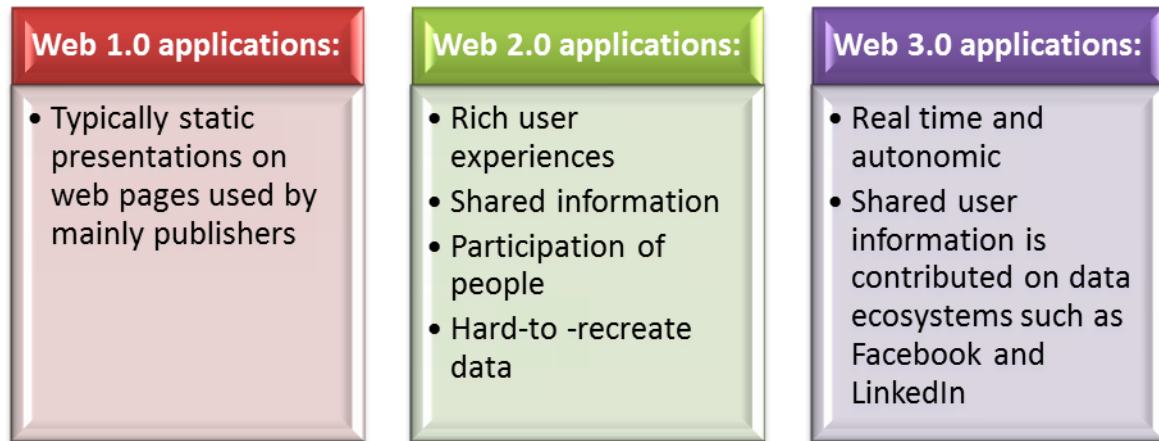


Figure 3.8 Differentiation between different web application media

(Source: Adapted from Lanubile *et al* 2010:52-55))

The interaction of various components in the process of constructing an effective virtual team could be compared to a narrative from the ICT environment from which it transcends; namely the “cloud”. The “cloud” description was particularly chosen for this study on account of the sample population chosen, but also for the expected significant role which it is anticipated to play in the development of ICT, such as its applications, platforms and infrastructures (Moreno-Vozmediano, Montero & Llorente 2012:1). In ICT, the “cloud” refers to a set of network enabled services, providing scalable guaranteed, normally personalised, inexpensive computing infrastructures on demand, which could be accessed in a simple and pervasive way (Wang, Von Laszewski, Younge, He, Kunze, Tao, & Fu 2010:138). In a layperson’s terms it can simply be described, as when you enter a computer network, you do not really know where your information that you enter is transacted (the cloud). Behind the screen is an umbrella of ICT services where information can be accessed irrespective of where the user resides. Users are not required to have their own structures or software (such as servers) but can lease those capacities from third parties. It is foreseen that cloud technology could play a significant role in the establishment of a future network society (Moreno-Vozmediano *et al* 2012:2).

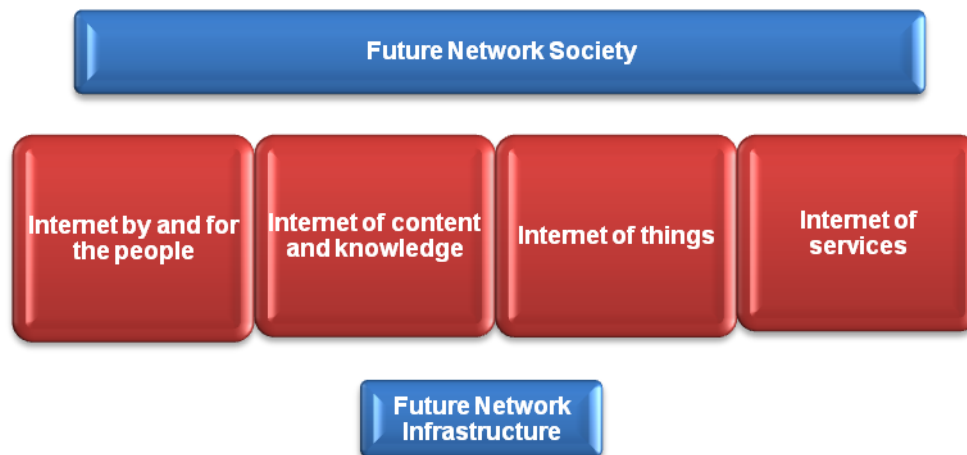


Figure 3.9 Internet applications within a network society

(Sourced: Moreno-Vozmediano et al 2012:2)

From the above figure, one can predict that future network infrastructure could be informed by people, services, knowledge or “things”. In summary, the actions of effective and successful virtual teams are informed by a number of smaller “clouds” within the big “cloud” of virtual teams. Within the virtual environment, a number of “clouds” interact with one another in turn influencing the effectiveness of the virtual team. Technology best practices for virtual teaming are as follows:

- The choice of collaboration tools should fit the purpose intended for.
- A professional decorum should be established, as the rise of text messaging, short-hand, and emoticons used in social networking, mediums can easily result into unprofessional communications.
- The availability of a common platform for logistics, HR, finance, and other transactions in an organisation, assists the formation of a heritage database on previous teams’ successes.
- Team members should be trained to professionally master both synchronous and asynchronous communication as well as the art of facilitating the possible.

3.5.2 Technology theme element: Location – Workspace versus workplace of virtual teams

Irrespective of an individual’s physical location, time zone, and nationality, organisations can obtain their expertise via the utilisation of virtual teams (Ebrahim *et al* 2009b). The “ability to

have access to the relevant technology carries a greater importance than access to a place of work. The workplace also carries a particular orientation towards work. In the more contingent form of engagement where the physical workplace and indefinite employment relationships are eroded, the traditional employment contract may increasingly offer less protection to workers or e-lancers” (ILO, 2012). Instead of the *workplace* concept, the *workspace* concept is a more appropriate terminology for virtual teaming. Farmer (2008:125) defines the workspace of virtual teams as “a high-performance virtual environment designed to make workers as effective as possible in supporting business goals and adding value. It results from a continually balancing investment in people, process, physical and technology environments to measurably enhance the ability of workers to learn, discover, innovate, team and lead, and to achieve efficiency and financial benefits”.

The current South African workplace definition has not yet acknowledged the existence of the new world of work by recognising the existence of modern technology workspaces and the existence of e-workers or virtual working. The Labour Relations Act 66 of 1995 (section 213) includes only “the place or places where the employees of an employer work”. If an employer carries on two or more operations that are independent of one another due to their size, function or organisation, the place or places where employees work in connection with each independent operation become the workplace. Chewable (1994:69) states the following: “It is evident from this definition that a workplace can be made up of one or more places of work. If an employer is engaged in more than one operation in different places which by virtue of their size, function and organisation are independent, the operations will be considered as separate workplaces.” The influence of the definition of “workplace” influences other labour legislation which may have a bearing on the virtual team member as employee, such as the Compensation for Occupational Injuries and Diseases Act 130 of 1993, as amended; the Occupational Health and Safety Act 85 of 1993, as amended; and the Employment Equity Act 55 of 1998, as amended. For instance, if the employer’s computer blows up in the virtual team member’s house while working in a remote destination in South Africa, causing injury, would that be considered an injury on duty? It is foreseen that the definition of a workplace could in future be challenged by similar incidents, by members of virtual team who are stationed within South African borders irrespective of their citizenship.

Best practices regarding location of virtual team location are as follows:

- For the purpose of labour legislation protection, and protection of organisational assets, the virtual space of the team member's anticipated space of work to be executed, should receive contractual attention.
- Duties of parties regarding various task and technology elements such as supplier of hardware; quality of internet connection; task specifications; security of information; and documentation, should be clarified.
- Support systems, in the case of technology failure, theft, and health and safety of team members, need to be delineated.

3.5.3 Technology theme element: Selection – Software and platforms used for virtual team communication

Computer-mediated collaborations (CMCs) “encompass asynchronous interactions through a collaborative workspace, through e-mail, instant messaging, and synchronous interactions using a system that incorporates desktop videoconferencing, shared workspace, chat and other features” (Rice, Davidson, Dannenhoffer& Gay567-594.2007)). A significant amount of research has been conducted into technology sharing. This researcher considers this research to be valid and applicable in a virtual team environment.

3.5.4 Technology theme element: Training - Knowledge and skills development

Ebrahim *et al* (2009) previously regarded this element as training. The researcher will broaden the training category to include the broader scope of how knowledge is developed in the group.

i) Knowledge creation and sharing team intelligence

The knowledge-based theory of the firm (KBT or KBV) holds that “knowledge is a strategically significant resource of a competitive organisation” (Barney, Grant, Kogut, Zander & Nonaka 1996). According to the dynamic capabilities theory (DC), organisations need to adapt to a changing environment through the “ability to create, integrate, re-generate internal and external competences” (Barney 1986). Knowledge may be defined as “information and skills gained through experiences and education. It refers to what is known, an awareness or familiarity with a fact or situation” (Oxford dictionary 2008:562). From

Aristotle's hermeneutic theory: the social construction of reality, notes that "individuals and teams adapt themselves in social context with regard to their own reality, knowledge, and learning: social system. This social system contains theoretical and scientific knowledge, which could necessitate unconventional and complex networks of experts. The roles and customs of these expert teams are created over time and in understanding how each member could or do react towards each other" (Berger & Luckman 1967). The organisational knowledge creation theory (OKC) of Polanyi (1962) placed this knowledge into context by referring to "different types of knowledge which are transferred differently. Codified knowledge is handed over through channels of systematic communication, whilst tacit knowledge is delivered in a particular context through personal involvement, commitment and interaction between people. "Sharing knowledge in relation to a particular task or process which a virtual team needs to address, has the benefit of increasing the whole team's knowledge" (Robey *et al* 2000: 51–66).

By selecting different communication media for tasks, collective team intelligence (CIR) may be influenced (Kim, Lee, Lee, Huang & Makany 2011:41–62). Team intelligence may be enhanced by the following:

- **Cooperative automation and computational intelligence:**

Taylor (1985) found that "knowledge of certain shared technologies impact positively on group performance".

- **Social intelligence:**

Holten (2001:36–47) warned that "despite the technological capability for purely virtual team work, some team members may have a desire and need for the emotional connection and the immediacy of the face-to-face environment".

- **Emotional intelligence:**

Bell (2007:595-615) suggests that "team minimum agreeableness and team mean conscientiousness, openness to experience, collectivism, and preference for teamwork are strong predictors of team performance, which is further enhanced by deep-level team composition variables (such as personality factors, values, abilities)."

Teams; however, should be aware of the dangers of “groupthink”. Brown (2011:288) describes groupthink as the “avoidance of team members to make harsh judgments of ideas set forward by other members of the team”. A number of groupthink characteristics have been found (Janis 1982; Jehn 1995:256-283) and are shown in figure 3.10.



Figure 3.10: Results of certain characteristics of groupthink

(Source: Adapted from from Janis (1982) and Jehn (1995:256-283))

Best practices in creating team intelligence are as follows:

- A selection of appropriate communication tools is needed to achieve a satisfying level of virtual interaction.

- Opportunities for members should exist to share and contribute towards the knowledge pool in a team.
- Teams should be aware of the groupthink traps, and take measures to avoid them.

ii) *Training and development*

The importance of training and development cannot be underestimated. Due to the current skills shortages in the economy, professional education programmes are witnessing an increase in student numbers (Botha 2009). Education is identified as a critical intervention for furthering the goals of sustainable development in the world (WSSD 2012; UNESCO 2010). Togo and Nhamo (2012: 81) state that lifelong learning should take place in all contexts, formal, non-formal, informal and throughout society. Employers in contemporary workplaces need a “range of applied skills from graduates for an effective workplace” (Griesel & Parker 2009). However, the information processing theory (IP theory, IPT) notes, “people have different learning styles and Therefore represent characteristic strengths and preferences, in the ways in which they absorb and process information” (Miller, 1956; Nienaber 2012:454). In virtual teams, “management has to ensure a right mix of abilities. Members of such a team should have the technical expertise to complete the task, but may not have the personality or technological expertise, which virtual team leaders need to manage. Therefore, management should ensure that they identify necessary training or built-in research time is provided for in the schedule of the team to allow members to learn as they progress. Particular attention should be given to training in the information gathering tools and the systems which the team will need to collaborate with each other and communicate progress on a task” (Brown *et al* 2007:12, 269-276).

In the team knowledge transfer model, Griffith, Sawyer and Neale (2003) differ by explaining that in a stable virtual team; members need to interact with local and co-located others in sharing knowledge, which will eventually be explicit knowledge, rather than tacit knowledge. The media richness theory explains that this “knowledge is embedded and carried through multiple entities including organisational culture and identity, policies, routines, documents, systems, and employees” (Daft & Lengel 1984). Wegner’s transactive memory theory (1986) notes that members are able to benefit from each other’s knowledge and expertise if they develop a good, shared understanding of who knows what in the team.

Best practice in the training and development of virtual team members is as follows:

- The best way to obtain the skills and knowledge of experts is to appoint a team of specialised team members who are able to work well together, thereby ensuring productivity (Gratton & Ericson 2011:45-71).
- In the absence of the above, virtual team members need development in the utilisation of technology for communication to increase their level of expertise (Robey *et al* 2000).
- Training and developments is a “continuous process from inception of the team for the duration of the team and will be more effective if the training is practically applied during the process of work with other members” (Robey *et al* 2000).
- It is necessary to develop a shared skills inventory of members for team reference, should they need an expert sounding board.
- Skills training are collaborative behaviour – and informal community building that represent the organisational culture and business strategy, and it does improve team performance.

3.5.5 Technology theme element: Security and risk management

Security is a great concern within the South African environment where a high crime rate is noted (Bezuidenhout *et al* 2011:1-448). The real options theory suggests that the “correct method of acquiring and protecting an asset should be utilised to reduce risk” (Black & Myron 1973). Ambiguities (unplanned for or unforeseen factors influencing projects or tasks) provide a residual risk and the literature suggests three typical approaches to these ambiguities depending on what the team knows about the problem. Besides the critical risk of losing a talented workforce, team leadership also needs to consider contingency plans on the following: collaborative risk management planning, information processing capacity, risk monitoring, inter-organisational collaboration, management contingency policies, management contingency profiles, collaborative software development and software development performance (Loch, *et al* 2006:71-73; Mohtashami, Marlowe, Kirova & Deek 2011:247-271).

A further risk area for virtual teams relates to cybercrime. Norton Cybercrime (2012) reported that in 2012 “556 million people (internationally) and 2.39 million people (64% of on-line adult users) in South Africa were victims of cybercrime. Notably the majority of cybercrime activities are within the BRICS countries (see table 3.11).



Figure 3.11: Top three countries with highest cybercrime rates

(Sourced: Norton Cybercrime (2012))

As most virtual teamwork occurs on mobile platforms and social networks, it is common cause that these teams are the most vulnerable to cybercrimes. Risk behaviour in virtual teams that should be curbed includes the following:

- Suspicious emails are not deleted.
- Personal details online are shared without checking the padlock symbol in the browser before entering sensitive personal information.
- A third of internet users do not log-off after each session of internet use.
- A fifth of internet users do not look at Internet links before they share them.
- A sixth of internet users do not have an idea of whether the settings on their electronic privacy are public or private.
- **Less than half** of internet users use security when they are engaged in social networks.
- **Only** half of internet users use security preferences to manage the information they share.

If the internet risk behaviour of virtual team members is not positively influenced by the team leader, experts warn that organisations will pay a hefty crime price. Estimations of \$110 billion (R952 billion) are associated with crimes such as fraud (forty-two percent), losses/theft (17 percent), repair for the damages caused by crime (26 percent) and other factors (15 percent) (Such as new infrastructure) (Norton Cybercrime 2012).

Best practice regarding security in virtual teams includes the following:

- Virtual team leaders should be aware of the internet cybercrime threats and adopt contingency measures to address risk behaviour of team members.

3.5.6 Technology theme synthesis

The last research question was to identify the best practices to stay conversant and relevant with latest technological changes to remain effective in its functioning (Theme 4). In the Ebrahim *et al* (2009) model, the identified elements were location, selection, training and security. Due to contemporary scholarly influence on Ebrahim *et al* (2009) model, the researcher retained location, but replaced it with the scholarly wording of the workspace of virtual teams. Selection was retained, but narrowed due to scholarly interest on around technology software and platforms. Training was retained as an element, but dealt with as a comprehensive element to acknowledge knowledge and skills development in virtual teams. Security was retained as an element, but broadened as an element to acknowledge risk management, which are key aspects to consider in the functioning of effective virtual team.

The literature indicated that stronger virtual teams would naturally create a greater competitive advantage. Virtual team members function within a network society, which is highly reliant on a technological information-sharing network for both professional and social interaction, hence the use of a combination of synchronous and asynchronous communication tools to enable collaboration with team members and to complete tasks. Network infrastructure should be informed by people, services, knowledge to accommodate virtual working. Besides the critical risk of losing a talented workforce, team leadership also needs to consider contingency plans on the following: collaborative risk management planning, information processing capacity, risk monitoring, inter-organisational collaboration, management contingency policies, management contingency profiles, collaborative software development, and software development performance. Cybercrime needs specific attention to combat its effects.

3.6 CHAPTER CONCLUSION

Considering ICT's dependence on virtual teams, this foundation could be called a “cloud”—a term which refers to elements which might be invisible to the eye, but vital to the effective functioning of a virtual team.

International research on teams can be applied to virtual teams with some adaptations. However, virtual team dynamics regarding culture, trust, and collaboration are unique to each team and should be managed accordingly. There are a number of core concerns, which need to be addressed in virtual teams, which include team dynamics, collaborative practices, communication, trust, and how conflict transpires. Team leaders cannot merely

utilise their knowledge and experiences of handling face-to-face teams, and should directly endeavour to apply the latter dynamics to virtual teams. Team leaders should attempt to utilise established knowledge, and question whether it is still applicable to teams functioning in a technological era. In the design of virtual teams, the unique character of each team should be honoured, and greater flexibility that enables innovation through sound collaboration practices, should be considered.

It is important in the design of any team that team members fit in for smooth transformation in reaching the team goal and purpose. It is necessary to ensure engagement and empowerment in the team, not only in the formation stage, but also throughout its duration. Prudent efforts should be made towards on-boarding team members in order for them to function on the same platform regarding knowledge and technology. For this reason, purposeful training is needed on a continuous basis. To ensure that the knowledge accumulated by the team is not lost to the organisation, provision should be made for knowledge generated by the team by means of an institutionalised knowledge retainer.

During the tenure of a virtual team, team leaders responsible for cohesion, should take appropriate care of the team. This includes ensuring the correct technological communication media between members and stakeholders. Contact between team members, stakeholders and the functions of each should be encouraged in support of the purpose of the team. Any sign of individual members who drift away from the team, should receive detailed attention. Conscious interventions should be made to keep the team effectively working together.

In a virtual team where the end product is not 100% comprehensible, virtual leadership requires a person with a special command not only of human nature (natural tendency of some people), but who is also susceptible to the possibilities of technology. Bill Gates (co-founder of Microsoft) summarised this as follows: "If I'd had some set idea of a finish line, don't you think I would have crossed it years ago?" Gate's greatest rival in later years, Steve Jobs (co-founder of Apple) summarised leadership as innovation which distinguishes between leaders and followers. Neither co-founders of two of the most prominent technology companies that influence millions of technology users today, summarised leadership in terms of people or tools. Their focus was on hope, possibilities and innovation. Neither recorded persona, structure, or procedures as enabling leadership characteristics. In fact, neither of them ever completed a college degree, in contradiction with modern day HR practices of considering qualifications as entry requirements for most positions. In virtual worlds, organisational leaders should be mindful to cues on evolving leadership practices.

Some of these practices might never come to fruition, but there should be opportunity to at least explore some of them in the context of virtual teams.

The next chapter will consider the methodology for investigating the four perspectives explored in previous chapters for the software sector of the technology industry of South Africa.

The following chapter consider the research methodology.

CHAPTER 4

RESEARCH METHODOLOGY

4.1 INTRODUCTION

This chapter introduces the empirical phase of the research.

This chapter follows the research methodology to the study according to the guidelines suggested by Mouton (2001), Richards and Morse (2013:51-52) and Trafford and Leshem (2008:143).

To explore the management best practices for the implementation and maintenance (functioning) of effective virtual teams in the software sector of the technology industry of South Africa, requires a qualitative interpretivistic research approach. This approach provides insight into the best practices in the functioning of effective virtual teams by means of a qualitative case study design.

This study explains the research methodological congruence (fit between research problem, questions and methodology) as suggested by Richards & Morse (2013:34). This chapter explores the research design and process where it fits in the overall methodology used for the study (Denzin & Lincoln 2013:27; Richards & Morse 2013:51-52; Seymore 2012:108; Silverman 2013;Trafford & Leshem 2008:143).

Where applicable, the choice of taxonomy for this study will be theoretically supported to facilitate understanding.

The researcher made a rigorous attempt to ensure the quality of the study. Hence, in response to a possible view that Chapters 4, 5, 6, and 7 may be perceived to be fragmented, it was done purposefully to firstly explain the understanding of credibility and ethicality, followed by an explanation of what will be done, and then ensuring that it was done. Being a qualitative study, greater responsibility for research ethicality is placed on the researcher.

Chapter 4 serves as a pre-amble for the empirical section contained in the ambits of Chapters 5, 6, and 7. In this chapter, a general overview of the research methodology will be presented to explain the intention of the research in the study. This includes:

- A general research methodology overview
- specific research methodology for this study
- discussion on the research design, including case studies
- discussion on the research context, inclusive of a discussion on the population and sample
- a discussion on the data gathering process, including a discussion on the data gathering instrument
- measurement in the study
- benefits and challenges facing virtual teams
- a brief discussion on the pre-testing of the questionnaire
- a brief discussion on the data analysis
- a brief discussion on the data interpretation
- a chapter conclusion will be presented.

Ethical considerations for the study will be highlighted in this chapter. In the next chapter, a description of best practices categorised into four main effectiveness themes (purpose, process, people, and technology), will be presented.

The research aim in this study was to understand best practices in the functioning of effective virtual teams, to be applied in South Africa, specifically in the software sector of the technology industry of South Africa. The research question associated with the research aim is (see section 1.7):

What are the best practices applied in the functioning of effective virtual teams in the software sector of the South African technology industry according to the four proposed themes of virtual teams (in figure 1.1)?

4.2 RESEARCH METHODOLOGY OVERVIEW

The researcher followed the conventional route of an inductive, qualitative, interpretivistic methodological approach to explore the best practices in effective virtual teams.

The research context of this study was in the software sector of the South African technology industry. The parameters of this industry are vague. This industry and sector were purposefully selected for economical and practical considerations; being a financially

growing industry, regarded as the obvious industry where computer technology practices will be found. A qualitative case study design was utilised in order to fence the sample of this study. This resulted in the selection of JSE listed companies within the software sector, as well as the three most significant international role players in this sector. Within these cases, a non-probability sample of members in effective virtual teams was identified by HR gatekeepers. The qualifying criteria to be identified as an “effective virtual team” were company specific, with no involvement of the research and were not part of the focus of this study.

To obtain a better understanding of best practices in effective teams, one would generally utilise focus groups. However, as the teams in this study are functioning virtually, face-to-face focus groups would not be a viable option, due to time and geographic constraints of the participants. Instead, information on best practices would be obtained through an electronic questionnaire tool. The uniquely developed electronic questionnaire will be designed and tested to accommodate the understanding that participants in the technology industry prefer electronic communication to written communication. Yet, to 'hear the voice' of the participants to understand the best practices, the researcher endeavoured to find a balance between listed menu type questions and open ended questions in the questionnaire.

After the pre-testing and actual empirical phase have been completed, the data will be analysed by means of a content analysis. Measurement will be obtained through credibility, transferability, dependability and confirmability declaration.

Information from the analysis will subsequently be interpreted. Interpretation in qualitative studies is a continuing process, and is formed from the exploration into the research problem through to the data gathering and analysis phases.

4.3 RESEARCH METHODOLOGY

To achieve the research purpose (Saunders *et al* 2012:163, 173), the focus of this study was to *explore to understand* best practices in the functioning of effective virtual teams across a selection of organisations. This is done by investigating questions (see section 1.6), enquiring into particular phenomena and exploring certain pertinent issues within a non-probability (judgmental) sample (Salkind 2012:96-103; Saunders *et al* 2012 262-281).

Further, a qualitative case study research design selection, through open-ended measures in a semi-structured data collection method and analysis was used (Clough & Nutbrown 2012:4; Gray *et al* 2007:1; Salkind 2012:3, Saunders *et al* 2012:4).

4.4 RESEARCH APPROACH

The research problem investigated determines the research philosophy regulating this study (Denzin & Lincoln 2013:26-29; Fisher 2010; Saunders *et al* 2012: 163). For ease of reference, the research question is re-stated here (see section 1.6):

What are the best practices applied in the functioning of effective virtual teams in the software sector of the South African technology industry according to the four proposed themes of virtual teams (in figure 1.1)?

The primary and secondary research objectives of the inquiry were as follows (see section 1.6):

Primary research objective

The primary research objective was stated as:

To explore the best practices in the functioning of effective virtual teams in the software sector of the technology industry of South Africa according to a provisional framework.

Secondary research objectives

These were as follows:

- To review and expand the literature in order to develop concepts that will build the final framework consisting of themes of best practices in the functioning for effective virtual teams
- to explore the themes that play a role in establishing best practices for the functioning of effective virtual teams as informed by the literature study

The research questions denote that the purpose of this study is to “discover and understand”

by exploring and describing virtual team best practices in the software sector of the technology industry in South Africa and to make recommendations to embrace best practices as well as a contribution to empirical knowledge in the field of virtual teams. The researcher wanted to make sense of and “understand” the subjective and socially constructed meanings expressed about the phenomenon (best practices in effective virtual teams) being studied (Saunders *et al* 2012:163).

4.4.1 Qualitative research

“Understanding” falls within the ambit of qualitative research (Henning *et al* 2005; Richards & Morse 2013:27). Although, the classic differentiation made between qualitative and quantitative research should in future be progressively replaced by the “scope of conditions”, because of the increasingly blurred packaging of each (Maggetti *et al* 2012:6). For ease of reference, the researcher states the theoretical approach of this study as leaning towards a qualitative nature.

This study seeks to explore the best practices in the functioning of effective virtual teams. Studies that seek to explore, describe or question “what is going on”, “what does it mean,” or “how can it be explained” are generally referred to as qualitative studies (Richards & Morse 2013:2, 34, 51-52; Saunders *et al* 2009:140). Creswell (2009:43) confirms a qualitative study as an “activity to locate the observer in the world”. Qualitative research is a distinct “field of inquiry” which consists of a set of interpretive, material practices that make the world visible (Denzin & Lincoln 2013:5; Richards & Morse 2013:2, 51). “These practices transform the world and turn the world into a series of representations and interpretations of the phenomena in terms of the meaning people bring to them within their natural setting” (virtual team) (Richards & Morse 2013:2, 51). Research strategies typically associated with research design as in this study (qualitative), may include focus groups, action research, case studies, archival records, ethnography, direct observation, grounded theory, physical artefacts, narrative research and documentation (such as press releases and policy documents), but also sources which have been utilised in Chapters 2 and 3 of this research such as peer-reviewed journals (Denzin & Lincoln 2013:5; Salkind 2012:214; Saunders *et al* 2012:163). This study utilised the literature to inform the questionnaire, which was utilised in the case study design.

It is not uncommon to utilise a qualitative approach to explore a phenomena such as virtual teams. The characteristics of a qualitative approach will be discussed subsequently.

4.4.1.1 *Characteristics of qualitative research*

A number of common characteristics of qualitative research exist (Creswell 2009:175-176; Richards & Morse 2013:2, 52):

- Research is often conducted in the field allowing direct interaction with the participants in their natural environment. In this study, the natural environment is a virtual environment and direct interaction in this environment is through technologically enabled communication.
- The use of previous theory to guide the future direction of research and the construction of new theory and explanatory tools are utilised to gain further insights (see Chapters 2 and 3).
- The researcher adopts a holistic approach by collecting data personally, through an electronic web based questionnaire aimed at documenting the participants' views, perceptions and experiences of various aspects of their environment. In this study, the researcher used an anonymous questionnaire, which included feedback from each participant. Usually multiple data sources (cases) are preferred over a single source which requires the researcher to integrate the information in order to make sense of it. In this study, a number of virtual team members in different organisations provided feedback.
- Researchers build patterns, categories and themes. A number of open-ended questions were included in this study to gather personal information. The focus is on the meaning that participants hold rather than the meaning the researcher holds. From the open-ended questions in the study, the researcher anticipated that the participants would share their personal opinions.
- Research is an emergent, shifting process in response to the field, and considering the evolving nature of the software technology as explained earlier, the research anticipates changes in the themes identified (figure 1.1) in response to the need for flexibility in the technology industry.
- The researcher has a unique background, history, context, and understanding and interprets what is seen, heard and understood against this personal background. Although the researcher (in this study) has some software development training, worked in the telecommunications field for a number of years and did some research in the technology industry, efforts were made to reduce the impact of subjectivity in this study in order to remain ethical.
- The researcher attempted to develop a complex picture of the issue by reporting

multiple perspectives and factors involved. In this study, the purpose perspective was added to an existing framework and the expansion of that framework was reported.

A discussion on the rationale for conducting qualitative research in the complex field of the technology field follows.

4.4.1.2 Rationale for conducting qualitative research

It is believed that the knowledge gained from exercising the “craft of qualitative research and its associated cognitive effort, will construct new understandings and explanations” regarding best practices in any research space (Richards & Morse 2013:7). The researcher in this study needed to gain an understanding of and explain, discover, and explore the best practices, their appropriateness and purposes within the virtual team milieu (where not much research information is currently available), against the background of qualitative multiple-case research design and complex existing literature (Richards & Morse 2013:3; Chapter 2). The intention of this research; therefore, is to move away from merely reporting on selected quotations of best practices, and rather engage with the data in a theoretical context, with a view to presenting a complete framework for best practices in effective virtual teams in this particular context (Richards & Morse 2013:8). Thus, obtaining information and understanding the experiences and views of virtual team participants, were the source of best practices in effective virtual teams within the social constraints of the software sector of the technology industry in South Africa (Denzin & Lincoln 2013:17). This research was further driven by a growing research demand for more qualitative research in the information systems community, which contributed to choosing it as a topic (Benbasat & Zmud 1999). The qualitative research assumptions made for this study will be discussed next.

4.4.1.3 Qualitative research assumptions

The following assumptions about qualitative research were made:

- Some prejudice in the study is acknowledged, as the researcher may have subjected participants to an instrument, which invites subjective responses, and the researcher was also an instrument of interpretation.
- Being human, the participants and the researcher may have experienced best practices differently.

- Practices included in the questionnaire may not have been experienced by the participants as the best practices available.
- A valid selection of participants may have been obtained if the researcher selected participants who were members of virtual teams at the time of the exploration. Although 16 organisations were included in the sample, the researcher continued to collect data until a theme crystallised. Where more than one participant in the sample shared similar views, it was regarded by the researcher theoretical sufficient which may influence the truthfulness of study (see section 4.8). Integrity in qualitative research will be discussed next.

4.4.1.4 *Integrity of qualitative research*

Salkind (2012:213) defines qualitative research as a “social or behavioural research that explores the processes that underlie human behaviour by using exploratory techniques”. Qualitative research is “often frowned upon by quantitative researchers, especially in the business and scientific fields” (Galliers & Huang 2012:119–134; Kapoulas & Mitic 2012:354–68). Therefore, this study will attempt to observe integrity measurements to ensure that the research is trustworthy (see section 4.8).

The merging of different scientific fields in this piece of research (Business, HR, and technology) necessitated a brief overview of the appropriateness of qualitative research as opposed to quantitative research:

- The research question demands this type of method. Approaches of discovering the phenomena of virtual team functioning are fragmented as different elements have been separately investigated (Chapter 3). Accounts of the team members’ own experiences of the functioning of best practices in effective virtual teams informed best practices regarding virtual teams in the technology industry in South Africa.
- The way in which the data were obtained also necessitated qualitative research. The researcher envisaged that the use of an online-computerised questionnaire, as used in this study, would contribute to the body of virtual team knowledge. The inherent nature of virtual working suggested the use of synchronous and asynchronous communication tools (see figure 3.6), with the more customary choice for communication. A choice in collaboration and participation with information provided on a need-to-know basis, in the amount needed, was; therefore, deemed to be technology workers’ preferred method of participation in

research projects. Furthermore, the participants in this study questionnaires as opposed to focus groups, due to the nature of their teams (being virtual).

4.4.1.5 Advantages and disadvantages of qualitative research

The main advantage of qualitative research is that it seeks to understand and explore broad and complex concepts in a particular context (Mertens, 2009). Disadvantages of qualitative research include a perceived subjectivity towards the research and the time-consuming nature of the research (Mertens 2009; Opdenakker 2006).

Further, Richards and Moore noted the following concerns (2013:4-10) which will be addressed throughout this chapter:

- Most qualitative texts describe single methods and do not explain the fit between purpose, data, and analytic technique. It was anticipated that this study would show methodological congruence.
- Researchers approaching a qualitative investigation need to be visionary and see the end before they start. It was anticipated that some of the best practices would be highlighted by participants, which is in line with literature findings.
- There is currently no best approach for the handling and analysing qualitative data. This study sought to produce credible knowledge and interpretations, highlighting the best practice in a virtual team context through content analysis.
- Qualitative research only makes sense in the correct context. These methods align the strategy and techniques used (sections 4.2.1-4.2.5).
- Some methodological choices made lead more directly than others to particular goals.

In summary, the qualitative research design allowed the researcher to explore and provide meaning to best practices in the effective functioning of virtual teams. A discussion on the research philosophy follows:

4.4.2 Research Philosophy

Philosophy is defined as the “study of the fundamental nature of knowledge, reality and existence” (Oxford dictionary 2008:764). Different views exist on what knowledge is (Denzin & Lincoln 2013:3; Richards & Morse 2013:2). In essence, all researchers consent to scientific knowledge representing truth (epistemology) (Salkind 2012:1; Trafford & Leshem 2008:97). In epistemology, truth is influenced by the essential nature of reality (ontology), influencing the methods being used (Saunders *et al* 2012:54; Trafford & Leshem 2008:97). Hence, different approaches can be employed to gain truthful knowledge, with the role of the values of the researcher (axiology) supporting the researcher’s standpoint to the area under discussion (Trafford & Leshem 2008:97; Salkind 2012:85-89; Saunders *et al* 2012:4). Phenomenology is an intellectual tradition which “cares and is concerned about” (Seymore 2012:30) “the way people experience social phenomena in the world they live in” (Saunders *et al* 2012:137). Phenomenology is characterised by a focus on meaning that research subjects attach to social phenomena, and an attempt through the research, to understand what and why the phenomena are happening. Marshall and Rossman (2011:19) explain that phenomenology seeks to “understand, explore, describe and analyse the meaning of the individual lived experience. The analysis of the phenomena proceeds from a central assumption that there is an essence to an experience that is shared with another person who has also had that experience”. The implication of the definitions for this study is that the participants could denote some practices in virtual teams to similar importance, and the researcher’s task was to understand and describe what these practices are, and what meaning the participants give to the practices.

Various orientations of phenomenology exist (transcendental, existential, hermeneutical and linguistically) (Richards & Morse 2013:71). The researcher confined this study to the transcendental phenomenological orientation. The transcendental phenomenological orientation explains that participants would be chosen purposefully and interpretations of their voices would be based on their insights, which constitute meaning (Richards & Morse 2013:71), and allow the research to construct the understanding of what the best practices are. This orientation supports the intent of the researcher to purposefully select virtual team members to explain their experiences, to give insight into what they regard as best practices in effective virtual teams.

Following from the holistic phenomenological tradition, one of the branches; namely interpretivism, gives insight into the complex virtual team phenomenon as to best practices

in the particular context (Richards & Morse 2013:71. This study focussed on the interpretivistic research philosophy for a number of reasons –

Understanding denotes an interpretivistic research philosophy, which holds that reality (knowledge) is a social phenomenon (social reality is created) (Seymore 2012:28). This means that the understanding of reality is not a simple account of what is, but rather that phenomenological insight needs to be obtained of what people in societies and groups form, that is, their interpretation of reality (Seymore 2012:28). Hence, reality is not objective, but the way people make sense of it, is important (subjective meaning motivating their actions). Seymore (2012:32) further notes that we cannot know the things as they intrinsically are, but only the phenomenon (of virtual teams) (what our synthesising cognition makes of things) with the focus on known individual internal data and processing. It is accepted by interpretivists that knowledge is not always easy to pass on to others, as it depends on a number of factors, such as the time, place and manner, knowledge is passed on. Interpretivists believe that the phenomenon (best practices in virtual teams) under consideration are not “things”, but rather a process where experts can be discovered and mobilised to participate in social processes, and add value by doing something differently (Seymore 2012:37). Although some traits of virtual team members such as biographical factors describe the context of virtual team members, the aim of this study was to rather understand the views of the participants (Cresswell 2009). Consequently, the researcher considered the details of a situation and the reality behind these details by studying the different accounts people gave of the subject. Interpretive research does not accept the existence of a standard interpretation of any particular topic. It emphasises plurality and relativism instead (Fisher 2010:22-23). Although qualitative philosophies normally explore a phenomenon and then in line with Creswell’s (2003:9) observation that the interpretivist approach does not normally start with theoretical research, this study first investigated the fragmented multidimensional theoretical approach (Chapters 2 and 3) to make sense of it, before data collection.

Although linking of the research problem directly to the phenomenon rather than the discipline is considered to be more appropriate to ascertain the research relevance for research of phenomena (such as in this study), the researcher chose the traditional approach (linking the problem to those disciplines whose viewpoint it embraces) (Szostac 2004). This implies, that the relevance of the research problem of the phenomenon in this study is confined by the research viewpoint contribution from the literature study (see Chapter 3) for practical manageability sake, and was confined to the management sciences, psychology, and technology disciplines.

Following from the research philosophy of this study, the intellectual tradition, as well as a clarification as to the researcher's judgment is needed (Saunders *et al* 2012:137). In considering how judgments are made in phenomenology, the axiology of this study needs to be clarified as it influenced the research process (Saunders *et al* 2012:137-140). The axiology of this study supports the intrinsic value of knowing why and how certain best practices are followed, and are considered to be valuable in themselves (Seymore 2012: 30). Since the researcher is a part of what is being researched in this study, interpretivist research is value-bound. The researcher; therefore, has to take special precautionary steps to lessen the impact of subjectivity, for the research to remain ethical (Saunders *et al* 2009:119; 2012:140). Throughout this study, the researcher explained why certain steps were taken for the research to be considered as credible, trustworthy consistent, and the results dependable (Richards & Morse 2013:215), in order to reduce the impact of researcher subjectivity.

From the above it is; therefore, held that the research philosophy of this study follows from a qualitative approach towards the interpretivist branch of the phenomenological tradition in a transcendental orientation, with remarks as to the precautionary steps taken to reduce the impact of the researcher's values throughout the research process to understand the best practices in virtual teams.

4.5 RESEARCH DESIGN

A research design is a flexible, broad setting which connects the research philosophy with the research strategy by explaining how the research question(s) will be answered (Denzin & Lincoln 2013:29; Saunders *et al* 2012:159). The research design of this study was a qualitative case study research design (Marshall & Rossman 2011:90; Saunders *et al* 2012:161)

From the research design and its associated epistemology and ontology follows the research strategy, which has a unique scope and particular procedures associated with it to achieve the research purpose (Saunders *et al* 2012:163, 173). In this study, case design was selected to explore the best practices in the software sector of the technology industry in South Africa. The population in the research field or cases was the companies in the technology industry of South Africa. The case study design will be discussed next.

4.5.1 Case study

A qualitative case study (particularly a multiple-case design, see section 4.5.1.1) was chosen as the research design for this study. A case study “promises rich insights into the best practices” in the functioning of effective virtual teams in the software sector of the technology industry in South Africa (Denzin & Lincoln 2013:192; Marshall & Rossman 2011:93; Saunders *et al* 2012:163; Seymore 2012:108).

Robert Yin (2014: xxv) suggested that case studies are preferred (as opposed to surveys and experiments) where:

- The research question are “how” or “why” questions (such is this study)
- the researcher has little or no control over behavioural events (as this study was done in different organisations, and access to information was controlled by the HR gatekeepers)
- the focus of the study is a contemporary phenomenon (virtual teams)

Yin (2014) further suggests that case studies are appropriate where a contemporary phenomenon (the case) in its real world context is researched, and suggest data triangulation to address distinctive technical conditions.

Case studies offer a contextualised, detailed, intensive, holistic approach (plan) of the exploration of a phenomenon, using different methods (actions) by which various detailed descriptions and perspectives of the case (virtual team) are obtained to understand each case (Saunders *et al* 2012:179; Seymore 2012:107; Richards & Morse 2013:78). A case is defined by “focus and location” or a “particular social unit or system” (in this instance the software sector of the South African technology industry), which is “bounded” (in the software sector of the technology industry in South Africa) and studied in its natural setting (virtual team) as a whole, like a geographical area/institution/unit (virtual teams in particular organisations) (Richards & Morse 2013:76-78).

The use of case studies is particularly supported in management sciences (one of the sources of this study) where “statistical methods are weak” (Richards & Morse 2013:75-78; Seymour 2012:107-108). Although best practices associated with case studies are typically used, they are not codified (Seymour 2012:107-108). However, due to advances in the technique and procedure used in this study; namely the Lime Survey 2.0+, codification of best practices was possible in this study (Annexure "G").

The characteristics of a case study (Seymour 2012:106) are as follows:

- Its focus is to understand the dynamics present in single settings.
- It may involve multiple or single cases.
- It can use quantitative data, qualitative data or both.
- It is normally used where data relating to phenomena are either underexplored or when dominant theoretical discourse requires re-evaluation.
- 'Why' and 'how' questions are posed.
- The researcher has little control over events.
- The focus is on contemporary phenomena in real-life contexts.

For the qualitative multiple-case research design used in this study, the focus of understanding of best practices was confined to the context of an existing virtual team in multiple organisations in the software sector of the technology industry in South Africa. The qualitative multiple-case research design sought to generate qualitative data to explore under-explored data for virtual teams.

4.5.1.1 Multiple-case design

A qualitative multiple-case research design aims to investigate similar or predictably contrasting outcomes (Seymour 2012:110). In the qualitative multiple-case research design, the number of cases does not connect with the notion of a “statistically representative sample” but the cases are selected because of the logical suitability of the constructs (Seymour 2012:110). The researcher supports the idea that the best place to explore best practices for the functioning of effective virtual teams, is at the source where they are developed; being the software sector of the technology industries as suggested by Lin (2009). Further, the qualitative multiple-case research design allows for multiple research settings and perspectives to be made from within and across various cases (Seymour 2012:111). The rationale for studying multiple cases is to achieve replication across cases to improve the vigour of the findings. The individual organisations in the qualitative multiple-case research design of this study were selected in a non-probability sample, with the intention of providing a rich, textured understanding of the virtual team phenomenon. The organisations in the study exhibited particular features which made detailed exploration of the phenomenon of virtual teams possible, although were still considered to be sufficiently heterogeneous to allow the four themes (purpose, process, people, and technology) to be identified.

The multiple research settings and perspectives, from which data would be generated, were the main international and national role players in the software sector of the South African technology industry, due to their influence in the South African market and dominance of global markets at the time. The following method was used to identify the cases for the sample in this study:

- Practical orientation towards this study; namely to obtain virtual teams from their source of software development, led the researcher to the software sector of the technology industry in South Africa; particularly organisations in the software and computer services sector.
- Financial indicators for effective functioning, led the researcher to the computer services subsector as these organisations indicated the “greatest market capitalisation (Business Connection Group Ltd, Datatec Ltd and EOH Holdings) and the highest compound annual growth rates (based mainly on financial figures in 2009 and 2011). The South African software market had total revenue of \$1.8 billion in 2009, representing a compound annual growth rate (CAGR) of 5.9% for the period 2005 to 2009. This trend is also mirrored in the international technology industry, with the greater number of organisations listed in the software and computer services sector and specifically computer services subsector” (Forbes 2009). The sub-sector software and computer services were; therefore, the focus of this study.

In this study, data were generated from a small number of cases selected to inform a particular issue (best practices in effective virtual teams), thereafter the data was described in detail. The norms for case studies are discussed in section 4.8.2.

Coding, according to theming, was utilised to categorise the questions, as influenced by the subsequent method of analysis; namely content analysis. The summarisation of data was focused by prior questions or theory to inform detailed understanding and comparison by contextual analysis of factors, events or conditions of interest (Richards & Morse 2013:33). Typically, a case study uses different sources of data; for example, company records/documents observation (of best practices by virtual team members) and data collected via questionnaires (Richards & Morse 2013). In this study, the electronic questionnaire data collection technique was utilised to gather the data.

This study benefited from using case studies because they (Seymour 2012:108):

- Allow the researcher to identify and measure the identified best practices in the functioning of effective virtual teams
- help the researcher identify new best practice variables
- allow exploration of new best practices

The use of case studies is highly diverse and criticised (Richards & Morse 2013:79; Seymour 2012:108) because of its perceived lack of validity, predictions, generalisation and over-contextualisation. However, the researcher will indicate how credibility, transferability, dependability and confirmability (see section 4.8) were achieved in this study.

4.6 RESEARCH CONTEXT

A number of pre-requisites exist within social research to mark the scope of the research field:

- Scientists study “human action and relationships in a systematic, rigorous, evidence-based, generalising, non-subjective and cumulative fashion (Maggetti *et al* 2012:15).
- The “voice” of participants is required to be heard in a “shared space” in order to create the research experience (Clough & Nutbrown 2012:63).

However, within the scope of this study, a number of dimensions exist that influence the pre-requisites for social research, which highlight the increasing complexity of the social research field in the technology industry discipline. These dimensions could influence future research into the technology industry.

4.6.1 Complexity dimensions in the technology industry

The following dimensions could influence future research into the technology industry:

- Human action and relationships
- the “voice” of participants
- “shared space”

To determine the research field, the researcher had to establish where reliable evidence could be found to indicate what best practices are and how these practices work. The researcher made a value call that the documentation available would confirm the current position of the team in relation to the projected target, but would not explain what actions from the team were necessary to accomplish a particular position. The researcher is of the opinion that the most realistic way to determine best practices in effective virtual teams, is to ask the members of those teams, what they regard as best practices, how they work, and what distinguish such practices from others.

Considering the different dimensions affecting social research (multiple identities and space as well as the altered-senses dimensions) in the software sector of the technology industry in South Africa, the researcher was challenged to follow a reliable research method in order to obtain credible, transferable, dependable and confirmable information in support of the conclusions of this study.

4.6.1.1 Human action and relationships

In the interest of clarity pertaining to an industry where team members are increasingly not identified as “people” or team members, but rather as “users” with log-in names and passwords, the participants in this study were those “users” in the identified virtual teams. They participated in this study as human beings and not in their virtual identity or other “non-human” capacity. This multiple identity dimension highlights the increasing complexity of research in the technology industry discipline.

The availability of technological devices such as computers, cell phones and the use of cyberspace have created “virtual communities” which form webs of interdependent relationships (see section 2.5). This evolving and new social arrangement bears unique language usage for communication, and works through an array of analogue and digital communication media, which have broadened the social sphere (Krippendorff 2013:2-3). Using participant observations to study aspects related to people’s relationships in web-based interest groups and chat rooms (to hear the “voice” of the “virtual community”) has recently become possible, but extremely technical.

4.6.1.2 The “voice” of participants

The “voice” of a “virtual community” (members of virtual teams) can be heard by the “establishment of a sustained connection in the context of data collection. Well established

modes of Internet-based participator research are yet to be developed in terms of weaknesses, strengths and disguised observation” (Gray *et al* 2012:200).

Virtual team members communicate their performance with their co-members predominantly as a “user name”. Their “voices” when they communicate by their “user name” are inaudible as opposed to members in face-to-face teams who are physically able to use the majority of their senses in a discussion. The members in virtual teams need to adapt their senses to derive meanings from inaudible messages. This altered-senses dimension highlights the increasing complexity of research in the technology industry discipline.

4.6.1.3 “Shared space”

Despite the proposition by Repko (2012:xxvii) that the classification option of Szostac (2004) (linking of the problem directly to the phenomenon rather than the discipline) would be more appropriate to ascertain the research relevance of the research problem of the phenomenon, the researcher chose the traditional approach (linking the problem to those disciplines whose viewpoint it embraces). This implies that the relevance of the research problem for the phenomenon in this study is confined by the research viewpoint contributed from the literature study (see Chapter 3) for practical manageability sake; that is, confinement to the management sciences, psychology, and technology disciplines.

The natural environment where members in the software sector of the technology industry in South Africa generally meet, is on technological platforms (“non-physical” space), as opposed to face-to-face team members generally meeting in an office, cafeteria or other physical space. This multi-space dimension highlights the increasing complexity of research in the technology industry discipline.

The “shared space” in this study is organisations, but in particular the people in those particular organisations who are members of virtual teams.

The research field in this study deviated from the typical norm of people literally and verbally sharing their thoughts. Instead of perceiving the environment of the participants as an obstacle, the researcher embraced the availability of technological devices as an opportunity to obtain the “voice” of the “virtual community” (members of the virtual team) to be heard by means of a web-based questionnaire following from a qualitative case study research design, which was deemed appropriate to this study since it explored a contemporary phenomenon (i.e. virtual team best practices) in its real-life social context (virtual space) (see

section 2.2.3).

The effect of these three dimensions will be discussed in the population and sample.

4.6.2 POPULATION AND SAMPLE

4.6.2.1 Population

The population in the research field (unit of analysis) was the companies in the technology industry of South Africa. Salkind (2006:124) defines population as a “full set of cases” and sample as “relative levels of the full set”. Salkind (2012:95) refines the definition of a population as “the group of potential participants to whom you want to generalise the results of the study, whilst sample is a subset of that population”. The population in this study was the technology industry in South Africa.

4.6.2.2 Sample

Because the researcher realised that it would be impossible to enumerate the whole technology industry in South Africa due to practical, time and budget constraints, a sample was chosen (Krippendorff 2013:120; Saunders *et al* 2012:125). Marshall, Cardon, Poddar, Fontenot 2013:11-12 did a study on qualitative research samples in the technology industry. They found that without justification of sample size, the implication is that the sample size is arbitrary and thus inconsequential. They further found that few concrete guidelines exist for saturation (or sufficiency as used in this study) in the technology industry, and that a case study design is regarded among the most difficult type of qualitative research to classify. Although they made suggestions for a focus group in a case study (which is not applicable to this study), they retain their justification stance sampling in that researchers should provide:

- Some kind of statistical demonstration
- explain how saturation (or sufficiency as used in this study) is determined to justify the sample size

Samples may further be differentiated into probability (relevance, purpose, representative) sampling (simple random sampling, systematic sampling, stratified sampling, and cluster sampling), and non-probability (judgmental) sampling (convenience sampling and quota sampling) strategies or techniques (Salkind, 2012:96-103; Saunders *et al* 2012:262-281).

The resultant sample was determined by the analytical problem at hand, and a non-probability (judgmental) sample (Salkind 2012:96-103; Saunders *et al* 2012 262-281) (Krippendorff 2013:120) was chosen.

A conceptual hierarchy was followed to determine the sample, systematically lowering the number of organisations needed for analysis (Krippendorff 2013:120).

Level 1: The international categorisation as utilised by the JSE (Johannesburg Stock Exchange) was used (Annexure "A") to categorise the technology organisations in terms of their purpose.

Level 2: Organisations listed in the technology industry cover two main categories; namely: hardware and software (Annexure "B") (Strydom 2011).

Level 3: The focus of the study was solely on the software sector that includes the software and computer services sectors, a total of 19 companies. Of these 19 companies, only 16 formed part of the study as set out further on, as three of the companies were companies that own other companies' outstanding stock only (confirmed telephonically).

Level 4: Merely considering the JSE for guidance on the extent of the South African software sector of the technology market does not present a noteworthy picture, as the most significant international role players are not sufficiently represented, considering South Africa's status as one of their top thirty software development outsourcing destinations in the world (Forbes 2009; Gartner 2011:1; Knight 1986). The most significant international role players who also function independently in South Africa were thus also considered for this study included the three companies in table 4.1 (Forbes 2009).

Table 4.1: Abstract from the Global 2000

Rank	Company	Country	Industry	Market Value (\$bil)
31	IBM	United States	Software & Services	198.1
49	Microsoft	United States	Software & Services	143.58
268	SAP	Germany	Software & Services	38.47

(Source: Forbes (2009))

The sample for this study, representative of the population of the software sector of the technology industry in South Africa, is reflected in table 4.2 as follows:

Table 4.2: Significant role players in South Africa's technology industry: software and services

Adaptit Holdings Limited Business Connexion Group Limited Compu-Clearing Outsourcing Limited Convergenet Holdings Limited Datacentrix Holdings Limited Datatec Limited Eoh Holdings Limited Faritec Holdings Limited Gijima Group Limited Paracon Holdings Limited PBT Group Limited Securedata Holdings Limited Square One Solutions Group Limited	JSE listed organisations
IBM Microsoft SAP	International organisations functioning in South Africa

(Source: JSE (South Africa))

The focus of the study was solely a non-probability (judgmental) sample (Salkind 2012:96-103; Saunders *et al* 2012 262-281) of the software sector of the technology industry in South Africa, which includes the software and computer services sector, a total of 16 companies (see table 4.2).

4.6.2.3 *Reasons for choosing the population and sample*

There are a number of reasons why the technology industry of South Africa, and the software sector in particular, was chosen as the research population for this study.

a) *Value contribution of the industry*

Since many companies nowadays implement complex software solutions, the researcher made a value decision that the software sector of the technology industry in South Africa would be an ideal environment to explore evidence of the virtual team (José 2012). The software sector of the technology industry in South Africa provides an accessible example of

team work, where virtual team working occurs relatively frequently due to the nature of companies' services which design enabling business software (Lin 2009).

b) The study refers back to the pilot study

A pilot study was conducted to explore the flexible working practices in a number of industries (including the technology industry) (Grobler & De Bruyn 2011:63-78). Following from the pilot study, virtual teaming as practice was noted in the technology industry, which leads to further exploration in the current study (see section 1.9.1).

b) Financial indicators of a growing industry

The software sector of the technology industry in South Africa is recognised as a market that is currently growing faster than real GDP, and conforms to international standards as asserted by Business Monitor International Ltd (2011). It is estimated that South Africa's spending in the software sector in 2009 will increase from total revenue of \$1.8 billion to a total technology spending of \$19.2bn in 2015, which is faster than real GDP growth. Internet penetration in South Africa is by far the highest on the African continent, although broadband penetration remains low. In comparison to other industries, the South African technology industry's share price has been the highest among industry share prices for the last five years ending June 2012, with growth of 25 percent for investors. The income of some organisations in this industry has grown by ninety-four percent over the last decade. Hence, it is anticipated that the growing role of ICT in the economy will increase even further (Newell 2012), indicating that this industry's operational methods is leading the market.

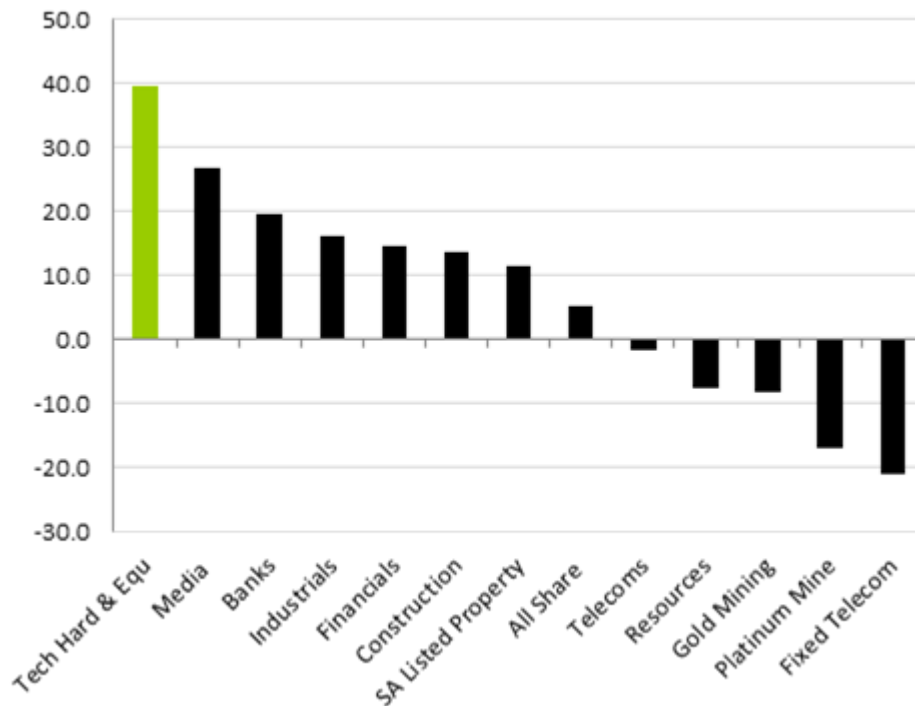


Figure 4.1: 2012 performance of a selection of JSE indices – total return (%)

(Source: Newell, 2012)

c) *Fragmented nature of the industry (number of organisations represented)*

Unlike other industries in South Africa, public, reliable information on the extent of the technology industry is difficult to explore because membership it is not as formally organised as the mining or manufacturing industries (Gillwald 2012; James, Esselaar & Miller 2004:1–8). The researcher thus decided to utilise information collected from the JSE on the software industry and internationally recognised sources such as Forbes (2009).

d) *Shortage of skilled workers in the industry*

ICT skills were classified as “critical for South Africa’s social and economic development with a declining number of ICT graduates being produced. This shortage corresponds with international ICT skills shortage trends in certain categories, where graduates need to be equipped to converge different aspects of technology; namely:

- Scarce skills (where people cannot be found to fill vacancies in the industry)
- critical skills (where individuals need skills development to upgrade their skill set)” (Pandor 2007)

- e) *Classification categories in the industry most likely to present results to answer the research question*

This industry poses a few challenges for identifying suitable participants since it is not a regulated industry. Nevertheless, these challenges can be overcome as follows:

- The best possible indicator of categorisation of the population in the technology industry follows from international practices as used on the JSE (Annexure "A"). Standardised financial reporting procedures define technology into hardware and software, making it possible to identify a possible framework for a particular number of organisations where the likelihood of virtual teams could be obtained (Annexure "B"), (Saunders *et al* 2012:262; Strydom 2011).

4.7 DATA GATHERING PROCESS

Gathering data is viewed as a complex, continuous, collaborative, interactive, flexible, difficult, and controllable process of obtaining representation of people's (virtual team members) accounts of events (best practices in effective virtual teams) (Richards & Morse 2013:119). The purpose in gathering data from a phenomenon, as in this study, is to obtain plausible insights into the best practices in the functioning of effective virtual teams, rendering particular techniques to make and analyse such data difficult to explore (Richards & Morse 2013:199).

Data for exploratory and descriptive research should be combined from sources natural to the phenomenon being investigated, which could include reports, surveys, interviews, and focus groups (Saunders *et al* 2012:177; Seymore 2012:113). The type of data needed for this study involved more than merely asking questions. "Who will be responding to the questions, what type of response can be expected as well as, what will the researcher do with the responses" gives direction to how data is gathered (Richards & Morse 2013:120). Focus groups for teams would normally be the appropriate method for putting together information in qualitative research (Salkind 2012:215). However, according to Loch *et al* (2006:252-253), "that the best type of collaborative architecture for a particular virtual team" needs to be chosen. Working in the same fashion as virtual teams, the researcher followed the advice of Kreitner and Kinicki (2010:64) to work in the same way as things are usually done; that is, to work virtually with the team. The technological nature of this study (virtual teams) allowed the researcher to consider questionnaires as opposed to the confinements of interviews and focus groups, to combine data from participants over physical and time

barriers. The researcher; therefore, deemed face-to-face focus groups as inappropriate for the context of virtual teams. Case studies seek to generate data through examining; pattern identification and interpretation and do not contain indications about the ways theories are used and derived (Richards & Morse 2013:207).

The method of confirmation or rejection as well as the opportunity to add greater meaning or reasons for responses and confirmation of theory through data was followed. Guiding and probing questions were asked to gain depth and insight into the experiences and views. The time horizon of the study was cross-sectional. Saunders *et al* (2012:190) define a cross-sectional study as an investigation seeking to describe incidences in phenomenology at a given point in time, or compare factors in different organisations.

This study was conducted in different companies in the software sector of the technology industry in South Africa during June 2013.

The steps as set out in the following were followed during the data gathering process.

4.7.1 Negotiation of organisational access

In preparing for access negotiations, the researcher telephoned the HR heads of the identified organisations and requested to mediate with a virtual team leader for participation of an identified virtual team. The invitation letter with the link to the electronic questionnaire letter was sent to the HR heads for distribution to the identified virtual leader, to forward to team members.

This research involved negligible or minimal risk and no coercion. The invitation to prospective participants took the form of an English e-mail explaining the nature and focus of the questionnaire, guaranteeing confidentiality, anonymity, and collectivity of the report on the information provided during the research.

4.7.2 Informed consent

Informed consent ensured that team members and team leaders of virtual teams participated voluntarily (Saunders *et al* 2012:455).

The team members and team leaders of virtual teams in this research study were informed that it would be conducted to enable the researcher to explore best practices in effective

virtual team in the software sector of the technology industry in South Africa. The team members were requested to provide meaning to questions on best practices. They were informed that the duration for completing the questionnaire would be at least 20 minutes and were requested to electronically respond to the questionnaire.

The researcher expressed appreciation for members' and leaders' cooperation and they were informed that they had the right, at any stage, to terminate their participation. The researcher explained the methods of maintaining confidentiality, privacy and anonymity to the HR heads (Bailey, Dittrich, Kenneally & Maugham 2012:71-75).

4.7.3 The right to self-determination

Section 235 of the South African constitution allows for the right to self-determination of a community, within the framework of "the right of the South African people as a whole to self-determination" and pursuant to national legislation. Furthering this constitutional right, the University of South Africa, where this research was presented, expects ethical clearance from doctoral students in the way in which research is conducted (see Annexure "H"). The right to self-determination means that the team members of virtual teams could choose whether or not they wished to be involved in this research study, without coercion. The team members of virtual teams were informed that they had the right (Beskow 2006:38–40):

- Not to reveal information on specific questions
- to seize participation at any time
- to ask for clarification at any time (see Annexure "E")

4.7.4 Data collection instrument

Questionnaire are regarded as an economical way to generate data using standardised questions, generating data which are easy to compare and providing possible reasons for relationships (Saunders *et al* 2012:17). Questionnaires; however, are dependent on participants' goodwill to participate, and have a limitation to the number of questions participants are able to answer. From a qualitative multiple-case research design, followed a self-completed web-based questionnaire selection using the Lime Survey 2.0+ tool. This allowed the researcher to design the questionnaire, electronically collect data from the participants, and to a limited extent allow for simple analysis of the data in the same software (Salkind 2012:156; Saunders *et al* 2012: 422).

Lime Survey 2.0+ is an open and free on-line application written in PHP (data software application), based on different databases and distributed under a license. It enables users to develop and publish online questionnaires, and collect responses, without doing any programming. Questions are added in groups. The questions within each group are organised on the same web page. Questionnaires can include a variety of question types that take many response formats, including multiple choice, text input, drop-down lists, numerical input, slider input, and straightforward yes/no input. Questions can be arranged in a two-dimensional array, with options along one axis, based on the questions on the other axis. Questions can depend on the results of other questions, which makes it suitable for use in qualitative studies. Lime Survey 2.0+ also provides basic statistical and graphical analysis of questionnaire results” (Lime Survey 2013).

The questionnaire was used as the main independent qualitative data gathering technique (Annexure "F") by composing qualitative information where participants could share their ideas in a semi-structured space, and could be completed via basic electronic hardware such as computers or smart phones. “Questionnaires save time and individuals can complete them without intervention or influence from the researcher. Questionnaires can be completed irrespective of time and space constraints and responses of people are deemed to be more accurate” which gives a better understanding of best practices in effective virtual teams (Salkind 2012:148).

When the virtual team members in a particular organisation were identified by the relevant HR manager of the organisation, they received an electronic invitation (email) to participate with an electronic link to the Lime Survey, which enabled each individual to visit the questionnaire contained in the Lime Survey at leisure. Once the questionnaire had been completed, the participants could simply activate the electronic 'submit' button provided, and the information would be automatically updated to the researcher. The relevance and soundness of the data collected as well as the response rate achieved, largely depended on the design of the questions in the questionnaire.

Following the advice given in the literature, the questionnaire addressed the following (Gray *et al* 2007:38; Saunders *et al* 2012:158-472) (see Annexures E and F):

Constructs

- Best practices
- effective functioning

- virtual team
- software sector of the technology industry in South Africa in South Africa

Concept - “General idea applicable to particular instances or examples of behaviour” (Gray *et al* 2007:38):

- Best practices where examples of behaviour are found in the four themes of the framework (*purpose, process, people and technology*)
- effective functioning as determined by *influence to process, transformation in process and output reached*
- virtual team behaviour: *Geographically dispersed team members, computer-mediated communication systems, membership is not always definable or limited to a particular point in time, functions independently, joint responsibility towards team goal*
- Software sector of the technology industry in South Africa: *Contract binding member to particular organisations linked to sample*

The questionnaire consisted of the following five main parts (see Annexures "E" and "F"):

- Introduction: Relating to the purpose of the investigation, consideration around ethicalities, definition of virtual teams and an invitation to participate.
- Biography: Determining whether the participant was; indeed, a virtual team member in the population and some background information on the participant.
- Purpose perspective: Investigating which best practices to a greater/lesser extent contribute to the purpose in the functioning of effective virtual teams.
- Process perspective: To investigate which best practices to a greater extent/lesser extent contribute to the processes in the functioning of effective virtual teams.
- People perspective: Investigating which best practices to a greater/lesser extent contribute to people/team members in the functioning of effective virtual teams.
- Technology perspective: Investigating which best practices to a greater/lesser extent contribute to the technology used in the functioning of effective virtual teams.
- The biographical questions were largely determined via listing questions where the participant could select answers (such as age, gender), as well as some open questions pertaining specially to the virtual team experience.

The theming questions in section C (purpose, process, people, and technology) were largely obtained via scaling questions to collect information on attitude, opinion, and belief according to a Likert scale, as well as open-ended enquiry questions, which allowed participants to elaborate:

- Pre-testing was conducted with as small number of virtual team leaders prior to the actual empirical study (see Chapter 5).

A number of questionnaires allowed for an automatic pre-coding tool for each question, enabling subsequent data gathering (Saunders *et al* 2012: 443). The Lime Survey 2.0+ questionnaire utilised in this study presents one such questionnaire. It allowed the researcher to obtain an individual's point of view (in a similar fashion, as quantitative researchers would do). However, the manner in which some of the questions were phrased, allowed the researcher in this study to gain better insight into participants' perspectives, as they were requested to give their own explanation of some of the best practices, i.e. open questions (Denzin & Lincoln 2013:19).

4.8 MEASUREMENT

Watts (2008:440-441) notes that the collection of "qualitative data which describes meaning and experience is subjective, not value-free and inextricably linked to the goals of the researcher who may not be emotionally detached from the topic of enquiry. In this sense, qualitative research is neither neutral nor objective, and acknowledgement of the values and assumptions that frame research is an important feature of integrity. Integrity is honesty and probity within the conduct of qualitative research and underpins ethical practice in all the activities that comprise data collection and analysis". Hence, the criteria observed to measure and ensure the integrity of this study (Lincoln & Guba 1985; Guba & Lincoln 1989) are as follows:

- Credibility
- transferability
- dependability
- confirmability.

4.8.1 Credibility (Trustworthiness)

Credibility implies that the quality of the study is trusted because it appraises what was

intended in the research purpose. The trustworthiness (reliability) of data implies a “determination of whether the findings are an accurate reflection from who’s viewpoint: the researcher, participants or the reader and examines the stability or consistency of responses” (Creswell, 2009:190-191). Creswell (2009:191) further suggests the following reliable research procedures:

- **Documentation of all procedures—even setting up protocol.** The researcher attached evidence to substantiate that this procedure was followed.
- **Checking transcripts (records) for obvious mistakes.** The researcher confirmed this procedure was followed, as the summary of the records confirms.
- **Cross-check codes by comparing results.** The researcher conducted a pre-test of the questionnaire to ensure that the codes were correctly identified (Chapter 5).
- **Provide definitions of codes and applications during coding process.** The researcher endeavoured to define all themes in the questionnaire.

4.8.2 Transferability

Transferability refers to the level of applicability in other settings or situations (Lincoln & Guba 1985). To some extent (in the process, people, and technology theme), the study of Ebrahim *et al* (2009) was repeated, indicative that this study may be applicable to more settings. Although the data for this study were not reproducible, except in the software sector of the technology industry in South Africa, some parts of the questionnaire or research findings could be used in other settings with minor adjustments.

4.8.3 Dependability

By following a detailed explanation of the research method (such as the detailed systematic method and the questionnaire used) of this study, some degree of dependability could be obtained by other researchers doing the exact same study in the same context. However, due to the flexible nature of virtual teams, team members and progression in technology, overall dependability may not be possible.

4.8.4 Confirmability

The term refers to the extent to which other researchers can *support* the findings in this study to ensure that the opinions and experiences of the participants are truthful, and the

subjectivity of the researcher is significantly reduced to provide a true reality. Validity confirms or rejects findings from the literature theory and the researcher could include multiple validity strategies to prevent invalid data (Creswell 2009:190). The confirmability of qualitative research may be approached from two different perspectives research (Marshall & Rossman 2011:41-44):

- Transactional validity focuses on collaboration and convergence.
- Transformational validity means that the focus is for the researcher to represent and reflect on the views of multiple participant perspectives:
 - Catalytic validity relates to the stimulation by the researcher to focus in a particular manner in order to obtain multiple participant perspectives.
 - Multicultural validity is a generative method to transmit an explicit social justice agenda.

Validity can be obtained from a number of strategies (Lincoln & Guba 1985; Cresswell & Miller 2000:124-130; Marshall & Rossman 2011:43), including transformational crystallisation. For this study, transformational crystallisation was utilised to ensure credibility and confirmability. According to Ellingson (2009), crystallisation highlights various positions along a continuum of thinking until a particular theme of thinking becomes apparent. The manner in which validity through crystallisation is achieved is by confirmation. Confirmations indicated by a greater extent of use served as indicators of dependability of best practices, while indication of lesser extent was an indicator of opportunities where practices could be enhanced. The researcher decided on arbitrary but logical grounds; that, should more than two participants share the same opinion of a practice, this was sufficient agreement for acceptance of best practice.

4.9 PRE-TESTING OF QUESTIONNAIRE

A pre-testing of the questionnaire was conducted to ensure that the questionnaire could be utilised for the empirical study. Feedback from the pilot study is contained in Chapter 5.

4.10 DATA ANALYSIS

The Oxford dictionary (2008:30) defines analysis as the “examination of something in detail in order to explain, discover its structure or composition”. Within a research context, analysis is regarded as a systematic act of identifying, organising, interrogating, and transforming

data in ways that allow researchers to comprehend consistent patterns, identify themes, discover relationships, develop explanations, make interpretations, mount critiques or generate theories (Creswell 2009; Gibbs 2007:1; Marshall & Rossman 2011:243).

The complex, diverse and meaningful nature of qualitative data calls for flexible analysis techniques to transform any non-numerical type of human communication (visual, written, audio behaviour, artefacts or symbolism) (Gibbs 2007:1-3).

Qualitative analytic techniques include the following: Grounded theory analysis (*objectivist grounded theory analysis and constructivist grounded theory analysis practice*); template analysis; analytic induction analysis; discourse analysis (*critical discourse analysis, qualitative evaluations, narrative analysis*); pattern matching; explanation building; and content analysis (Henning *et al* 2005; Saunders *et al* 2012; Krippendorff 2013). The researcher considered all these qualitative analytic techniques and the research question, as the driver for choosing content analysis as the preferred analysis technique. The reasons for rejecting all the other analytical techniques are indicated as follows:

Qualitative analytical technique	Reason for rejection
Grounded theory analysis	The epistemology of the grounded theory informs this form of data analysis which is generally featured as a structured, rule-bound type of analysis, and is inductive in its ontology as opposed to the deductive nature of this study (Henning, <i>et al</i> 2005:47,115).
Template analysis	This form of analysis combines both the inductive and deductive ontologies as the original categories are predetermined, but opportunity for flexibility is allowed to the researcher to include more categories if the data obtained identify emergent issues (Saunders <i>et al</i> 2012:574). After weighing this analysis choice, the researcher did not consider this analysis technique as appropriate, as pre-existing theories were first consulted to identify the initial conceptual framework and the emergent issues in the literature, thereafter the categories and themes were finalised. The intent of the researcher was not to enclose the information, but rather to explore the factors that play a significant role in establishing best practices for the functioning of effective virtual teams, as informed by the literature study, as well as investigating the

	<p>antecedents of virtual team best practices empirically to present a consideration of set best practices.</p>
Analytic induction analysis	<p>This inductive type of analysis investigates inferential causes for a specific phenomenon in strategically selected cases. Its <i>modus operandii</i> is to develop an explanation of the phenomenon instead of utilising well-developed analytical procedures, considering pre-existing theory or categories first to explain the phenomenon (Saunders <i>et al</i>, 2012:574). The researcher did not consider this analysis option as appropriate, since pre-existing theories were first consulted to identify the gap in literature before the virtual team phenomenon was investigated alongside particular categories.</p>
Discourse analysis	<p>The researcher utilising discourse analysis needs to appreciate the meaning and structure of the language protocol (which could include factors such as symbols and culture), by which the participants provide meaning and clues to their rule-governed behaviour where they make sense of their reality, usually associated with a subjective ontology (Henning <i>et al</i> 2005 117-122; Saunders <i>et al</i> 2012:577).</p> <p>The intention of this study was not to understand the meaning and structure of language between the participants (discourse analysis).</p>
Critical discourse analysis	<p>Make sense of and produce an ideological social system (critical discourse analysis).</p>
Qualitative evaluations	<p>Capture change to establish the impact of a study (qualitative evaluation).</p>
Narrative analysis	<p>Focus on the patterns in the story grammar and the story (not the story elements) rather than the language protocol in which it is presented (narrative analysis) (Henning <i>et al</i> 2005:45).</p>
Pattern matching	<p>This form of analysis follows from a deductive ontology. The capability of a conceptual framework based on pre-existing theory, to predict certain outcomes, is used to explore patterns that will assist in interpreting data in the pattern matching analysis choice. Although the researcher was alerted to patterns in gathering data, the intent of this study was not only to test the framework based on prior theory to predict certain best practices, but also to establish evolving best practices in the functioning of effective virtual teams. The intent of this</p>

Explanation
building

study was wider than this analysis technique could provide for.

This form of analysis follows from a deductive ontology and is also regarded as a pattern matching choice, which may share similarities to the analytical induction and grounded theory choices, but the processes of gathering data differ. In essence, they involve building explanations while collecting data, instead of testing a predicted explanation. A theoretical proposition is tested by collecting data from a case study for comparisons. If necessary, the theoretical proposition is amended and data collected, and this phase repeated until a satisfactory explanation is obtained (Saunders *et al* 2012: 580). The researcher considered this analysis choice but decided it was unsatisfactory, as the researcher did not merely intend obtaining acceptance of prior theoretical knowledge, but wanted to explore the widening usage of best practice options.

One of the approaches for analysing qualitative data is content analysis, which is a method for identifying, analysing, and reporting patterns (themes) within data. It minimally organises and describes data in rich detail (Braun & Clarke 2006:79). Thematic analysis methods seek to describe patterns across qualitative data in an attempt to understand people's everyday experiences of reality in great detail. This is done in an understanding of the phenomenon in question (McLeod 2001 in Braun & Clarke 2006:80). However, in this research study, thematic analysis went further and also interpreted various aspects of the research topic. Schutz (1967) refers to interpretive understanding and recommends a two-stage process; being first-order and second-order analysis. First-order analysis is the process by which the researcher makes sense of the phenomena under investigation.

Content analysis had its origins with Lindesmith (1931) as a scientific technique to rebut existing hypotheses found in natural sciences. In social sciences, content analysis was first viewed as a neutral and objective method to analyse raw material such as the texts provided in Lime Surveys (Marshall & Rossman, 2011:161). Later, Berelson (1952:74) developed a definition for content analysis as "a research technique for the objective, systematic, and quantitative description of manifest content of communications". Busch, De Maret, Flynn, Kellum, Le, Meyers, Saunders, White, and Palmquist (2005) added that in content analysis researchers make deductions from messages in the content of communication, as they are presented in the "relationships, presence and meanings of concepts and words". Babbie (2010:530) elaborates on the definition of Berelson, by defining it as a "type of recorded

human communications which is analysed such as laws, websites, books and even paintings”.

Krippendorff (2013:24-31) explains that “content analysis is a research technique for making replicable and valid inferences from meaningful matter (such as texts) to the contexts of their use”. The nature of the data obtained defines the definition of a content analysis:

- Text is not objective.
- Text does not have a single meaning.
- The meanings invoked by texts need not be shared.
- Meanings speak to something other than the given text.
- Texts have meanings relative to particular contexts, discourses or purposes.
- The nature of text demands that content analysts draw specific inferences from the body of text to their chosen context.

Making sense of the data was necessary throughout the research process (findings, analysis and interpretation of data) and started from the point where the research question was formulated, the literature was reviewed and the questionnaire was developed and participants’ responses obtained (their lived experiences shared) and analysed (Richard & Morse 2013:68). The process continues with the interpretation of the empirical data, focusing on gaining insight into best practices (a transcendental phenomenology as described by Richard and Morse 2013:71):

- The unit of analysis is best practices in the functioning of effective virtual teams in the software sector of the South African technology industry as explored in the empirical study (Babbie 2007).
- The unit of observation was the words and sentences of the responding participants when they replied to the questions in the Lime Survey 2.0+ electronic questionnaire (Babbie 2007; Krippendorff 2013:84).

4.10.1 Content analysis guiding questions

Saunders *et al* (2012:234) note that internet data raise questions on confidentiality, anonymity, privacy, and copyright. However, this study only utilised the internet as a communication medium and did not access websites to obtain information, which could contain copyright. Access to the participants was negotiated and an informed consent

process was followed (see section 4.7). To ensure ethical behaviour in this study (dependability, credibility, transferability, and confirmation of data) the researcher requested that participants electronically accept that the questionnaire would be anonymous, confidential and the subsequent report of the findings would be done collectively (Marshall & Rossman 2011:41) (see Annexure "E").

The empirical data analysed in this study resulted from the Lime Survey 2.0+. The utilisation of computer-assisted methods in qualitative methods of analysis allows for frequency counts, tabulations and low-level statistical analysis (Denzin & Lincoln 2013:17). Virtual team members diverse in a number of biographic categories were determined via the Lime Survey. Human-based content analysis was used to critically plan and examine the data in this study. Founded by Berelson (1952), content analysis has evolved, stretching over almost all scientific disciplines as an analytical method in social sciences to learn more about the content and inferences of conditions of communication as well as counting and relying on the simple frequencies of symbols (Krippendorff 2013:19).

4.10.2 Steps of data analysing technique

The data analysing technique typically associated with case studies is “content analysis” (Richards & Morse 2013:207). This data analysing research technique is “replicable and valid descriptions and interpretations of the written productions of a society or social group” can be obtained (Krippendorff 2013:24; Marshall & Rossman 2011:161). Content analysis is a technique used to determine the presence of certain themes, words, and concepts in text such as a questionnaire, by means of coding the text in manageable sections. The outcome of the content analysis is a used to produce insights to the best practices and has at least three characteristics for this study (Krippendorff 2013:1-5):

- It is empirically grounded, exploratory in process and either predictive in intent
- it transcends traditional notions of symbols, contents and intents
- it has a unique methodology.

Generally, two distinct methods of content analysis exist; namely conceptual (examination of the number of occurrences of certain words, concept or themes in recorded text), and relational analysis (examines the relationships between concepts in texts). For the purpose of this study, a combination of these two methods was utilised. Since the purpose of content analysis is to understand structure, informative regularities in patterns between virtual teams

can be obtained from it, such as size and relationships. In general, the relationship analysis was utilised for section, A which involves the four themes (purpose, process, people, and technology). Sections B and C were predominately analysed via conceptual analysis.

4.11 INTERPRETATION OF RESULTS

After the data, categories and themes are analysed, the researcher will offer an integrative understanding of what was observed. Interpretation serves to bring “meaning and coherence to the findings”. This clarification of what has been learnt serves to make sense of the connection of the “themes, patterns categories”, context units and responses in the empirical study (Marshall & Rossman 2011:219).

The responses of the participants will be considered in terms of their “usefulness” and “significance” (Marshall & Rossman 2011:219). If any response was repeated or similar meaning attached to it more than once, *theoretical sufficiency* (not *saturation*, since people's explanation of their experiences would be subjective) is deemed to be reached. The meaning will be labelled as a context unit, which will contribute to significance (Marshall & Rossman 2011:220).

Qualitative studies normally have small sample sizes. Three guiding norms for qualitative phenomenology studies suggest the sample range for case studies (Masibigiri & Nienaber 2011):

- Eisenhardt (1989) proposes samples of between four and ten. Morse (in Denzin and Lincoln, 1994) suggests six cases whilst Creswell (2002), in Onwuegbuzie & Leech (2007); Guest, Bunce & Johnson 2006:59-82) prefers between three and five cases.
- It is held that both the number of organisations (five) as well as the number of participants (19) in the current study falls within the guiding norm for qualitative studies.
- The significance of responses, which provided meaning in this empirical study, supports the definition of interpretation proposed by Marshall and Rossman (2011:219).

4.12 CHAPTER CONCLUSION

In this study, a qualitative research approach was adopted. The literature review was an integrative critical analysis and culmination of the fragmented but most relevant and significant research on virtual teaming to inform the provisional framework of best practices. It was conducted prior to the making of data. The researcher also considered measurement facets with regard to the research. The researcher made use of a non-probability selection of participant groups, as well as a guided virtual team questionnaire in which open-ended and probing questions were asked.

Chapter 5 focuses on the testing of the questionnaire. It shares some of the data, the content of the preliminary analysis of data. Further, it discusses the applicability of the questionnaire to be utilised for the empirical study.

CHAPTER 5

PILOT STUDY – PRE-TESTING OF QUESTIONNAIRE

5.1 INTRODUCTION

Prior to utilising the questionnaire on the sample population, it was tested using a pilot study. Saunders *et al* (2012:451) suggest that a pilot study be used to refine and obtain confirmability and increase the dependability and credibility of the data collected. Further, a preliminary data analysis should be undertaken to ensure that the data collected answers the research question. Saunders *et al* (2012:451) further suggest that the group chosen for the pilot study should consist of participants similar to the final population in the sample, with a minimum of ten participants, but if the researcher is extremely pushed for time, the pilot study may be tested utilising friends and family to establish that the questionnaire makes sense and presents confirmable data. The pilot study participants should be queried as to the time the questionnaire took to complete, clarity of instructions and questions, topic omissions and other comments (Saunders *et al* 2012:452).

Chapter 5 focuses on the testing of the questionnaire. It shares some of the data and the content of the preliminary analysis of data. Further, it discusses the applicability of the questionnaire to be utilised for the empirical study. From this chapter, the changes to the questionnaire and the challenges experienced will be discussed in Chapter 6. Chapter 7 contains the final information gathering of information on the questionnaire, which includes the responses of the participants, an analysis, and interpretation of the result.

As pointed out by one of the examiners of this study, a pilot study is normally deferred to the more appropriate annexure section of the study, as opposed to serving as a chapter. This practice is considered to glean data for the research study. However, as this study is a qualitative study where this particular chapter forms part of the process being expedited, the researcher found the inclusion of this section as a chapter, to contribute to the logical flow of arguments, leading the reader into an evolutionary process of comprehension and understanding. Furthermore, the ideas and concepts, through their logic presentation create consistent building up of the ultimate idea, ultimately culminating in the recommendations.

5.2 BACKGROUND

A pilot study was conducted during 3 June 2013 – 9 June 2013 in the software sector of the technology industry of South Africa. Five main representative people currently working in virtual teams in the software sector were approached and requested to ask an additional team member each to also complete the online questionnaire. The participants represented two international organisations, one of which was also requested to participate in the actual empirical study. Two other participants were selected, one from an actual listed JSE software industry organisation, and another belonging to a software organisation not listed on the JSE.

None of the participants in the pilot study participated in the empirical study.

Participants were allowed to return a “no reply” on all questions. Nine responses were subsequently obtained. Four full responses and five semi-completed responses were received. Sections A and B of the questionnaire were generally completed in full because they required short or pre-selected choices. Section C received only partial attention. Section C contained questions that are more open-ended. Questionnaire fatigue was suspected and two of the respondents who completed the questionnaire in full were contacted to enquire about their experiences. The participants did not question clarity of instructions and items. Confirmation was received that no pertinent topics had been omitted. The researcher was informed that the following three major barriers were experienced in completing the questionnaire:

- The researcher’s institutional server was only available for certain periods during the research week causing an access problem which came up as follows: “*CDb Connection failed to open the DB connection: SQLSTATE[HY000] [2013] Lost connection to MySQL server at 'reading initial communication packet', system error: 113*”. For this reason, participation was not possible during server downtime. Server problems at Unisa are common due to large volumes of students working online.
- As the participants were compelled to complete the questionnaire during normal working hours, both the windows to the questionnaire as well as their work-related windows were kept open on their computer screens. This enabled them to complete the questionnaire when they had downtime in their workload. However, an automatic system time-out on the questionnaire page, after about 17 minutes, resulted in information being lost if it had not been saved.

- Saving of information already submitted could only be done if a full screen page had been completed by clicking on the save button. If normal saving procedures (without clicking on the save button) were followed (as any software specialist habit would be), all data were lost and the participant was taken back to the first page.

For the latter reasons, the researcher suspected that questionnaire fatigue was not the only reason for the final section not being completed. Instead, software programming led to failure to complete the last section. The researcher's organisation was made aware of the failure problem and maintenance was completed. The collected data was analysed in order to make results possible.

5.3 DATA-ANALYSIS TECHNIQUE UTILISED

Content analysis was applied to analyse the data obtained from the questionnaire. Prior to the commencement of the analysis, the data was transferred from the LimeSurvey 2.0+ (Build 130423) to a SPSS command file to aggregate patterns using processes to control missing values. Sample demographics were obtained using an analysis of the repeat rates of participants in each of the demographic categories.

5.4 REPORTING RESULTS

Coding was utilised to establish categories. The categories were arranged themes (particularly in section C). A collective analysis was presented here in order to protect the identity of the participants. Where neutral information was available, it was presented in tabular format.

Section A dealt with biographical data to give insight into the context of virtual team members. Codes used under this section relate to factors such as gender, nationality, population group, home language, year of birth, highest qualification, job title in the organisation, position, nature of the position, years of work experience, income determination and trade union membership. Code numbers range from A1-A11.

Section B relates to organisational and team data to provide insight into the context of virtual teams in the chosen industry and team environment. Codes used under this section relate to elements such as the company the participant is contracted to; the nature of the participant's contract with the company; the participant's experience with face-to-face teams;

comparison of the participant between face-to-face and virtual team experiences; best aspect of working in the current virtual team; greatest advantage for the participant of working in the current virtual team; and how the participant knows that the virtual team is functioning effectively. Code numbers range from B12-B24.

Section C relates to best practices in effective virtual teams according to the four themes: purpose, process, people, and technology. This section is the focus of the study as it provides an opportunity to understand the views of participants (Creswell 2009). Code numbers range from:

Theme 1 (purpose) : A1:1 – 12
Theme 2 (process) : A2: 1 – 11
Theme 3 (people) : A3: 1 – 3
Theme 4 (technology) : A4: 1 – 7

Two additional questions were also considered:

- “Are there any comments you would like to leave on issues which you believe were overlooked or not covered in sufficient detail, which could enhance insight into best practices in effective virtual teams?”
- “I would like to read the collective report on the findings of this study, in the following media (journal or newspaper).”

5.5 SECTION A (BIOGRAPHICAL DATA)

5.5.1 General

This section presents the descriptive information on the biographical variables of the sample.

5.5.2 Gender

Typical virtual team members in the software sector of the technology industry in the sample are white males. However, employment equity steps have been taken as females (two) and blacks (two) are represented in the sample.

Table 5.1: Pilot study: Gender

	Frequency	Percent	Valid percent	Cumulative percent
Valid				
1 Male	5	55.6	71.4	71.4
2 Female	2	22.2	28.6	100.0
Total	7	77.8	100.0	
Missing from System	2	22.2		
Total	9	100.0		

5.5.3 Nationality

Typical of virtual teams, geographical distribution was noted in the sample. Although most participants were South African (five), other nationalities were also noted (two).

5.5.4 Population

An unwillingness to comment on population group was noted among the non-South African participants. The general sensitivity towards population group is in accord with the strong employment equity orientation where South Africans belonging to certain population groups may benefit from obtaining employment in South African organisations.

5.5.5 Home language

A pattern of local languages; namely Afrikaans (three) and the Sotho grouping (two) were noted.

Table 5.2: Pilot study: Home Language

	Frequency	Percent
1 Afrikaans	3	33.3
6 Sepedi	1	11.1
7 Sesotho	1	11.1
Missing from System	4	44.4
Total	9	100.0

5.5.6 Year of birth

Most participants were born in the 1970s (four), with representation of the late 1960s (one) and 1980s (one). Participants were; therefore, representative of generation Y.

5.5.7 Highest qualification

All respondents had post-school qualifications. The majority obtained either a bachelor's degree or advanced diploma in terms of South Africa's national qualification framework.

Table 5.3 Pilot study: Highest qualification

	Frequency	Percent	Valid percent	Cumulative percent
5 NQF level 6: Diploma or advanced certificate	2	22.2	28.6	28.6
6 NQF level 7: Bachelor's degree or advanced certificate	3	33.3	42.9	71.4
8 NQF level 9: Master's degree	2	22.2	28.6	100.0
Total	7	77.8	100.0	
Missing from System	2	22.2		
Total	9	100.0		

5.5.8 Job title in the organisation

In terms of position in the virtual team, there were team leaders and team members. The majority of the participants viewed themselves as team members (5), with only two regarding themselves as team leaders (managers).

Table 5.4: Pilot study: Job title

	Frequency	Percent	Valid percent	Cumulative percent
2 Manager who has financial authorisation powers (i.e. approval of leave, buying of items)	2	22.2	28.6	28.6
3 Team member	5	55.6	71.4	100.0
Total	7	77.8	100.0	
Missing from System	2	22.2		
Total	9	100.0		

5.5.9 Position

All participants in the pilot study were in positions that would typically be associated with the software sector of the technology industry. The researcher noted that they elaborated on specific descriptions of the positions, deepening the uniqueness and emerging complexity of each position in this industry.

Table 5.5: Pilot study: Position

	Frequency	Percent	Valid percent	Cumulative percent
Missing data	3	33.3	33.3	33.3
Global lead	2	22.2	22.2	55.6
Operational network support	1	11.1	11.1	66.7
Software developer	1	11.1	11.1	77.8
System centre technical specialist	1	11.1	11.1	88.9
Technical specialist IT security	1	11.1	11.1	100.0
Total	9	100.0	100.0	

5.5.10 Nature of the position

A crystallised understanding of the distinction of the architecture of each position was noted. A balanced representation pattern between maintenance (two), system continuation (one), and business change policies (two) was also evident.

Table 5.6: Pilot study: Nature of Position

	Frequency	Percent	Valid percent	Cumulative percent
1. I deal with policies and procedures to bring about business change to ensure the organisation's competitiveness	2	22.2	40.0	40.0
2. I deal with system continuity to ensure that the system's capacity is effectively used	1	11.1	20.0	60.0
3. I deal with the maintenance of systems	2	22.2	40.0	100.0
Total	5	55.6	100.0	
Missing from system	4	44.4		
Total	9	100.0		

However, it became evident that the system design (seven) and management of business relations (one) increasingly defined the position of the incumbents' positions, adding to a wider dynamic scope of tasks performed by the participants.

Table 5.7: Pilot study: Architecture of tasks

	Frequency	Percent	Valid percent	Cumulative percent
Missing data	7	77.8	77.8	77.8
Design and implementation of IT systems, adhering to standards and policies	1	11.1	11.1	88.9
Manage business relations	1	11.1	11.1	100.0
Total	9	100.0	100.0	

5.5.11 Years of work experience

Only two of the participants had less than seven years of working experience. The majority of participants had significant experience of between 16 and 21 years.

Table 5.8: Pilot study: Years of work experience

	Frequency	Percent	Valid percent	Cumulative percent
5 years	1	11.1	14.3	14.3
7 years	1	11.1	14.3	28.6
16 years	1	11.1	14.3	42.9
17 years	1	11.1	14.3	57.1
20 years	2	22.2	28.6	85.7
21 years	1	11.1	14.3	100.0
Total	7	77.8	100.0	
Missing from system	2	22.2		
Total	9	100.0		

5.5.12 Income determination

Only one person was paid hourly. Eight others received basic remuneration. Six participants each received additional fringe benefits. Two participants received bonuses as part of the remuneration package.

Table 5.9: Pilot study: Remuneration

	Frequency	Percent	Valid percent	Cumulative percent
100% hourly rate	3	33.3	33.3	33.3
Basic	1	11.1	11.1	44.4
Basic pay, benefits, 13th cheque, medical aid, pension fund	2	22.2	22.2	66.6
Basic, benefit, bonus	1	11.1	11.1	77.7
Total	8	88.9	100.0	
Missing from system	1	11.1		
Total	9	100.0		

5.5.13 Trade union membership

A pattern was noted that the majority of participants (five) did not belong to a trade union. Only one participant belonged to a trade union and another opted not to declare union membership status.

Table 5.10: Pilot study: Trade union membership

	Frequency	Percent	Valid percent	Cumulative percent
1. Yes	1	11.1	14.3	14.3
2. No	5	55.6	71.4	85.7
3. I choose not to answer this question	1	11.1	14.3	100.0
Total	7	77.8	100.0	
Missing from system	2	22.2		
Total	9	100.0		

5.6 SECTION B (ORGANISATIONAL AND TEAM DATA)

5.6.1 B12 The companies you are currently contracted with, I am contracted with more than one of the companies listed

Only two participants shared a pattern of primary contractual bonds with the sample population of the empirical study. All the other participants were primarily contractually bonded with organisations that were in the software sector of the technology industry but not listed on the JSE. A pattern was noted that all the participants had secondary contractual bonds with some of the companies listed on the JSE in the software sector, confirming the notion of multiple networking in this industry.

5.6.2 B13 Nature of contract with organisation

Five of the participants were permanent employees of their organisations. Only one was an independent worker (I work for myself, but I am contracted to do certain tasks for the company). It is noteworthy that three participants did not wish to reveal their contractual status.

Table 5.11: Pilot study: Nature of contract with organisation

	Frequency	Percent	Valid percent	Cumulative percent
Permanent employee	5	55.6	83.3	83.3
Independent worker (I work for myself, but I am contracted to do certain tasks for the company)	1	11.1	16.7	100.0
Total	6	66.7	100.0	
Missing from system	3	33.3		
Total	9	100.0		

5.6.3 B14 Have you ever participated in a face-to-face team?

Six participants could respond positively that they had participated in a face-to-face team before, making comparison between virtual and face-to-face experiences possible. Three participants chose not to respond.

Table 5.12: Pilot study: Participated in a face-to-face team

	Frequency	Percent	Valid percent	Cumulative percent
1 Yes	6	66.7	100.0	100.0
Missing from system	3	33.3		
Total	9	100.0		

5.6.4 B15 The organisation in which you are involved selected your team as representative of a “virtual team”. What makes the way that you are currently working unique in comparison to traditional face-to-face teams?

- At least two participants shared the opinion that the virtual team does geographically dispersed work, which spans multiple countries or locations, multiple cultures, multiple languages and requires many trade-offs to fit working and sub-team "culture". Therefore, the current working model is more a conglomeration of "tried and tested practices" than textbook methods. The way of working is depicted by a "core team/team of three", the operational team (people responsible for deliverables) and the outer rim (people who know people who can fix challenges). These factors confirm the theory as stated in Chapter 2.

Further, the participants noted the following:

- With less contact, more effort has to be made to maintain contact. However, less contact results in less conflict, and more time for resolving conflict when it does transpire.
- Much more emphasis is placed on communication and team members need to make use of technology to get their work done.
- The only communication takes place via technology.
- Work is executed individually or as a group and away from the office. This makes work easier to complete and tasks are completed faster as well.

5.6.5 B16 What is the best aspect(s) of working in your current team?

Although only three participants shared their views on the best aspect of working in their current teams, a number of reasons were mentioned:

- Flexibility
- I get to work from anywhere yet I can still contact my team members anytime should I require their assistance or input.
- It is important for a knowledge worker to have (and depend) on a wide networked community (rapport). See FFE -"Fuzzy Front End" of innovation (Reinertsen). Central decision-making is often too slow and cannot adapt swiftly enough to coalface customer needs. The virtual team construct spans beyond interest groups or communities in that one has the opportunity to have personal contact with an expert, whereas that expert may potentially solve future challenges, or where someone else markets one's experiences. This breaks down national borders and enables a next level of efficiency.
- It is important for knowledge workers to have (and depend) on a widely networked community. Virtual teams span beyond interest groups or communities, as members have the opportunity to personally get in touch with an expert who has the potential to boost future work, thus also breaking down national borders and promoting greater efficiency.
- There is more time without interruptions.
- There is support from the team leader. Bonuses can be calculated remotely.

5.6.6 B18 How would you know that your team is functioning effectively?

Although only three participants answered the question, and it emerged that, a number of different methods indicate to the virtual team member that a team is functioning effectively. Indications include the following:

- Due dates and deadlines
- getting a bonus
- the outcome of projects
- two levels are affected:
 - Pure work-related – we use multiple techniques and methods to ensure proper alignment, dependency checking and critical paths. The deliverables are a strong measure of cohesiveness.
 - Inter-social – due to the matrix structure, most team members have to: “Learn to cope with the uncertainties of keeping many stakeholders satisfied. So a certain amount of social intelligence is required to “survive” and be more sensitive to other team members.”
- “We use tools like Microsoft Lync for communication to keep abreast.”
- “Most of our work is more on delivering projects based on scopes and within the set time frame.”

5.6.7 B19 Rank the practices enabling the effective function of a virtual team from 1 – 4 (with 1 being the most)

- **The goal or direction of a team changes throughout the life cycle of the team:**
A pattern of very important (two participants) and critically important (two participants) was noted.
- **Formal role and responsibility clarification for each team member happens when the purpose or direction of the team changes:**
A pattern of very important (three participants) was noted. A fourth participant rated this item as critically important, indicating the importance of role clarification.

- **Formalised team structure, communication, language and terminology used:**
A pattern where two participants rated the formalisation as somewhat important was noted.
- **Formalised team structure, communication, language and terminology used:**
A pattern where two participants rated the formalisation as somewhat important was noted.
- **A management system is available where virtual team members can obtain and store team-related documentation and conversations:**
A pattern where two participants rated formalisation as somewhat important was noted.
- **Ideal team size ranges from six to 20 members:**
Team size seems to matter, as three participants rated it as somewhat important. However for question B15 (The organisation in which you are involved selected your team as representative of a “virtual team”. What makes the way that you are currently working, unique in comparison to traditional face-to-face teams?), one participant indicated a core team of three participants. This topic will be explored further explored in the empirical study.
- **Personality traits toward a high performance team instead of personality fit is achieved:**
A pattern where personality traits were somewhat important for two participants was noted, while one participant regarded them as very important.
- **Regular honest feedback on negative as well as positive performance:**
A pattern where two participants rated regular honest feedback as very important, irrespective of whether it is positive or negative was noted.
- **Celebration of milestones reached:**
Celebrating milestones reached seems to have a pattern of growing importance for virtual team members. While a pattern of two participants indicated it as somewhat important, the other two valued it as very important to critically important.
- **Team members are able to work independently and in a group:**
The ability to work independently as well as in a group is highly valued in a virtual team as a pattern of two participants rated it as critically important.
- **Networking with professional organisations:**
Two participants valued this element as somewhat important.

- **Technical skills, qualification, personality and character-fit with other team members:**
The nature of this question lends itself to ambiguity. Although two participants indicated that it was somewhat important, further clarification needs to be made in the empirical study as some participants rated it as critically important.
- **Conditions of service which include how reward is determined should be individualised and contractually prescribed:**
The nature of this question lends itself to ambiguity. Although a pattern of two participants indicated that it was somewhat important, further clarification is required in the empirical study as some participants rated it as critically important.
- **The ideal member of a virtual team member is a permanent employee of the organisation for commitment reasons:**
A pattern of three participants indicated that this element was somewhat important. However, one participant indicated that it was critically important.
- **Developing a shared skills inventory of members for team reference, if team members need an expert sound board:**
An evolving pattern of three participants indicated that this element was very important to critically important.
- **Ideally, probation for new virtual team members is initially on smaller projects:**
Conflicting answers to this question required the researcher to consider the participants' answers in more detail. A pattern evolved where managers in a virtual team deemed probation as very important to critically important, while team members viewed probation as not important at all.
- **Periodic rotation of different partnerships in the virtual team create increased team collaboration:**
A pattern of two participants valued this element as somewhat important.
- **Common platform for logistics, HR, finance and other transactions to assist with the building of a heritage database on previous teams' successes:**
A pattern in which a common platform was not valued as important by the participants at all was noted. This was in conflict with two other participants who valued it as somewhat important to very important, but not critically important. Given the ability of the industry to utilise its own programming experts to

overcome platform challenges, it makes sense that a common platform is not really an obstacle.

- **Team members are trained to professionally master both synchronous and asynchronous communication and the art of communicating electronically:**
A pattern of two participants valued this element as critically important.
- **Contractual attention is given to the virtual space of where work of a team member is expected to be done:**
A pattern of two participants valued this element as somewhat important, while two other participants valued it as very important to critically important.
- **Support systems in the case of technology failure, theft and the health and safety of team members:**
A pattern of two participants valued this element as somewhat important, while two other participants valued it as very important to critically important.
- **Clarification on the duties of parties regarding various task and technology matters: supplier of hardware, quality of internet connection, task specifications, security of information and documentation:**
Two participants valued this element as very important.

5.6.8 B19 Rank the practices enabling the effective function of a virtual team from 1 – 4 (with 1 being the most)

Insignificant ranking was done due to the non-participation of participants on this question.

5.6.9 B20 List the top five best current practices that make your team function more effectively than others (with 1 being the first best practice)

A wealth of meaningful contributions by the participants was offered on best practices in the functioning of effective virtual teams. It was noted that the participants shared an intensely good understanding of why and how a virtual team should function. The current best practices as set out as follows, make the current team more effective than others:

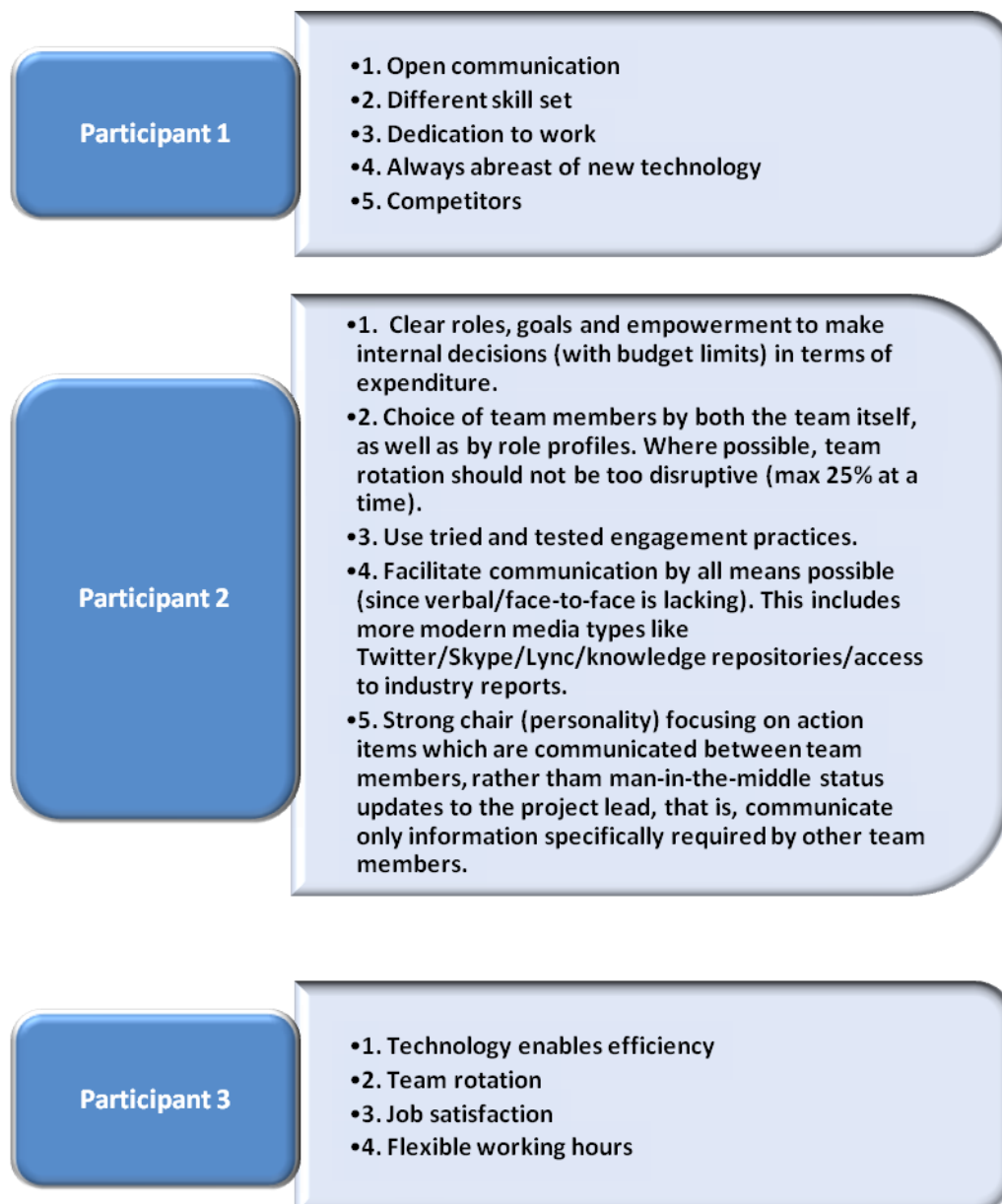


Figure 5.1: Pilot study: Effective functioning best practices

Note the clear communication style of the participants for ranking information. With the exception of participant 2, note the short sentences to clarify what is meant. This is indicative that those who are prepared to participate in the study were prepared to share information.

5.6.10 B20_1 Why did you choose number 1 as the best current practice for functioning in effective virtual teams?

Participants offered a rich variety of insight into the reason why their number 1 choice was important:

- I cannot do my work without technology.
- It gives focus and direction.
- Virtual teams have a highly contracted group development (forming, storming). Such teams are called to life at a premium, that is, where some benefit is much higher than what can be achieved by a more homogeneous team. The team therefore has to be able to make highly complex decisions in a short time –stated succinctly, less directive on "how", more directives on "what".
- Without clear communication lines there will be many breakdowns in business function.

5.6.11 B21 Consider the following practices and list the top five, which enable a virtual team to function most effectively (1 being the top best practice)

- **Formalised clarification of goal/direction of each team member:**

A pattern of three participants indicated that formalised goal clarification of each team member enables a virtual team to function most effectively.

- **Formalised electronic interactive written documentation and automatic electronic updating of reports, which is revisited as per formalised schedule:**

This was noted as an ambiguous question that needed clarification in the empirical study since all the variables were chosen.

- **Flexible virtual team leadership which is assertive, consistent, understanding of individual circumstances, caring and coaches rather than controls:**

A pattern of two participants indicated that flexible virtual team leadership rather than controlling leadership enables a virtual team to function most effectively.

- **Internal group dynamics and external group support mechanisms are more important than advanced technologies to make a team function effectively:**

This was noted as an ambiguous question, which needed clarification in the empirical study since all the variables were chosen.

- **Individual virtual team members have the flexibility to work from any location:**

Two participants indicated that the flexibility to work from any location enables a virtual team to function most effectively.

- **Team members receive advanced training in hard and software, project management skills, communication skills and self-managing skills:**

This was noted as an ambiguous question, which needed clarification in the empirical study since all the variables were chosen.

- **Special technological and security needs of virtual team members are assessed and addressed:**

This was noted as an ambiguous question, which needed clarification in the empirical study since all the variables were chosen.

- **Members are selected on the basis of suitability and skill for each particular project, and provided with the external support to implement it:**

Two participants indicated that members who are selected based on suitability and skill for each particular project as well as provided with external support to implement it, enable the virtual team to function most effectively.

- **Rewards are based on individual, team and organisational performance:**

This was noted as an ambiguous question since all the variables were chosen. However, clarification was obtained from question theme_2_31_18, indicating that virtual team members do not necessarily choose a single method of reward. This will be further explored in the empirical study.

- **Opportunities for formal and informal knowledge sharing are created to contribute towards the institutional, team and individual knowledge repositories:**

Two participants indicated that created opportunities for formal and informal knowledge sharing contribute towards the institutional, team and individual knowledge repositories, which enable a virtual team to function most effectively.

- **Alignment of processes occurs because of members' knowledge sharing as well as hard and software sharing:**

Three participants responded to this question, and although their answers differed, alignment between knowledge sharing seems to have an influence on processes.

5.6.12 B22 List the top five current practices in your team without which the team would still be able to function effectively (with 1 being the first practice, which could be terminated):

Three participants noted a number of practices, which could be terminated and suggested methods to overcome them:

- Minimum reports
- no administration overheads
- physical location
- process for drafting/creating deliverables described in a generic corporate form
- load on team members to do repetitive status updates formatted for multiple stakeholders
- resource virtualisation – common use of virtual technology resources

5.6.13 B24_[Comment] – Do you socially bond with your virtual team members?

Participants were keen to describe how they socially bond with other virtual team members and made a number of suggestions of their own accord, such as the following:

- For larger projects, t-shirts with team name and slogan (chosen and voted for by teams)
- organised virtual team games (baby/adult picture matching)
- the virtual office tour (notebook camera where employees show their work areas and colleagues)
- shared storage (part of levelling the playing field)
- meeting from time to time after work or using social media

5.7 B22 SECTION C (BEST PRACTICES)

5.7.1 Theme: purpose

5.7.1.1 *Theme_1_1 [Rank 1] Theme 1: Consider the follow practices and list the top five practices, which are needed to establish the purpose of a virtual team most effectively*

A number of best practices were selected by participants as the top practices needed to establish purpose in a virtual team. One participant maintained that the purpose in virtual teams is best described as a written, specific, quantifiable goal, and that purpose establishment at the entrance of new members to the team, where the roles, rights, privileges and accountability of the team is established, is also important.

A pattern where a third of the participants selected that the virtual team aligns its direction, purpose, resources (people) and design with that of the organisation was also noted. These participants also noted that purpose in virtual teams is best described as a clear, quantifiable direction and evidence that a virtual team has effectively achieved its purpose is found in successful handover of projects.

5.7.1.2 *Theme_A1: In the absence of your selected top best practice to establish purpose for the team, how would the team be able to overcome your critical practice?*

It was noted that the participants chose not to respond to this question, but with good reason. Given the good pattern of response on the previous question, it is not excluded that no enablement practice was foreseen by the participants to overcome the non-existence of purpose for a team.

Table 5.13 Pilot study: overcoming a lack of purpose

	Frequency	Percent	Valid percent	Cumulative percent
Participant	8	88.9	88.9	88.9
n/a	1	11.1	11.1	100.0
Total	9	100.0	100.0	

5.7.1.3 *Theme_A2_2_SQ001 [Interpersonal communication channels] [Rank (Top 5)] Rank the following conditions according to their importance for the creation of an innovative climate for virtual team members (1 being the most important)*

A combination of interpersonal channels was ranked by three participants (knowledge sharing between team members, interpersonal communication channels, and reliance on personal contacts in decision-making) as the most important for creating an innovative climate, while six participants did not rank the items.

5.7.1.4 *Theme_A2_3_SQ001 [Reliance on personal contacts in decision making] [Rank (Top 5)] Rank the following conditions according to their importance for the creation of an innovative climate for virtual team members (1 being the most important)*

Three participants listed options 2, 3 and 4 as the most important for creating an innovative climate by relying on personal contacts in decision making, while six participants did not respond.

5.7.1.5 *Theme_A2_4_SQ001 [Relying on published reports] [Rank (Top 5)] Rank the following conditions according to their importance for the creation of an innovative climate for virtual team members (1 being the most important)*

Three participants listed options 2, 3 and 4 as the most important for creating an innovative climate by relying on published reports, while six participants did not respond.

5.7.1.6 *Theme_A3 In the perceived absence of an innovative team climate, the best practice which I came across to drive new ideas in a virtual team is (current or previous virtual teams)*

In the absence of eight responses, one participant highlighted boot camps or team meetings as well worthy of consideration when driving new ideas in a virtual team.

Table 5.14: Pilot study: Drive new ideas

	Frequency	Percent	Valid percent	Cumulative percent
Boot camps or team meetings	8	88.9	88.9	88.9
Non-respondent	1	11.1	11.1	100.0
Total	9	100.0	100.0	

5.7.2 Theme: process

5.7.2.1 *Theme 2: Process [Comment] Can a virtual team function effectively without a leader?*

A pattern of two participants indicated that a virtual team could still function effectively without a team leader, if team members delegate each task and rotate responsibility. The seven other participants did not respond to this question.

5.7.2.2 *Theme_2_29_4 [Rank 4] Consider the following practices and rank them in importance in virtual team facilitation to function most effectively (1 being the top best practice)*

The following best practices indicated trends since they were rated as most important regarding the facilitation of virtual teams:

- The hierarchically and organisationally assigned individual creates culture in the team.
- Particular hierarchical and organisational responsibility is assigned to a dedicated individual in a team.
- Team leaders understand the personal circumstances of each team member.
- The team leader is able to choose and use unique team embedded processes.

- There are techniques and procedures for dealing with discipline.

5.7.2.3 Theme_2_30 Members in a virtual team are selected as follows

Although traditional recruitment process are still being applied to obtain members of virtual teams, one participant and an emerging pattern for two participants, signalled that prior experience of people who have worked together via a networking system are increasingly being used as recruitment methods. Six participants did not respond to this question.

Table 5.15: Pilot study: Member selection

	Frequency	Percent	Valid percent	Cumulative percent
1. Traditional recruitment procedures are followed where individuals apply for an advertised position and follow the usual procedures	1	11.1	33.3	33.3
2. Members are recruited via a networking system of people that have worked together before	2	22.2	66.7	100.0
Total	3	33.3	100.0	
Missing from system	6	66.7		
Total	9	100.0		

5.7.2.4 Theme_2_31_18 Consider the following 22 aspects which positively influence your performance as a virtual team member (choose the top 5 influential factors) (1 being the top best practice)

A pattern of seven aspects, which positively influence the performance of team members, were noted:

- Team support
- bonus based on individual
- team and organisational performance
- scheduled individual performance feedback
- individual and team work progress is electronically visible for all team members
- anticipation of a particular known reward
- weekly team performance feedback meetings.

5.7.2.5 *Theme_2_32 Cultural differences in virtual teams are bridged as follows:*

Although six participants were silent on this question, there was a pattern of consensus among three participants that the clarification of individuals' world and work and the people perspective were important from induction of the team.

Table 5.16 Pilot study: Bridging of cultural differences

	Frequency	Percent	Valid percent	Cumulative percent
2 Clarification of individuals' world, work and people perspective from induction of the team	3	33.3	100.0	100.0
Missing from system	6	66.7		
Total	9	100.0		

5.7.2.6 *Theme 2_33 The best practice, which I have come across to align, update and integrate processes in a virtual team, are*

Communication and the ability to use technology to bridge distance were identified by two participants as the best practices they had come across to align, update and integrate processes in virtual teams. Seven participants did not respond to this issue.

Table 5.17: Pilot study: Align, update and integrate processes

	Frequency	Percent	Valid percent	Cumulative percent
Communication	7	77.8	77.8	77.8
Use of technology to bridge distance	1	11.1	11.1	88.9
Missing data	1	11.1	11.1	100.0
Total	9	100.0	100.0	

5.7.3 Theme: people

5.7.3.1 *Theme_3_34: The greatest area of conflict encountered in my virtual team is*

Two participants listed the greatest area of conflict as lack of communication and misunderstanding of cultures. The other seven participants did not respond to this question.

Table 5.18 Pilot study: Greatest area of conflict

	Frequency	Percent	Valid percent	Cumulative percent
Lack of communication; misunderstanding of cultures	7	77.8	77.8	77.8
No response	2	22.2	22.2	98.9
Total	9	100.0	100.0	

5.7.3.2 *Theme_3_35: The best practice for solving the conflict identified in the previous question is by means of:*

Seven of the participants did not answer this question, with one specifically indicating that there is no applicable best practice to solve identified conflict in the virtual team. However, one participant did mention the creation of an open environment for training on the handling of cultural differences.

Table 5.19: Pilot study: Conflict resolution in virtual teams

	Frequency	Percent	Valid percent	Cumulative percent
Non response	7	77.8	77.8	77.8
Create an open environment for training and cultural differences and how to handle these differences	1	11.1	11.1	88.9
n/a	1	11.1	11.1	100.0
Total	9	100.0	100.0	

5.7.3.3 *Theme 35_6 The best way to create a team, which is meaningfully engaged in its work, is*

Eight of the participants did not respond to this question. However, one participant did mention that the provision of support systems contributed to the meaningful engagement of the team, which could add value to future engagement practices.

Table 5.20: Pilot study: Meaningful engagement virtual teams

	Frequency	Percent	Valid percent	Cumulative percent
Providing supportive systems	8	88.9	88.9	88.9
Missing data	1	11.1	11.1	100.0
Total	9	100.0	100.0	

5.7.4 Theme: technology

5.7.4.1 *Theme_4_37: In your experience, is there a way that a virtual team will still be able to function effectively in the absence of technology (i.e. extended server and electricity outages, viruses, etc.)?*

Two participants responded that the team would not be able to function effectively. The rest of the participants did not respond to this question.

Table 5.21: Pilot study: Absence of technology

	Frequency	Percent	Valid percent	Cumulative percent
Valid responses (no)	2	22.2	100.0	100.0
Missing from system	7	66.7		
Total	9	100.0		

5.7.4.2 *Theme_4__38_41_1: The choice of collaboration tools fits the purpose for which it was intended*

Three participants indicated that collaboration tools should fit the purpose they are intended for. The rest of the participants did not respond to this question.

Table 5.22 Pilot study: Choice of collaboration tools

	Frequency	Percent	Valid percent	Cumulative percent
1. To a great extent	2	22.2	66.7	66.7
2. To some extent	1	11.1	33.3	100.0
Total	3	33.3	100.0	
Missing from system	6	66.7		
Total	9	100.0		

5.7.4.3 *Theme_4__38_41_2: Availability of a common platform for logistics, HR, finance, and other transactions in your organisation assist the formation of a heritage database on previous teams' successes*

Three candidates indicated that a shared platform does not have an influence on databases for the operational activities of the organisation. The rest of the participants did not respond to this question.

Table 5.23: Pilot study: Availability of a common platform for logistics, HR, finance, and other transactions in your organisation

	Frequency	Percent	Valid percent	Cumulative percent
3 No influence	2	22.2	100.0	100.0
Missing from system	7	77.8		
Total	9	100.0		

5.7.4.4 *Theme_4__38_41_3: Contractual attention is given to the virtual space of where work of a team member is expected to be done for the purpose of inclusion in labour legislation protection and protection of organisational assets*

Two participants indicated that specific attention is given to the workspace of the virtual team member. This contractual attention ranges from some extent to a great extent regarding virtual workspace and labour relations practices.

Table 5.24 Pilot study: virtual space

	Frequency	Percent	Valid percent	Cumulative percent
1. To a great extent	1	11.1	50.0	50.0
2. To some extent	1	11.1	50.0	100.0
Total	2	22.2	100.0	
Missing from system	7	77.8		
Total	9	100.0		

5.7.4.5 *Theme_4__38_41_4: Risk behaviour of team members regarding cyber-crime should be carefully monitored and addressed*

High regard for the ability to work independently and the trustworthiness of individuals in this industry is reflected in this question. To some extent, risk behaviour of team members is monitored, with two respondents confirming this. Seven participants chose not to respond to this question.

Table 5.25: Pilot study: Risk behaviour- cyber crime

	Frequency	Percent	Valid percent	Cumulative percent
2 To some extent	2	22.2	100.0	100.0
Missing from system	7	77.8		
Total	9	100.0		

5.7.4.6 *Theme_4_42: The best practice which I have come across to keep team a member abreast of the latest technology in a virtual team is*

Two participants indicated personal discussions on technology platforms, while seven chose to refrain from responding.

5.8 CHANGES TO THE QUESTIONNAIRE

Since major programming changes to the Lime Survey would result in further loss of time, the following changes were made to the questionnaire:

- The four themes were addressed separately and first on smaller pages, which would enable participants to save their information on a more regular basis.
- Coding was changed so that:
Section A covered best practices:
Theme 1: Purpose – Section A: codes 1–10
Theme 2: Process – Section B: codes 11–20
Theme 3: People – Section C: codes 21–30
Theme 4: Technology – Section D: codes 31–37
- Section B (biographic and organisational data) was retained in its second position with its coding.

- Section A from the pilot study was moved to the last position, retaining its codes but changing the name to section C. Theme_4_43 “Are there any comments you would like to leave on issues which you believe were overlooked or not covered in sufficient detail, which could enhance insight into best practices in effective virtual teams?” Theme_4_43 “Publication: I would like to read the collective report on the findings of this study, in the following media (journal or newspaper):” was moved to the last position. Another question was added as theme 4.44: “If the researcher may contact you to clarify some of your responses in section A (Best practices) please provide your email address”.

5.9 CHAPTER CONCLUSION

The responses to the pilot study enabled the researcher to establish arbitrarily, but on logical grounds, that where two or more participants share the same opinion regarding a practice, this was sufficient agreement for acceptance of the practice. This decision enabled ethical clarification of the pilot study as follows:

- The quality of the study could be trusted because it appraised what was intended in the research purpose. The questionnaire was; therefore, considered by the researcher to be credible.
- The level of applicability in other settings or situations in the software sector of the technology industry was established, making the questionnaire transferable.
- Following the questionnaire as used in the pilot study with minor changes, as noted in the previous section, some degree of dependability could be obtained in the same context. However, due to the flexible nature of virtual teams, team members and progression in technology, overall dependability might not be possible.
- Confirmability to support the findings of the pilot study and literature theory (Chapters 3 and 5) were possible through the utilisation of transformational crystallisation to ensure credibility of data. Confirmations indicated by a greater extent of use served as indicators of dependability of best practices, while indications of lesser extent were indicators of opportunities where practices could be enhanced.
- Some changes and the reasons for the changes to the questionnaire are suggested in the following chapter. These changes are mainly about the positioning of questions and type of question.

- Despite the changes to the pilot study questionnaire, the researcher valued the quality of the instrument to provide quality insight and extract sufficient information to be able to answer the research question.

Chapter 6 presents a comprehensive overview regarding the researcher's experiences whilst obtaining the data from the responding participants in the companies and the approach followed in delivering the findings. Thus, it links the theory to practice by explaining how sense was made in this study. The strategies followed to ensure trustworthiness is enhanced by explaining their actual application. Chapter 7 contains the final roll-out of the questionnaire, which includes the responses of the participants, an analysis and interpretation of the result.

CHAPTER 6

MAKING SENSE OF THE DATA: DATA ANALYSIS AND INTERPRETATION OF RESULTS

6.1 INTRODUCTION

This chapter serves as a prelude to Chapter 7 where the empirical findings, analysis and interpretation are shared.

In this chapter, a comprehensive overview is presented regarding the researcher's experiences while obtaining data from the responding participants in the companies and the approach followed in delivering the findings (Chapter 5). This is in line with qualitative research as described by Salkind (2012); Saunders *et al* (2012) en Richard and Morse (2012). Following Chapters 4 and 5, the strategies followed to ensure trustworthiness are enhanced by explaining their actual application.

6.2 CHAPTER OVERVIEW

The questionnaire utilised in this study was pre-tested (Chapter 5) and certain changes made to it (section 5.8).

This chapter consists of three sections; namely:

- A group code overview, which contains a summary of the questions pertaining to the group (regarding organisational, team and biographical data)
 - questions:
 - Overview of the question(s)
 - presentation of participants' responses
 - analysis
 - interpretation
 - summary of group code
- The theme overview, which summarises questions pertaining to each group code on the four themes (purpose, process, people and technology)
 - questions:
 - Overview of the question(s)
 - presentation of participants' responses
 - analysis

- interpretation
 - summary of group code for the themes
- The chapter summary, which contains the following:
 - The responses of the participants (the unit of observation) described in words and sentences by the participants as they replied to the questions in the Lime Survey 2.0+ electronic questionnaire (which is in sync with recommendations from Babbie 2007; Krippendorff 2013:84):
 - The four themes of this empirical study (purpose, process, people and technology)
 - an analysis of best practices (the unit of analysis) as expressed with regard to the unit of observation (the four themes: purpose; process; people; and technology in virtual teams)
 - an interpretation of the responses to each question against the theories covered in Chapter 3, then concluding with a summary

Data was collected from 10 June to 4 September 2013. For ease of reference, and to prevent the frustration of paging between chapters, the findings, analysis and interpretation of questions are kept together. In figure 6.1, is a summary of the themes, categories and questions used to answer the research question.

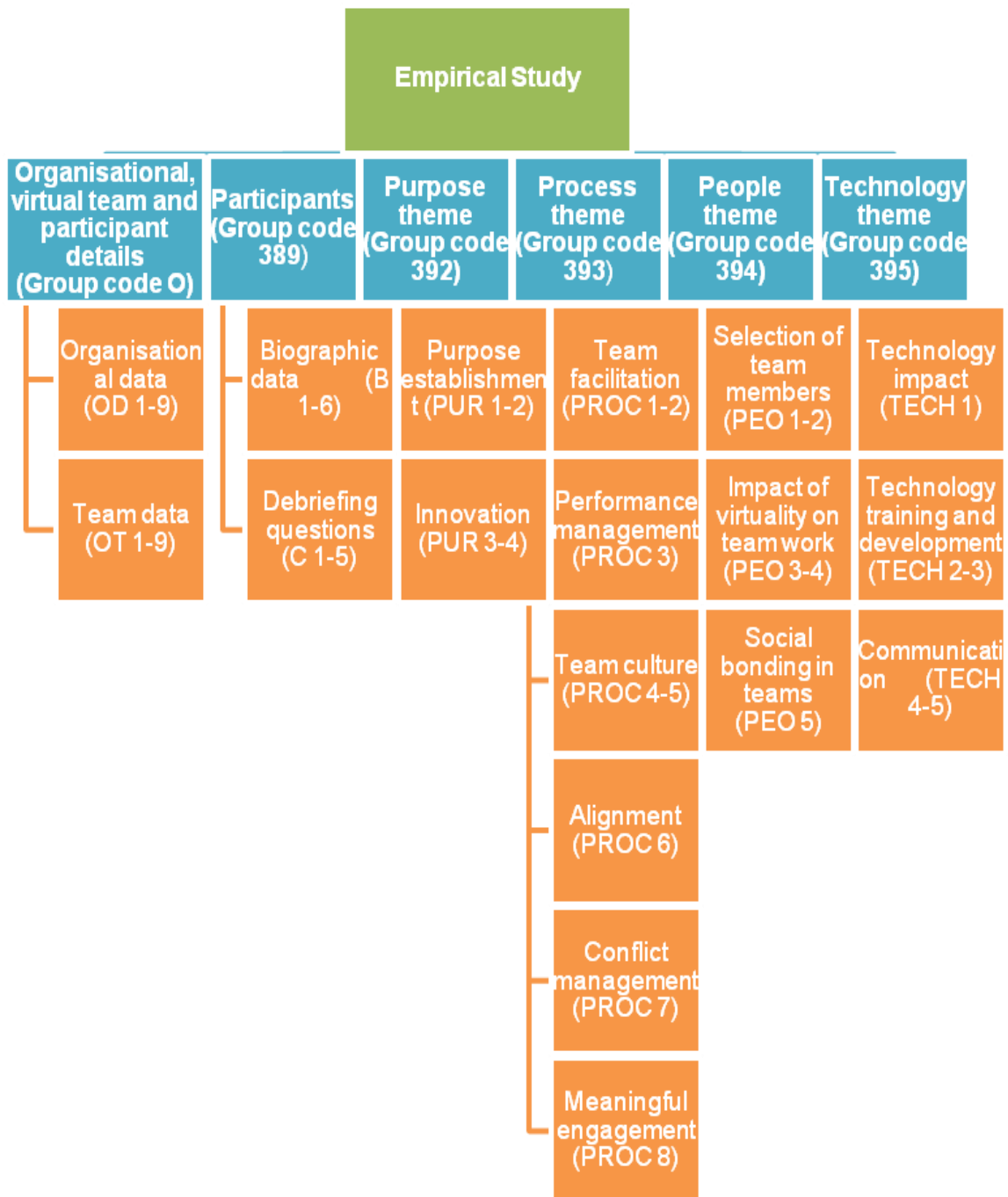


Figure 6.1: Representation of the Lime Survey 2.0+ electronic questionnaire themes, categories and questions

It is evident from figure 6.1 that the literature on the themes of purpose, people and technology is fairly balanced. However, the majority of studies investigate how virtual teams work (the process theme).

6.3 EXPERIENCE WHILE OBTAINING DATA

In this section, a discussion on experiences in the gathering of information from the participants follows:

- Negotiation of access and company requirements
- experiences with the electronic questionnaire tool, the Lime Survey 2.0+ electronic questionnaire

6.3.1 Negotiation of access and company requirements

During January and February 2013, all the companies selected for inclusion in this study were approached and buy-in was obtained via the assigned company human resource representatives to conduct this research (see section 4.7). The roll-out date was confirmed as June 2013, which at that stage was operationally the most suitable period for all the companies to allow representative virtual teams from their organisations to respond to the researcher's questionnaire.

However, when the researcher approached the companies again in June 2013 to make final arrangements for the roll-out of the questionnaire, a huge turnover in decision-making and human resources staff had occurred, and entry had to be renegotiated. By the June date, the only three international companies (J, K, and N) and two national companies (M and F) had specific policies in place that prohibited staff from participating in studies such as the research in question.

Difficulties with access to research subjects are not a new challenge encountered in research. The sampling and context of the empirical study were influenced by the level of access to the companies and involved prolonged negotiations (Sinkovics & Alfoldi 2012:826). The competitive nature of the technology industry was reflected in the participation rate in the empirical study. Kapoulas and Mitic (2012:362) ascribe company reservation and participants' personal scepticism towards open-ended and interpretive approaches (such as in this empirical study), fears over potential loss of competitive intelligence from participation in research. According to Lugtig, Lensvelt-Mulders, Frerichs and Greven (2011:319-348), researcher access to information in companies is an increasing central challenge with low response rates, likewise experienced by the researcher in this study.

The response rate for this study was further challenged due to the operational schedules of participants in the companies, with only a limited number of participants being able to participate in the study.

The time frame from requiring access to the companies to the final actual collection was January 2012 to 30 May 2013. Although data collection was originally scheduled for only one month during June, too little participation was obtained. Participation in the empirical study was extended from 10 June to 4 September 2013 after weekly reminders alternating between telephonic contact with the assigned company human resource representatives and emails sent to them.

6.3.2 Experiences with the questionnaire data collection technique: the Lime Survey 2.0+ electronic questionnaire

The Lime Survey 2.0+ electronic questionnaire was selected as the electronic questionnaire data collection instrument. Institutional support from the researcher's university was provided at a technical, training, and practical level.

However, technical problems were encountered by the responding participants during both the pilot and empirical studies. The institutional server of the researcher did not function optimally. "Slowness"; "down time"; "response rejection"; and "early closure of the questionnaire" were experienced by some responding participants in both the pilot and empirical studies.

In contrast to paper-based questionnaires that participants do not complete, the researcher experienced a different approach of responding participants with the electronic questionnaire. Some of the responding participants, who experienced problems with the Lime Survey 2.0+ electronic questionnaire, contacted the researcher to make the researcher aware of the problems. Some even suggested possible solutions for future usage. The researcher experienced the method of feedback as positive and supportive. The researcher experienced real interest from the responding participants, whom made suggestions to improve the product, even though they would not gain from it. This attitude of concern and suggestions about the products presented by the industry, even if participants did not design them, is indicative of a phenomenon new to the researcher. Why would anybody offer extensive technical suggestions to improve a product—when they have nothing to gain from it—as their area of focus would not allow them to construct new software to replace this questionnaire? The researcher received a verbal answer from two participants—who

preferred to be referred to as anonymous: “Because it can be done and it will work better”. This offering of intellectual knowledge/experience, for no other purpose than to make the world a better place, was echoed in different ways throughout the rest of the study (OT4 and PROC6). Participant responses were shared with university representatives, for consideration and adaptation for future researchers at the institution, who might consider utilising the Lime Survey 2.0+ electronic questionnaire data collection instrument to obtain improved response rates.

6.4 APPROACH IN DELIVERING THE FINDINGS OF THE RESPONSE TO THIS QUESTION

This questionnaire is in support of the research question of this study.

6.4.1 The research question

The primary research question (see section 1.7) that this research intended to answer was as follows:

What are the best practices applied in the functioning of effective virtual teams in the software sector of the South African technology industry according to the four proposed themes of virtual teams (in figure 1.1)?

In exploring the research question, this study followed an inductive, phenomenological, interpretivistic research philosophy (see section 4.4.2). A qualitative multi-case study research design was conducted to obtain data for the research scope of the software sector of the South African technology industry (see section 4.6). Cases were selected based on the logical suitability of the constructs, as inferred from a conceptual hierarchy. (See section 4.5.1.1).

An electronic questionnaire data collection instrument was used (see section 4.5.1) to obtain data within a cross-sectional time horizon (see section 4.5.1). The Lime Survey 2.0+ electronic questionnaire data collection instrument was used (see section 4.5.1) in synchronisation with the collaborative architecture of virtual teams; namely asynchronous electronic communication, which allowed participants to share their experiences (TECH3) (Denzin & Lincoln 2013:508-509). This resulted in responses from virtual team members in the companies selected.

6.4.2 Response rate explained

Participation in the Lime Survey 2.0+ electronic questionnaire was voluntary for both companies and their employees (Annexure "E"). The comments of the responding participants were electronically captured by each individual participant on the Lime Survey 2.0+ electronic questionnaire. Respondents were allowed the option to participate or decline participation. In addition, they could opt to answer a question or not:

- In total, five of the 16 companies (thirty one percent) participated.
- In total, ten usable responses were obtained from 19 participants (53 percent).

Electronic questionnaires are not the perfect way to collect information (Dillman, Smyth & Christian 2009). Response rates in electronic questionnaire, as low as two percent, have been noted in international research (Petchenik & Watermolen 2011). Although electronic questionnaire responses (11 percent lower than phone and mail questionnaire) might be viewed by some as low, the electronic response rate for this research was supported and fell within the range of the theoretical findings of Saunders *et al* (2012), who indicates a benchmark of thirty percent as an acceptable response rate for electronic questionnaires.

The response rate is further clarified in the discussion on the challenges faced during the implementation of the Lime Survey 2.0+ electronic questionnaire data collection instrument.

Responding participants also had the opportunity to indicate whether they could be contacted to clarify information. Two participants (27 and 28) indicated their willingness to be contacted to clarify information, but indicated their personal and not their company electronic addresses. Choosing not to communicate via traceable company infrastructure as well as the small number of people prepared to be contacted to further discuss information, suggests a risk-averse attitude among respondents (TECH5). Despite the risks, the researcher contacted the willing respondents and clarified their responses, as will be indicated during the discussion that follows.

Because many participants had complained (see section 6.2.2 for criticism), the researcher requested the Unisa institutional software technician—not part of the sample group—during the empirical study, to test the functionality of the Lime Survey 2.0+ electronic questionnaire data collection instrument to complete it (participant 47). For the purposes of the response to the research question, the observations made by participant 47, were not included, except that it was noted that the electronic questionnaire data collection instrument functioned adequately under test conditions.

In total, fifty-three people responded to the Lime Survey 2.0+ electronic questionnaire data collection instrument.

Rejections:

- One questionnaire was rejected, as a member of the sample population did not complete it. It was completed by the Unisa institutional software technician to test the functionality of the questionnaire 47.
- In total, the responses of thirty-three other participants were rejected. The following participants' responses were rejected as they provided either completely empty questionnaires; or because the time period for opening and then closing the electronic questionnaire was less than one second: 1–4; 6–7; 10–11; 16–24; 26; 29, 31; 33–34; 36; 38–39; 41–42; 44–46; 50–51; and 53.

The remainder of the questionnaires (53 minus 34 equals 19) contained partially usable information, of which ten were completed questionnaires that were accepted. On average, it took the participants 25 minutes to complete the Lime Survey 2.0+ electronic questionnaire, with the shortest completion time being six minutes and the longest thirty-five minutes. The 25 minutes in the empirical study were slightly more (five minutes) than the average of 20 minutes for the pilot study.

Given the above theoretical foundation regarding response rates on electronic questionnaires, the nature of the study, the challenges that were experienced to obtain the information, and the natural virtual working environment of the participants, the researcher felt confident that the response rate agreed with the minimum requirements for the study to be regarded as reliable in the context of the software sector of the South African technology industry. Although the response rate was accepted as low, the response rate for Lime Survey 2.0+ electronic questionnaire contributes to research by providing information within a specific industry, on not one (like most studies), but at least four themes. The low response rate and the complexity of the subject necessitate further research as recommended in the last chapter.

The norm for both the organisation as well as the number of participants in this study complies with the recent standards in qualitative studies (see section 4.11).

The focus of the findings and conclusions of the cases in this empirical study was not to generalise, but rather to understand and explore the best practices in the functioning of effective virtual teams in the companies selected (see section 6.5.1: member checking). The study was not intended to represent all virtual teams. The words utilised by the virtual team members only represent those virtual team members who completed the questionnaire. Therefore, the responses to the questions cannot be extended to the whole software sector of the South African technology industry, as the sample population—only those organisations, which were listed on the JSE and participated in the questionnaire—was too narrow to be generalised.

6.5 STRATEGIES TO ENSURE TRUSTWORTHINESS

Following the guidelines to ensure trustworthiness in qualitative studies, proposed by Guba and Lincoln (2012), Marshall and Rossman (2011: 221) and Richards and Morse (2013), the researcher endeavoured to pursue the strategies, as set out as follows, to ensure scientific value of the empirical study (also see section 4.8):

6.5.1 Credibility (truth-value)

Although the individual participants are highly likely to be the only people who would be able to reasonably judge whether their responses were accurately captured, the researcher endeavoured to ensure that the results of the empirical study were plausible, by using the following research steps (as prescribed by Richards and Morse (2013)):

- ***Prolonged engagement with the companies in the study***

The researcher contacted the assigned company human resource representatives and reminded them on a weekly basis (alternating between electronically and telephonically), to encourage participants to complete the questionnaire.

- ***Questioning technique and researcher authority***

The researcher could be regarded as a novice in research. This lack of research abilities was overcome by a variety of training in areas such as research proposal writing; literature reviews; research methodology; writing for publication; and extensive Lime Survey 2.0+ electronic questionnaire training. An institutionally assigned statistician as well the research

supervisor further verified both the questionnaire and the data. A pilot study was conducted prior to the empirical study to fine-tune questions.

- ***Reflexivity***

A field journal was kept and experiences during the research process were captured. Upon finalisation of the research, the participants who indicated their wish to be informed of the findings, will be notified on the electronic Unisa library link (<http://uir.unisa.ac.za/handle/10500/25>). This link will also serve as a debriefing for the participants who completed the Lime Survey 2.0+ electronic questionnaire.

The social interaction influence component of the researcher-participant relationship was reduced, as only two anonymous participants contacted the researcher to report challenges with the Lime Survey 2.0+ electronic questionnaire, and the researcher only contacted two participants (27 and 28) to clarify information after they had submitted their responses.

- ***Structural coherence***

A logical, coherent flow and alignment of the research process and method utilised, as described in Chapter 4, ensured dependability of the responses to the questions (Sinkovics & Alfoldi 2012:817-845).

- ***Member checking***

Member checking of this research occurred during November 2013. The purpose of member checking was to elucidate whether any important aspect in either theory or application had been missed and whether the study was “fit for purpose”. No misfit was found. The findings of the responses to the questions were presented at the following two conferences:

1. Glafad International Conference on good governance, conflict resolution, decentralisation and socio-economic development, Pan African Parliament, 13 November 2013 to 15 November 2013. A peer-reviewed research paper was presented on the topic with the title: “Conflict resolution best practice in effective virtual teaming”. The audience consisted of senior academia from all over the world, political representatives, representatives of companies in Africa,

government officials of various African countries and NGOs from African countries (De Bruyn & Nienaber, 2013: 301-315).

Questions (from political leaders in Africa attending the conference) on the paper presented resulting from this conference were:

- Can this model be used to address the 26 current wars in Africa?
- Can this model be applied in both the private and public sectors?

The researcher accepted that non-academics might not be familiar with the differentiation between qualitative and quantitative studies. The responses to these questions were explained as follows: The study needs to be assessed in the contextual framework in which it was presented; namely virtual teams in the software sector of the South African technology industry and was not intended for general application. It was presented against the 2001-2013 position tracking of South Africa on the World Bank's World Competitiveness index (WCI) for the sake of the participants' overview to indicate the changing landscape and increasing utilisation of electronic data. Leaders of companies could take note of best practices in these virtual teams in response to this question as building blocks for managing teams utilising extensive electronic computer communication media to organise their work.

The following comments on the study by participants at the conference are included, but because the comments were out of context, they were perceived not to add value in response to the research:

Note was taken of the opinions of two participants (one, a person who had 15 years of union experience) who commented that poor relations in workplaces in South Africa cause South Africa to be in the overall last position regarding employer-employee relations (position 148 in 2013) on the WCI, caused by the following factors:

- The historical background of South Africa (in particular apartheid)
- the belief that the overall attitude of employers is that they want a quick means of getting rid of employees

These participants disputed the World Bank's report about wages in South Africa and indicated that they are not fixed, as most employees' salaries are negotiated through bilateral negotiations. They therefore disputed that South Africa's recruitment and dismissal

practices are regarded as stringent as portrayed in the WCI, and held that conflict is ultimately caused by poor management strategies.

The researcher had over 20 years of extensive labour relations experience (in labour relations management positions in the public and private sectors, holds a Master of Commerce degree in Labour Relations, and at the time, lectured collective bargaining and negotiations at a postgraduate level at the largest university in the southern hemisphere, Unisa (also one of the four major universities in the world). This information was not shared with the audience, as it was deemed not to be conducive to the climate of the conference at the time and the participants comments were evaluated as a red herring. As a response was expected—and to avoid causing offence to the participants making these comments—the researcher responded by indicating scientific validity of the study and noted the impact of investors' decisions in responding to the World Bank's WCI of which participants should take heed. No comments or questions from academic participants were received and the researcher evaluated this as acceptance of the study.

2. International symposium on building a sustainable future in Sub-Saharan Africa, Monash University (South Africa), 26 to 27 November 2013. A peer-reviewed research paper was presented on the topic: "Best practice in effective virtual teaming for sustainable companies". This audience consisted mainly of local and international researchers, academics and business students.

Although time was allowed for questions after the presentation, none was posed. It was Therefore accepted that members supported the process and findings presented.

- ***Triangulation***

In justifying that the research is credible, the following three types of triangulation were utilised (Denzin 2012):

- (1) **Theoretical triangulation**

Multiple theories were utilised in response to the research question (see Chapters 2 and 3).

(2) **Investigator triangulation**

The researcher, researcher's thesis supervisor, and a Unisa institutional software technician ensured that the data was cross-examined and deemed to be an accurate reflection of the information presented by the participants.

(3) **Researcher-participant triangulation**

The researcher contacted participants 27 and 28 (electronically, as they indicated their preference to support some of the information presented in their completed questionnaires. No changes were made to their responses.

Triangulation is normally associated with at least three people examining the results in research to ensure that it is a true reflection of the actual data. Triangulation of the responses to the Lime Survey 2.0+ electronic questionnaire was dealt with as follows:

- Triangulation in the data was obtained as more than one theory was utilised to inform the questions in the questionnaire and the interpretation of the findings (Chapters 4 and 6).
- Responses were not obtained from only one company, but the experiences of the participants were shared from more than one company as a source of data.
- Neither the researcher nor the researcher's thesis supervisor imported the information from the Lime Survey 2.0+ electronic questionnaire. It was electronically downloaded by a third trained party—a Unisa institutional software technician—and data from the website and Excel spread sheet could be verified by both the researcher's thesis supervisor and the researcher.

Thus, multiple perspectives through completed studies (such as Bergiel *et al* 2008:99-110; Ebrahim, Ahmed & Taha 2009:2653-2669; Lipnack & Stamps 1993:1-40, 1994:1-264, 1997:1-11; Lojesky & Reily 2008; Miles & Snow 1986:62-73a; Piccoli *et al* 2004:359-379) were gained to clarify and verify the findings of the Lime Survey 2.0+ electronic questionnaire with other studies (Richards & Morse 2013:103).

- ***Referential adequacy***

The researcher attempted not to plagiarise the research work of other people. All research noted in response to initial research question was cited in the study and noted in the bibliography of the study (see declaration at beginning of this study). Turnitin similarity report is available upon request.

6.5.2 Transferability (applicability)

Silverman (2013) notes that many qualitative studies cannot be generalised, which similarly applies to this empirical study. However, in the nominated sample, a dense and rich description of the data was presented to ensure replicability of the study in a different context to enable transfer of the audit study. Furthermore, under the thematic questions in particular, there are specific notes to the reader on instances of agreement/disagreement between participants' experiences and theory. This is also in line with the so-called Kent theory (which falls outside the scope of this study), which may be signal universal application (see Chapter 8).

The results of a case study research design are transferable in the sense that researchers "suggest further questions, and future implications" and present the results as "directions and questions" as noted in the last chapter (Barnes, Conrad, Demont-Heinrich, Graziano, Kowalski, Neufeld, Zamora & Palmquist 2012).

- ***Replicability*** of the study can be modestly certified. The aim of replicability is to document the empirical study in order to maintain the comprehension and informative value of the research data (Friedhoff, Meier, Pietsch & Meyer 2013). It was noted that the software sector of the South African technology industry experiences a high turnover rate of personnel in general, and the flexible nature of team membership of virtual teams may be an impediment for exact future replication. The questionnaire is attached, and should participants in similar teams be approached in a period where work pressure is similar, replicable findings could result. However, the questionnaire was pre-tested and empirically tested and may to some extent (as will be discussed in Chapter 5) be applied in other studies.

6.5.3 Dependability (consistency)

- The following attempts were made to ensure the dependability of the responses to the question:
- ***Dependability audit***

The questionnaires of participants are available for audit purposes on the Lime Survey 2.0+ electronic database, but will for ethical reasons not be published in this document.

- ***Dense description and research methods***

An attempt was made to provide a thorough and detailed explanation of the research method utilised, as well as the findings, analysis and interpretations made (Richards & Morse 2013:58) (see Chapter 6).

- ***Peer examination***

Both the questionnaire and the information provided by the responding participants were verified by the Unisa institutional software technician, as well the researcher's thesis supervisor on the Lime Survey 2.0+ electronic database.

- ***Code-recode procedures***

The Excel spreadsheet used to download the information was retrieved by the Unisa institutional software technician and confirmation thereof is available on request. Coding of question groups and questions was automatically and electronically created via the Lime Survey 2.0+ electronic questionnaire data collection instrument.

- ***Authenticity***

A sincere attempt was made to give a voice to all responding participants and companies that participated in this empirical study. The original response document was verified by the researcher's thesis supervisor and the researcher. This was achieved by a coding system where participants and their responses were electronically assigned unique numbers. The researcher then assigned to each responding participant a number (e.g. 1, 2, 3), and an

alphabetic letter to each company (e.g. "A", "B", "C"), followed by their particular responses—if any—to the questions, to protect their identity. Furthermore, respondents were invited to indicate whether they wish to obtain the results of this empirical study, to which two participants (27 and 28) indicated their interest. Should it be questioned whether the responding participants did not complete the questionnaire personally, the coding system would have elucidated such an occurrence, because it is accepted that responding participants in this industry have secure usernames and password for their email accounts. No such occurrence was noted or reported. The researcher is; therefore, confident that the responding participants completed the questionnaire personally. Any proof that someone else has completed the questionnaire on behalf of a participant is regarded as malicious. The questionnaire is first of its kind and an original work, which incorporate questions regarding best practices in the functioning of effective virtual teams, on all four themes.

- ***Audit trail*** (Saldaña, 2013)

The audit trail of this empirical research is included to allow for an official, integrated and aligned, independent third-party process assurance evaluation. Its purpose is to minimise risk and oversight, control efficiencies, and optimise overall research assurance (King III; Saica, 2004, as adapted for academic research purposes). The audit trail contributes to the validity of the qualitative study (McBrien, 2009). The following steps were followed:

Step 1 (Saldaña, 2013:1-9)

From the theory, four themes were identified and each was electronically assigned to an electronic group code:

- An electronic code was assigned to each question (letter code with a number). To serve as an example. see section 7.2 – findings for the companies that participated in the study (group code 390): company data.
- An electronic code was automatically assigned to each participant. Refer to any table in Chapter 7 labelled as “participant’s identification” (e.g. 27).

Step 2 (Saldaña, 2013:9-11)

After participants had completed the Lime Survey 2.0+ electronic questionnaire, the information was downloaded to an Excel spreadsheet. The researcher then followed the steps set out as follows:

- Review the responses to make sense of the comments.
- Read through all the responses carefully.

Step 3 (Saldaña, 2013:11-12)

- Under each group code, all the questions assigned to the group code were listed:

Example:

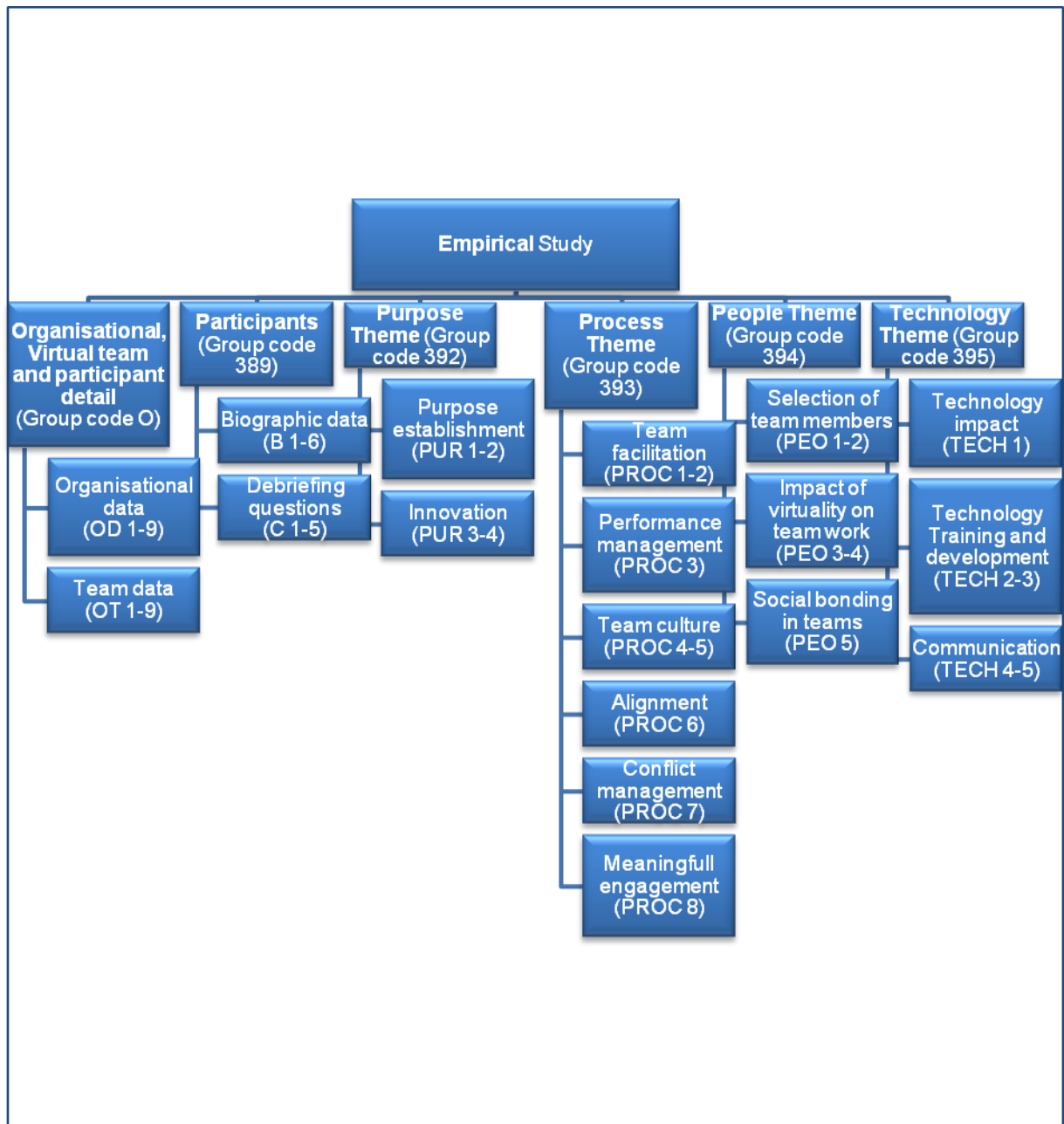


Figure 6.2: Representation of the Lime Survey 2.0+ electronic questionnaire themes, categories and questions (*placed here for ease of reference*)

- *Theoretically, sufficient* information was clustered (where two participants shared the same or similar experiences or ideas) in contextual units (see section 7.4 for a discussion of theoretical sufficiency).
- Cluster context units were used as categories.

Example:

Table 6.1: Summary of participants' comparisons between virtual teams and face-to-face teams

Participant	Response of participant	Context units	Axial code
12	Collaboration and communication are varied over multi-media and traditional meetings, and guidance is given, not by a single individual, but by various team members, depending on their subject-matter expertise.	Technology Knowledge leadership	<ul style="list-style-type: none"> • Technology (12, 13, 32) • Knowledge leadership (12, 27) • Workspace (25, 37, 43) • Self-managed performance (27, 28, 35)
13	Make use of technologies such as UCS and live meetings.	Technology	
25	No geographical boundaries.	Workspace	
27	Each one of us specialises in our own area, overlapping in certain instances. Each member can drive towards the deliverable without having to have a physical face-to-face team assisting.	Knowledge leadership Self-managed performance	
28	Remains energised and focused in the face of ambiguity, change or strenuous demands.	Self-managed performance	
32	New technology implementations [require] face-to-face engagement.	Technology	
35	It takes a lot of discipline to make sure that you adhere to working hours.	Self-managed performance	
37	We work off-site in a face-to-face office environment.	Workspace	
40	Participant chose not to answer the question.	No response	
43	I don't think we are a virtual team - we sit on the client's site and (communicate) face-to-face with the client and all other team members.	Workspace	

Step 4 (Saldaña 2013:12-13):

- Context units were clustered until categories for all themes were noted.
- Of the 16 companies, three were incomplete, and two full responses were obtained.
- Responses are within the norms set for case studies.

6.5.4 Ethicality in the study

The changing research landscape has necessitated ethical regulation and governance (Miller, Mauthner, Birch & Jessop 2012). Ethics are the norms or standards for conduct that distinguish between acceptable and unacceptable behaviour in research (Resnik 2011) (see section 1.12). Norms promote the aims of research (such as knowledge creation) and standards promote the values that are essential for collaborative work (such as trust) (Resnik 2011) (see section 4.8).

Although the research process was stretched over time, this empirical study could only be continued by means of formal Unisa institutional ethical clearance, which was obtained in June 2012. During the different stages of the study, the strategies outlined were followed in an attempt to ensure that the process was ethical (Saunders *et al* 2012:236):

- During ***formulation and clarification*** of the research topic, the researcher recognised that knowledge sharing would be a great risk to the companies in the sample, since it formed part of their competitiveness strategy, and their names, would; therefore, be kept anonymous to protect and respect their privacy against possible harm.
- During the ***design of the research and gaining access to the companies phase***, the researcher did not at any stage coerce or incentivise the assigned company human resource representative (gatekeeper), or participants, into allowing access or obtaining information. The same letter and link to the Lime Survey 2.0+ electronic questionnaire were sent to the assigned company human resource representative, who subsequently forwarded the link to the participants for their views as virtual team members in effective virtual teams. The participants and the assigned company human resource representatives could view the questions before answering the questionnaire. The participants were fully informed of the questions and gave their informed consent by clicking on the link to continue, or exit, at any stage during the research process (Denzin & Lincoln 2013:134). Privacy was protected by giving each participant and company a unique code.

Although the assigned company human resource representatives gave only telephonic approval, the researcher deemed it necessary to obtain formal, written

approval of all the companies by means of the actions of their decision makers. The decision makers forwarding the electronic link and letter of the researcher to the chosen participants, first had to obtain internal company approval to allow participants to participate. In such instances, the assigned company human resources representatives gave telephonic consent. Participants in the study received a letter of invitation, and by clicking on the link of the questionnaire, they could decide to continue with their participation (<http://survey.unisa.ac.za/index.php/125492/lang-en>).

During completion of the questionnaire, the participants could choose not to participate in any of the questions. Participants and companies were only identified in the response to this question by means of an anonymous code for scientific sampling. Their responses were more important to the study than their identity.

- The ethics observed with the **collection of the data** were that the responses were automatically channelled directly to the Lime Survey 2.0+ electronic questionnaire database and not via assigned company human resources representatives. Participants were assured in the Lime Survey 2.0+ electronic questionnaire of their privacy and that they would be dealt with anonymously and confidentially. The link will be forwarded to those participants who indicated that they wish to receive feedback on the outcome of the study via journal on acceptance of such publications.
- During the **storage and processing phase** of the data, the researcher, the researcher's thesis supervisor and the Unisa institutional software technician, who downloaded the information to Excel, could only access the information. Strict university ICT protocol was observed in this regard. Again, the responses of the participants and their companies were dealt with anonymously, and confidential and personal data were kept safe electronically on the Lime Survey 2.0+ electronic questionnaire as well being password protected on the excel spread sheet to respect the participants' agreed consent.
- Finally, in **analysing and interpreting the responses**, the researcher did not act coercively with any participant, assigned company human resource representative, sponsor, or company to compel them to provide an analysis or

interpretation reflecting negatively or positively either on the participant's anonymity, or that of the company. The anonymity and confidentiality of participants and their companies were protected at all times.

6.6 EXPLAINING THE METHOD OF DATA ANALYSIS

In line with the research question, the researcher was interested in understanding the best practices of in the functioning of effective of virtual team members in their natural context in the particular way in which they normally function: electronically as suggested by Gibbs (2007:xi).

Data analysis refers to the transformation of collected data through analytical procedures to gain insight and clarity, in an attempt to reply to the research question as suggested by Gibbs (2007:1). The data obtained in the response to the research question are regarded as the texts ("**response of participants**") for the empirical study as suggested by (Gibbs 2007:2).

In analysing the text of the empirical study, the kinds of data followed from the information obtained from the participants:

- The first data source resulted from choices participants could make from a list of possible responses such as those in question OD3.
- The second source was from responses on long and short text such as those in question OT4 (Gibbs 2007:3).

The style of analysis was chosen to provide a rich and detailed description of the participants' responses (Gibbs 2007:4). Fortunately, the use of the Lime Survey 2.0+ electronic questionnaire tool enabled the researcher to download the exact words used by each participant. This information was downloaded to an Excel spreadsheet. From the spreadsheet, the data were reorganised into different tables for different questions.

Following the exact words of the participants, the researcher considered common ground between their responses. This common ground was shared in the context unit column by the researcher. Where two or more similarities, overlaps or duplications in the context unit column were noted, the researcher deemed it satisfactory to establish theoretical sufficiency (Gibbs 2007:4; Marshall & Rossman 2011:210).

The theoretically sufficient context units were shared in the axial code column with the participants' identification code to support theoretical sufficiency (see section 6.4.3: audit trail). These theoretically sufficient similarities are discussed under the "findings" heading following each table. However, in longer textual responses, the researcher attempted to understand the participants' experiences against certain theories, and certain deductions, with motivation (by the researcher), were made (Gibbs 2007:5).

In this empirical study, the time spent on transcribing the data was minimised and subjectivity was reduced to a greater extent, as the data was simply downloaded as a specific function of the Lime Survey 2.0+ electronic questionnaire product, to a usable Excel spreadsheet (Gibbs 2007:10). No additional coding was deemed necessary by the researcher to organise the data than that provided in the table. In writing up the data, the use of the Excel spreadsheet made it possible to table the responses of each participant on each question, and these responses are presented as various tables in the report (Gibbs 2007:33).

Although the biographic information of the companies, teams and individuals is not dealt with first on the questionnaire, it will be discussed first in Chapter 6. The reason for this is that biographic information of the companies and teams was placed at the beginning to make sure the participants qualify to participate. Individual biographic information was moved to the end to combat questionnaire fatigue experienced in the pilot study. To replicate the study, it is suggested that this strategy should also be followed.

The companies and team elements are coded under the group code (390) with group code (389) for the individual element. Following each element, a table will be presented with a summary of all the questions contained under the element. Thereafter, the findings of each question will be discussed.

The approach to the themes will be dealt with differently. From the theoretically generated codes, four themes were identified (purpose, process, people, and technology) from the literature (Marshall & Rossman 2011:211). These codes were utilised to provide direction and coincided with the real-life, in vivo codes, or electronically assigned group codes (Marshall & Rossman 2011:211). Directly after each theme, a table will be presented with a summary of all the questions (and their unique coding numbers) contained under the theme. Thereafter, the findings of each question will be discussed. After each question, a summary of the responses of the participants will be included in table format. This summary will indicate the following:

- The responding participant (numbered to protect their identity) and the sampling units distinguished for selective inclusion in the response to this question's analysis, is explained in the previous chapter.
- The response of the participant (in table format): Krippendorff (2013: 99) refers to these responses as "recording units". To enable the researcher to distinguish between the various responses of each participant, the Lime Survey 2.0+ electronic questionnaire tool allowed for each participant to respond to a question, either by choosing a predetermined response and thereafter providing reasons for the response, or by providing a space for his/her unique response.
- A "context unit": This considered tangencies between the content of the various responses (recording units) of the participants. Krippendorff (2013:101) refers to these context units as limits set on textual matter to describe recording units. The researcher; therefore, endeavoured to explore overlapping descriptions between the responses of the participants which indicate possible best practices.
- Axial code: Where two or more similarities, overlaps or duplications in the context unit column were noted, the researcher considered it satisfactory to establish theoretical sufficiency (known in quantitative circles as "theoretical saturation") (Gibbs 2007:4; Marshall & Rossman 2011:220). The participants whose responses contributed towards this understanding are noted in the numbers, which follow the practice in brackets (e.g. 12 and 13).

In summary, following the table of the particular responses of each participant to the question, the researcher considered tangencies and common ground between the responses. This common ground was shared in the context unit column by the researcher. Where two or more similarities, overlaps or duplications in the context unit column were noted, the researcher considered it satisfactory to establish theoretical sufficiency (Gibbs 2007:4; Marshall & Rossman 2011:220). The theoretically sufficient context units that are shared were placed in the axial code column with the participants' identification code to support the theoretical sufficiency, as suggested by Marshall and Rossman (2011:217). Theoretically, sufficient similarities are evaluated under the "findings" heading following the table.

6.7 EXPLANATING THE METHOD OF INTERPRETATION

After the data, categories and themes were analysed, the researcher offered an integrative understanding of what was observed. Interpretation serves to bring “meaning and coherence to the findings”. This clarification of what has been learnt serves to make sense of the connection of the “themes, patterns categories”, context units and responses in the empirical study (Marshall & Rossman 2011:219). The responses of the participants were considered in terms of their “usefulness” and “significance” (Marshall & Rossman 2011:219). All responses, which provided information not linked to “participant chooses not to respond”, were valued as useful. If any response was repeated or similar meaning attached to it more than once, it was deemed to have *theoretical sufficiency* (not *saturation*, since people's explanation of their experiences would be subjective) and labelled as a context unit which contributed to significance (Marshall & Rossman 2011:220). Furthermore, the response to this empirical study falls within the sample range suggested for phenomenology (5-25) (Creswell 1998:64; Guest, Bunce & Johnson 2006:59-82; Richard & Morse 1994:225). The significance of responses from which meaning was made in this empirical study, supports the definition of interpretation proposed by Marshall and Rossman (2011:219). After the table and findings on a question, an interpretation of the data follows. After each theme, a summary of the main findings is synthesised.

6.8 CHAPTER CONCLUSION

In summary, a sincere attempt was made by the researcher to compile a scientific and trustworthy report by providing an in-depth description of the many elements that contributed towards the trustworthiness of the evidence provided.

The next chapter focuses on the presentation of the participants' responses to the Lime Survey 2.0+ electronic questionnaire in the empirical study. These responses resulted from the research question. Chapter 7 presents an overview to each question and the actual responses of participants on each question.

For ease of reference the analysis and interpretation follows the findings of each question.

CHAPTER 7

PRESENTATION OF PARTICIPANTS' RESPONSES, ANALYSIS AND INTERPRETATION OF INFORMATION

7.1 INTRODUCTION

This chapter focuses on the presentation of the participants' responses to the Lime Survey 2.0+ electronic questionnaire in the empirical study. These responses resulted from the research question, which explored the following:

What are the best practices applied in the functioning of effective virtual teams in the software sector of the South African technology industry according to the four proposed themes of virtual teams (in figure 1.1) (see section 1.7)?

Chapter 7 follows from the pilot testing of the questionnaire (Chapter 5) which was changed and adapted to bridge the challenges experienced during the pilot testing (Chapter 6). The questionnaire was based on the theoretical foundations layed down in Chapters 2 and 3. Whereas Chapter 4 explained the intention of the researcher to follow a particular research methodology, Chapter 7 discusses what the researcher actually found and the rigorous extent to which the researcher followed the intended research methodology.

7.2 CHAPTER OVERVIEW

The responses of participants on each question are reflected. For ease of reference, the analysis of the responses and the interpretation of the information presented follows. Observations and the researcher's own reflections are included in this chapter.

From Chapter 6, the reader is reminded that:

- Group codes and question codes are automatically generated from the Lime Survey 2.0 electronic questionnaire.
- The questions and themes for this framework stem from the literature in previous studies (see Chapters 1 – 3).
- The analysis was done in accordance with section 6.6.
- The interpretation was done in accordance with section 6.7.

- The participants and the companies they represented, varied during answering the questionnaire. In total, 19 participants, representing five companies, gave full responses in this questionnaire. Where these participants did not respond to a question, it was indicated.
- Although the number of organisations and the number of participants who participated may be regarded by some as low, it corresponds with the norm as set out in section 4.11.
- Despite being offered two additional opportunities to reconsider participating in each question, few participants selected "I choose not to answer this question". In instances that the participants did select the "I choose not to answer this question", it was indicated.

The questions covered in this questionnaire were voluntary, and participants had a choice not to supply them, or proceed to the next question. The latter choice represents missing data. At the end of the questionnaire, the participants were afforded the opportunity to reconsider any responses to questions and could change, or reconsider these, before submission.

Two types of questions were utilised in this questionnaire:

- A menu of pre-drafted choices inclusive of the options not to participate and "other" from which the participants could choose to accommodate their preference not to write and elaborate (Feynman (1960), De Beer (2002); Shull, Carver & Travassos (2001); Windsor (2013).
- The "other" option allowed participants to share their opinions and experiences, in their own wording, to establish best practice for this question.

Open questions, where participants were required to share their opinions and experiences in their own words, to establish best practice.

The responses of the participants to the questionnaire were as follows:

7.3 RESPONSES OF PARTICIPANTS REGARDING THE COMPANIES WHICH PARTICIPATED IN THE STUDY (GROUP CODE 390)

7.3.1 ORIENTATION TO THE COMPANY DATA

In this section, guidelines were followed from Silverman (2013) in suggesting that descriptions of the demographic profile of the participants of the target population, the companies, and the themes should be given, followed by a discussion of the results. The seven questions contained under the company biographical data element serve to explore information on the company setting in effective virtual teams with regard to the experiences of team members. Both company and team data were electronically coded under the group code (390) to provide the same context for both codes (see table 7.1). The element descriptors; however, differentiated company information from team information.

The questions relating to company information are set out as follows:

Table 7.1: Summary of questions regarding company data (code 390)

Question group	Element	Group code	Question code
Company and team data	Company information	(390)	
Questions			
The company (or companies) that you currently have contracts with:			OD2
I am contracted to more than one of the companies listed; namely:			OD3
Nature of the contract with the company:			OD4
My job title in the company is:			OD5
Please specify your position.			OD6
The greater part of my job is best represented as follows:			OD7
Work experience in years:			OD1

7.3.2 Questions OD1 and OD2

Overview

Questions were related to the companies of which the participants were employees.

Although the assigned company human resource representatives for each company were approached, the response rate was low (only five companies in total). The response rate is; however, within the norm (see section 4.8). During the empirical research phase, 19 companies, which included 16 JSE-listed companies (A—I, L, M, O and P) as well as the three most significant role-players in the software sector of the international technology industry (J, K and N) were approached. After extensive access negotiations, the international

companies' (J, K and N) legal departments viewed the questionnaire, and denied the researcher access for obtaining the information from their employees (the assigned company human resource representatives informed the researcher telephonically). The reasons provided relate to the protection of their intellectual knowledge. Hence, the companies' human resources representatives did not forward the questionnaire to any virtual team members, and thus no information was expected from these companies. This left only 13 companies, thus reducing the sample size.

Presentation of participants' responses

Table 7.2 indicates the particular responses of each participant to the question.

Table 7.2: Summary of the companies that were included in the study

The company (companies) that you currently have contracts with	Total number of people who participated in the study	Explanation for non-participation	Participants' identification
Company A	3		5, 8 and 9
Company B	2		48 and 49
Company C	0	Only work face-to-face (no virtual teams)	
Company D	0	Holding company without any virtual team members	
Company E	0	Only work face-to-face (no virtual teams)	
Company F	0	Chose not to participate	
Company G	5		12,13,14,15 and 52
Company H	0	All official contact details suspended	
Company I	8		25, 27, 28, 32, 35, 37, 40, 43
Company J (International Company)	0	Questionnaire was reviewed and access denied after consultation with legal team	
Company K (International Company)	*1	Questionnaire was reviewed and access denied after consultation with legal team *Employee was working on a virtual team in a company listed on the JSE	30
Company L	0	Delisted from JSE	
Company M	0	Chose not to participate	
Company N (International Company)	0	Questionnaire was reviewed and access denied after consultation with legal team	
Company O	0	Holding company without any virtual team members	
Company P	0	Delisted from JSE	
Five companies	19 participants		

Analysis

It is presumed that one participant (30) in company "K", was also working as a team member in a virtual team of one of the 13 JSE-listed companies. This person, who consented to participate, was included on request of the company's HR representative. This individual is a manager in company "K", with permanent employment of thirty-three years at the company. The researcher had to evaluate the content of what this individual noted, against the potential legal consequences of being denied access to information directly from company "K". Participant 30 completed the first three sections of the questionnaire, and although it was evident that the participant continued to the last page, the person did not contribute any further information. The response of participant (30) in the study supports the existence of

collaboration of team members between companies, despite their primary affiliations. It also supports an area of risk (TECH3) in the disclosure of information and reliability strategies where company members work across company boundaries. The researcher decided to include the information of this participant (30), whose seniority and extensive employment experience was ample proof that the person has the ability to make a judgment call on whether or not to participate. The reason why participant (30) took part in the study could not be established. However, the comment of participant (30) (as team manager) on why the person's virtual team is more effective than others, was described as “*understanding the client landscape*”. This could be a possible motivation for participation, indicating that this manager truly understands the “*client landscape*” (section 1.2.1).

Two JSE companies were delisted (companies L and P). A further two companies withdrew participation based on their JSE-holding status, as they keep stock and not people resources (companies D and O). Although company "H" was approached telephonically and electronically on several occasions, none of its official JSE contact details led to a response. Two companies indicated that they had no employees working in virtual teams (companies C and E). Six companies remained, of which four finally agreed to allow one virtual team each to participate (companies A, B, G and I). Companies F and M chose not to participate, despite having agreed originally to do so, and no reasons were offered for their withdrawal. The most senior human resource professionals in companies A, B, G and I, were allowed by the researcher to make the decision of whether the teams identified could be considered the most effective virtual teams in their companies.

Interpretation

The results in response to this question are related to a rather small number of participants (see section 4.6.2.2) in the empirical study, and could be viewed as a weakness in the study data. The researcher considered the unit of observation (words and sentences the participants utilised) to express their experience or view of best practices in a virtual team (unit of analysis). This led to the researcher's interpretation of the information obtained. The insight gained from the participants provides clarity across companies, hierarchy, and job description, and covers an area of which little is known, as will transpire with the discussion of the themes.

7.3.3 Questions OD3, OD4, OD5 and OD7

Overview

These codes address questions relating to contract and job title of participants.

Data is of no value merely as data, and thus the extraction of meaning from accumulated data is necessary (Van der Linde 2005). Participants supported their voices and attitudes by responding to each question. Four of the companies (A, B, C and I) that participated in the study were listed companies on the JSE. The fifth company ("K") is an international company and represented by participant (30). The flexible nature of the industry as well as the flexibility of virtual teams, led the researcher to predict that the type of employment contracts for team members would be flexible as well. However, the researcher's prediction was contradicted, evident from the following:

19 participants representing five companies gave full responses and elucidated their employment status, their virtual team position, and years of service with their companies.

Presentation of participants' responses

The particular responses of each participant to these questions are set out as follows:

Table 7.3: Summary of the responses of the participants on the nature of their employment contracts, job titles and years of service

The company (companies) that you currently have contracts with	Participant identification	Nature of contract	Job title	Years of service with company
Company "A"	5	Permanent employee	Virtual team member	8.5
	8	Permanent employee	Virtual team manager	8
	9	Permanent employee	Virtual team manager	12
Company "B"	48	Fixed-period contract	Virtual team manager	12
	49	Fixed-period contract	Support: Human resources	12
Company "G"	12	Permanent employee	Support: Human resources	11
	13	Permanent employee	Virtual team manager	32
	14	Permanent employee	Virtual team manager	32
	15	Fixed period contract	Virtual team member	25
	52	Permanent employee	Virtual team member	32
Company "I"	25	Permanent employee	Virtual team member	19
	27	Permanent employee	Virtual team member	12
	28	Permanent employee	Virtual team member	30
	32	Permanent employee	Virtual team manager	33
	35	Permanent employee	Support: Human resources	28
	37	Permanent employee	Virtual team member	20
	40	Permanent employee	Virtual team member	20
	43	Permanent employee	Virtual team member	22
Company "K"	30	Permanent employee	Virtual team manager	33

Presentation of participants' responses

Table 7.3 reveals that the majority of participants are permanent employees and virtual team members. Of concern is the three extensive fixed period contracts (*48, 49 and 15*), as South African labour litigation is highly likely to regard these contracts as being permanent, or by nature being independent contractors, should they not utilise company resources to perform their work. Seven of the 19 participants (highlighted in blue) were company-assigned virtual team managers, which gives significant and valuable insight into views on the management of virtual teams. It was noted that all teams had at least one virtual team manager, functioning either alone (*30, 32 and 48*), or with another manager in the same team (*8 and 9; 13 and 14*). Where managers were functioning in tandem, one team (in company "G") had a differentiation of tasks assigned to each.

Three people participated in their role as Human resource practitioners (participants *12, 35 and 49*), which provide insight into the typical HR-related issues which they encounter in virtual teams. Therefore, the perspectives of team members, team managers, and HR support staff are reflected in the responses to this question. These perspectives take account of the views of different roles in virtual teams.

Prolonged periods of employment (between 8 and 33 years) were noted.

Interpretation

The results of the empirical study support that the expertise in virtual teams is not just confined to technical knowledge, as Human resource practitioners also aligned themselves within the team (in companies B, G and I). They suggest a change in traditional hierarchies where HR practitioners are typically silos or departments separate from any technical or operational environment. Further, they imply that in the absence of hierarchical team leaders, the team has sufficient Human resource expertise to overcome HR-related issues (PEOP and PROC). The roles of HR practitioners in virtual teams are unclear, thus suggesting an area for future research.

The results of the empirical study suggest that effective virtual teams in the sample companies are retained using permanent employment records. The topic of trust comes to mind. The nature of the relationship (being permanent) and the relationship period (between 8 and 33 years), suggests a motivational factor for companies to consider the virtual team paradigm. This motivation is consistent with Bellingham (2001:98), who suggests that the

establishment of a cooperative relationship between the employer and employee is more likely to result in opportunities for the employee to work independently in a virtual team.

The composition of the virtual team and team size is striking. The results suggest that it is not so much the size of an effective virtual team, but rather the quality of bonding and engagement between team members through networking, which makes the team more or less effective. Some teams had more than one manager, which indicates either dual, mentoring, or co-management roles. The reason for this phenomenon is not clear and would make an interesting topic for future research.

7.3.3.1 Question: OD3

Overview

This question relates to how virtual team members explain or categorise their jobs.

Presentation of participants' responses

Participants described the greater part of their job as represented as follows:

Table 7.4: Summary of the responses of the participants on the biggest part of their jobs

Total number of participants responding to this question in the questionnaire:		19			
Total number of participants who gave full responses:		17			
Total number of companies presented by the participating respondents:		4			
Type of question:		A menu of pre-drafted choices			
Number of participants selecting the option “ I choose not to participate”:		2			
Missing data (Participants moved on to next question without any response to the question):		2 (28, 35)			
Company	The biggest part of my job is best represented as follows:				
	I deal with the maintenance of systems	I deal with system continuity to ensure that the system's capacity is effectively utilised	I deal with policies and procedures to bring about business change to ensure the company's competitiveness.	I manage people in a team	I provide a human resource support function
Company A- Participant identification	5			8 and 9	
Company B- Participant identification		48			49
Company G- Participant identification		15	13	14 and 52	12
Company I- Participant identification	30	43	25 and 27	32 and 40	35
TOTAL NUMBER OF PARTICIPANTS	2	3	3	6	3

Analysis

Table 7.4 shows that the majority of participants (six) in the study considered the biggest part of their jobs as managing the team, which contradicts the information in the previous table where seven participants indicated that they were hierarchically appointed virtual team managers. The data gives the impression that company "B" does not have a manager. The HR support function participants remained the same (three). Four participants (8, 9, 14 and 32) retained their opinion that they manage a team, while other participants came to the fore claiming that their role is to “manage a team” (13, 30, 40, 48, and 52). Three hierarchically appointed managers qualified their managerial leadership by citing maintenance (30), business change (13) and HR (48) as the main parts of their jobs. This phenomenon supports the literature, which indicates that leadership (PROC2) may change throughout the tenure of a team. Furthermore, a relative balance but also a notable divide between

maintenance, system continuity, and business change were noted as the biggest parts of the participants' jobs. Participants were able to position their jobs in the greater spectrum of software jobs, which supports the literature on the broad categories in the software sector of the technology industry.

Interpretation

These responses suggest that the members of effective virtual teams were able to align their jobs to the Zachman enterprise architecture framework (Zachman 1987) of which a detailed discussion falls outside the scope of this study. This Zachman tool defines entities, relationships and properties, which allow for the construction of a repository in terms of the perspectives people have on data and the ability to view their complex data environments. The virtual team members were capable of aligning their perspective of their duties into specific categories:

- Company "A" focuses on the routine maintenance of information technology.
- Company "B" ensures that its information technology networks are steady and functional.
- Company "G" does not deal with maintenance but operates on the level that deals with systems, processes and procedures to bring about business change.
- Company "I" deals with the full spectrum of the software sector, but its focus is more on designing systems towards procedures to bring about business change.

Should the majority of teams (virtual or face-to-face) in the same company operate within the same category, it would translate to the business strategy that the company follows (Tipton & Krause 2008:263). Theoretically, for a software client only needing IT maintenance services, it would be ideal to engage with company "A", if the majority of the teams in A only render that service, and preferably not with company "G" if none of the teams deliver a maintenance service. It would be advantageous for a competitive client seeking a more conceptual alignment between business processes to deal with companies "G" or "I", if the majority of teams deal with business change. This implies that software design will attempt to not only harmonise the client's company vertically, but also across functional units (Inmon, Zachman & Geiger 1997). The three main levels deal with the focus of the company. Maintenance functions are perceived to be on a basic level, while business change is perceived to be on a higher level.

Being listed on the JSE, the impact of the design of these companies contributes to the greater business environment and stretches beyond merely writing a software programme. The focus areas of participants in these virtual teams have the potential to transform the design (partial or complete) of how their client's businesses operate and function. This power to influence is significant because they gain insight into, and access, to propriety information regarding the inner workings of their clients, particularly on the business change level. This explains why participants value knowledge, trust, dependability, and maturity within the team. Their responsibilities are not only confined toward their own teams and companies, but the boundary stretches towards their clients as well. This explains their unyielding attitude towards risk management (TECH3), meeting deadlines (OT5), and non-acceptance of incompetence in team members. Their boundaries are truly dispersed, not just physically, but move as far as their services stretch.

7.3.3.2 Questions: OD4 and OD5

Overview

These questions relate to the current positions of virtual team members.

Presentation of participants' responses

Participants described the biggest part of their jobs as best represented by the categories set out as follows:

Table 7.5: Summary of the responses of the participants on job title categorisation

Total number of participants responding to this question in the questionnaire:		19	
Total number of participants who gave full responses:		17	
Total number of companies presented by the participating respondents:		4	
Type of question:		This was a menu question.	
Missing data (Participants moved on to next question without any response to the question):		2 (13, 52)	
	My job title in the company is:		
	Team member	Team manager	Support function
TOTAL	8	6	3

Analysis

A contradiction was noted between questions OD4 and OD3. In question OD4, more participants participated in the question and an additional manager was noted. The balance between members and managers in the teams is apparent. As the previous question related to their official job title and this question to their actual role, it is apparent that one of the members was also assuming the team facilitation role during the time this questionnaire was completed.

Interpretation

The question of Volchok (2010:5-9) regarding how a team should be structured within a technologically-mediated, asynchronous working environment, could be answered by indicating that a team consisting of a manager and small numbers of team members, constitutes an effective virtual team. Further, the quality of networking (B5 and PUR1) between virtual team members rather than the span width of authority is of greater significance than in face-to-face teams (OD3), which could be attributed to knowledge and expert levels (OT3) in the team as well as independent working (PUR4_1).

Non-technical members such as HR practitioners form a natural part of the team as 'experts' are needed for effective functioning.

7.3.3.3 Question: OD7

Overview

This question relates to the number of years a virtual team member has worked for the company.

Total number of participants responding to this questionnaire:	19
Total number of participants who gave full responses:	19
Total number of companies presented by the participating respondents:	5
Type of question	This was a menu question.

All 19 participants representing five companies gave full responses regarding tenure. This question was utilised to establish reliability of responses of participants with question B7.

The responses between the two questions were found to be reliable (trustworthy) and similar.

Presentation of participants' responses

Tenure of participants (in years) is represented in figure 6.2 as follows:



Figure 7.1: Employment periods of participants

Analysis

The average norm of the duration of employment is 17.6 months (Caliendo, Künn & Uhendorff 2013). The responses of participants in the empirical study suggest that the average duration for effective virtual teams is longer and could be interpreted as a contribution to the study. Relatively long periods of service with the particular employer, ranging from eight to 32 years, with the average number of years being 18 years. The graph above supports longer tenure, suggesting that the average norm in JSE-listed companies in the software sector of the South African technology industry may be much higher than the norm, and even outshine the norm for generation X.

Interpretation

The virtual team organisational design provides a viable avenue for organisations to retain talented employees which results in relatively long tenure for the members of these teams

(Bergiel *et al* 2008; Farmer 2008:125; Kepes & Delery 2007:385). Extensive periods of employment for virtual team members associate well with the findings of Lee-Kelly and Sankey (2007:51-62), that permanent virtual teams are increasingly used to perform long-term work or renewal projects. This question was also utilised to verify internal consistency of participants' responses and supported the extensive virtual team membership as contained in question B7. From the responses of participants it was determined that the majority of participants were of generation X, born between 1965 and 1981 (Bova & Kroth 2001). The norm for generation X is to stay in a job for approximately 3.5 years (in Masibigiri & Nienaber 2011).

7.3.4 Question: OD8

Overview

This question addresses remuneration determination in virtual teams.

Presentation of participants' responses

The responses of the participants are summarised as follows:

Table 7.6: Summary of the responses of the participants on remuneration structuring

Total number of participants responding to this question in the questionnaire:					15				
Total number of participants who gave full responses:					15				
Total number of companies presented by the participating respondents:					4				
Type of question:					This was an open question.				
Missing data (Participants moved on to next question without any response to the question):					4 (5, 14, 30, 48, 49)				
Company	Describe how your income is determined								
	Basic pay, benefit, bonus	Cost-to-company, discretionary bonus	Total cost to company. All inclusive of basic pay. All allowances like car, etc. ;plus telephone allowance	Basic is not market-related and commission is a variable	Basic salary	Basic pay and benefit	Basic pay and car allowance	Cost to company	
Company "A"	8			9					
Company "G"	12, 13, 15	52							
Company "I"				25, 27, 32 and 43	28	35	40		

Analysis

All participants received what they termed as basic pay or cost-to-company remuneration. The wording chosen to describe remuneration was distinctive for each company (e.g. participants in company "G" replied as "cost-to-company" and company "I" as "basic"). One respondent had a dual system of a basic pay plus commission (9). Unique company-specific remuneration practices were noted in the language used to describe remuneration practices: basic pay ("G") as opposed to cost-to-company ("I"). Both companies ("G" and "I") shared the practice of adding a structured benefit as part of the conditions of services as reflected in their income description. These benefits were described differently by members of different companies such as either a "benefit" ("A" and "G") or an "allowance" ("I"). Two participants indicated allowances, such as car and telephone allowances, as part of their income structure (52 and 28). It is noted that one fixed-period participant (15) received similar remuneration treatment to permanent staff, despite the nature of the employment contract in the same company ("G"). Except for participant 28, all the other participants received

benefits attached to basic pay. No differentiation between ordinary virtual team members and virtual team members fulfilling the role of managers (such as 9, 32 and 40) could be distinguished. It was noted that the participants who indicated in question OD3 that they were responsible for maintenance of systems (5 and 30), did not participate in this question. One company ("I") had a differentiated remuneration system which allows for a commission structure, and a basic pay or cost-to-company remuneration structure.

Interpretation

To understand the responses of the participants to the question about remuneration, it is necessary to have a broader understanding of remuneration practices in South Africa. Although South Africa is perceived to be moving increasingly to a centralised definition of remuneration, four main sources still inform remuneration practices in South Africa: Labour Relations Act 66 of 1995 on “benefits” in s186(2)(a) (LRA); Basic Conditions of Employment 75 of 1997: the schedule to section 35(5) published 23 May 2003 (BCOE); the Income Tax Act 58 of 1962 of which the schedules are reviewed on an annual basis (ITA); and current labour litigation such as the Labour Appeal Court (LAC).

Remuneration is an umbrella term used to describe a reward for or income earned by virtue of employment or services rendered. Remuneration can be in the form of, *inter alia*, pay, salaries or wages, including allowances, benefits (such as a company car, medical plan, or pension plan), bonuses and cash incentives.

In general, benefits are referred to as indirect and non-cash compensation paid to an employee. Some deductions from salaries cannot be regarded as benefits because they are mandated by law and are; therefore, an obligation rather than a benefit (such as income tax and contributions to the unemployment insurance fund), while others vary from company to company, or industry to industry (such as health insurance, life insurance, medical plan, paid vacation leave, pension, and gratuity), and therefore have a cost element. The essence of remuneration structuring (also known as salary structuring) is configuring an employee's remuneration optimally for both the employer and employee. The primary objective is to achieve an optimal employee cost for the employer and to ensure that the employee's remuneration is provided on a tax-efficient basis. By referring only to tax savings, certain tax anti-avoidance provisions may be triggered. Achieving this objective involves two components; namely the tax treatment of various types of remuneration by the South African Revenue Service (SARS) in terms of the Act, and the basis of remuneration formulated by the employer. In summary, remuneration refers to the structuring of a remuneration package

around a mix of taxable benefits and allowances, and the employer could be a sole proprietor to contributions with optimal tax outcomes.

A “benefit” is generally understood to be something employees enjoy as a result of their association with their employers. The proper approach is to interpret the term “benefit” to include a benefit to which the employee is entitled (by contract or by practice), as well as an advantage or privilege which the employee has been offered or granted in terms of a policy or practice subject to the employer's discretion (Grogan, Jordaan & Maserumule 2013:18). Although intended to regulate the taxation of (*fringe*) benefits provided by employers to employees, the specific valuation rules, including some exemptions, afford employers the opportunity to provide certain employment-related benefits at no tax cost to employees. Based on the initial rules, employers filled remuneration packages with an assortment of benefits, such as residential accommodation, use of company cars, annual long-service awards, club subscriptions, cell phones, internet, and electronic services. However, over the last number of years, the applicable provisions have been amended to such an extent that only a limited number of planning opportunities remain.

An “allowance” is paid to assist employees to perform their work. It is regarded as a remuneration-structuring tool available to employers, which is subject to the position of the employee and business requirements. Reimbursed allowances and subsistence allowances (up to certain limits) are “tax-free” (such as a travel allowance), and are subtracted from an income to arrive at taxable income. Allowances consisting of an amount paid to employees as part of their salary package, or to defray their out-of-pocket expenses incurred on behalf of the company, or an amount deducted from an invoice as an incentive for a large order, are not regarded as allowances, but rather as bonuses or commission. The majority of allowances are taxable, but certain exemptions are made, such as the provision of uniforms. Today, many companies in South Africa have moved to the total cost package methodology to replace scattered benefits and allowances in their salary bills.

The type of “benefits” and “allowances”, are viewed by the researcher as *taxable benefits* as the participants did not indicate that vehicles were company pool cars or communication devices provided by the employer, which would typically be associated with “allowances”. The researcher; therefore, concluded that the majority of participants (12) received remuneration which is complemented with taxable benefits and the remaining two participants received a basic cost-to-company remuneration package of which the content is undetermined.

Despite the narrowing theme of remuneration practices as described above, a refreshing twist was noted in the fluid and flexible nature of remuneration in company "I". Although it could involve a heavy administrative burden, the flexible nature of remuneration practices in this company is viewed by the researcher as bold and progressive and may be regarded as a baton for future remuneration practices in effective virtual teams. However, it is noted that some of the participants in company "I" indicated in OD9 that they belong to a trade union, signifying that they feel the need for third-party representation.

7.3.5 Question: OD9

Overview

This question addresses trade union membership in virtual teams.

Presentation of participants' responses

The responses of the participants are summarised as follows:

Table 7.7: Summary of the responses of the participants regarding trade union membership

Total number of participants responding to this question in the questionnaire:				15
Total number of participants who gave full responses:				12
Total number of companies presented by the participating respondents:				5
Type of question:				A menu of pre-drafted choices.
Missing data (Participants moved on to next question without any response to the question):				2 (5,52)
Company and team data	Company information	(390)	Are you currently a paid-up trade union member?	OD9
Companies A, B, G, I, and K			No (8, 9, 12, 13, 14, 15, 25, 27, 28, 30, 32, 35)	12
Company I			Yes (37, 40 and 43)	3

Analysis

Three participants (37, 40 and 43) indicated trade union membership in the technology industry. These trade union members were virtual team members with permanent employment status in the same company ("I") and extensive employment histories (two decades or more). Among them was one manager (40). Neither the need to belong to a

trade union or the name(s) of the trade union to which they belonged was noted by the participants. It is of concern that a manager with many years of service and the proportional union representation of one sample in a company are unionised to such an extent. The differential structuring of remuneration between the participants may be a reason for the need to belong to a trade union.

Interpretation

The technology industry in South Africa does not have a specific registered bargaining council and labour issues are not propagated, given the competitiveness status of South Africa regarding fixed wages (position 144), recruitment and termination practices (147) (WorldBank, 2013). This implies that decentralised bargaining on specific conditions of employment takes place at the company level and might differ from company to company in the industry or, as this study indicates, even within the same company.

People have different reasons for belonging to a union (Bendix 2010:168-171). The reason(s) that participants might belong to a trade union are unclear and speculative. However, their choice to express their constitutional right (s 25) of freedom of association by means of membership in a trade union is noted with interest. It signifies the interest of a minority of employees to belong and to address feelings of isolation. It also signifies a need for a third party to represent their interests in their physical absence (being virtual). This membership signifies to employer's dedicated and continued action to reinforce meaningful engagement, collaboration and communication in virtual teams.

From the previous question (remuneration practices), it could be established that no benefits are specifically included in addition to their basic salary packages. For employees with such extensive years of service, trade union membership could signify an area of unhappiness with their company's remuneration practices. Alternatively, one could argue that a cost-to-company remuneration system allows employees the freedom of choice how they prefer to allocate their benefits.

The significance of union membership in virtual teams suggests that unions continue to play a significant role in organisations despite changes to organisational design.

7.4 FINDINGS REGARDING THE TEAMS WHICH PARTICIPATED IN THE STUDY (GROUP CODE 390):

7.4.1 Orientation to team information

The 11 questions contained under this item, explored the team setting in effective virtual teams as noted by virtual team members.

Table 7.8: Summary of the responses of the participants regarding virtual team information (code 390)

Question group	Element	Group code	Question code
Company and team data	Team information	(390)	
Questions			
Have you ever participated in a face-to-face team?			OT1
The company in which you are involved selected your team as representative of a "virtual team". What makes the way that you currently work, unique in comparison to traditional face-to-face teams?			OT2
What is the best aspect(s) of working in your current team?			OT3
What is the greatest advantage, for you as an individual, of working in a virtual team?			OT4
How would you know that your team is functioning effectively?			OT5-9

7.4.1.1 Question: OT1

Overview

This question addresses whether the participant has ever participated in a face-to-face team.

Presentation of participants' responses

The responses of the participants are summarised as follows:

Table 7.9: Summary of the responses of the participants regarding participation in face-to-face teams

Total number of participants responding to this question in the questionnaire:	19
Total number of participants who gave full responses:	17
Total number of companies presented by the participating respondents:	5
Type of question	Menu of pre-drafted choices.
Missing data (Participants without any response to the question):	2(5, 52)

Presentation of participants' responses

Only four of the participants had never worked in a traditional face-to-face team (12, 35, 48 and 49).

Analysis

The participants who had never worked in a traditional team (12, 35, 48 and 49) provided an HR support function to virtual teams. These support workers had more than a decade of service at their IT companies (11, 12 and 28 years). In the absence of a face-to-face experience, the ability of these members to understand and influence HR practices for their IT counterparts is signalled through the HR policies and practices they design. Thirteen participants had experience in both the virtual and face-to-face environments. The participants were; therefore, able to compare and share their experiences with regard to the two types of teams, which put them in a position to judge the differences between the two types of organisational designs.

Interpretation

The technology industry is a relatively young organisational design, and the virtual team even more recent. (Miles & Snow 1986:62-73; Nemiro *et al* 2008:1-50; Schultze 2012:108-109). With the participants in the study having an average of 18 years' experience, it is highly likely that the majority participated in the dawn of the technology industry in South Africa and lived through its teething years. In the absence of virtual working in the formative years of the technology industry, the only way of working was face-to-face. However, as technology progressed, a generation emerged who had never worked face-to-face (such as those with only a few years' experience). It is predicted that as time progresses, increasingly

more people will not be able to differentiate between working face-to-face and virtually, simply because virtual working could become a norm in the industry.

The bearing of this question proposes that leadership in organisations should take note that some members (in this empirical study, a significant number of members) are accustomed to both the traditional and virtual teams. Those members who have worked in both types of teams are; therefore, in a position to judge and compare the obvious advantages and disadvantages of working in either type of team. This further suggests that members' negative experiences from face-to-face teams could be overcome with a different leadership style in virtual teams.

7.4.1.2 Question: OT2

Overview

This question required that participants identify and compare unique virtual working to traditional face-to-face teams.

Presentation of participants' responses

The responses of the participants are summarised as follows:

Total number of participants responding to this question in the questionnaire:	19
Total number of participants who gave full responses:	12
Total number of companies presented by the participating respondents:	4
Type of question	This was an open question.
Missing data (Participants moved on to next question without any response to the question):	7 (5,8,9,40, 48, 49 and 52)

Table 7.10: Summary of the responses of the participants indicating what makes the way that they currently work unique in comparison to traditional face-to-face teams?

Participant	Response of participant	Context units	Axial code
12	Collaboration and communication is varied over multi-media and traditional meetings, and guidance is given, not by a single individual, but rather by various team members, depending on their subject-matter expertise.	Technology; knowledge; leadership; collaboration	<ul style="list-style-type: none"> • Technology (12, 13, 32) • Workspace (25, 37, 43) • Self-managed performance (14, 27, 28, 35) • Knowledge leadership (12, 15, 27) • Collaboration (12 and 27) • Contract (30)
13	Make use of technologies such as UCS, Live Meeting.	Technology	
14	Freedom to get work done when it's best suited. That could be 20:00 at night. Also, staying home provides for more productivity as there is no traffic to fight! Each team member knows what his/her responsibilities are and stick to that.	Self-managed performance	
15	Working as a virtual team allows you to gather more skilled resources from other areas of the business for the delivery of your services.	Knowledge;	
25	No geographical boundaries	Workspace	
27	Each one of us specialises in our own area, overlapping in certain instances. Each member can drive towards the deliverable without having to have a physical face-to-face team assisting.	Knowledge; leadership; collaboration; self-managed performance; goal	
28	Remains energys[z]ed and focused in the face of ambiguity, change or strenuous demands	Self-managed performance	
30	Contractual requirements of system maintenance and different functional roles determine face-to-face teams.	Contract	
32	New technology implementations [require] face-to-face engagement.	Technology	
35	It takes a lot of discipline to make sure that you adhere to working hours.	Self-managed performance	
37	We work off-site in a face-to-face office environment.	Workspace	
43	I don't think we are a virtual team - we sit on the client's site and [communicate] face-to-face with the client and all other team members.	Workspace	

Analysis

Five unique traits, which are distinctive to virtual teams in comparison to face-to-face teams, were emphasised by the participants: Knowledge leadership (12, 15 and 27); self-managed performance (14, 27, 28 and 35); technology (12, 13 and 23); workspace (25, 37 and 43); and collaboration (12 and 27). Collaboration challenges in virtual teams correspond with the findings of Lin *et al* (2008:1031-1045). The shortest sentence provided by the participants who did respond was three words. No spelling mistakes or grammatical deficiencies were noted.

Two specific perceptions noted by participants have a bearing on conditions for leadership in a virtual team (See PROC2):

- Variability of leadership, which in turn is based on subject matter proficiency (knowledge) (12, 15 and 27). This notion supports and explains a previous question (OD3) where virtual team managers, although appointed as hierarchical team leaders, regarded themselves as mere team members. Therefore, it could be expected that at the stage where specific hierarchical team leaders were required to complete the questionnaire, they did not regard themselves as the leader because of a lack of subject matter proficiency. At this stage, a virtual team member assumed the role of team leader, based on subject matter proficiency.
- Self-managed team performance as opposed to a leaderless team was noted (14, 27, 28 and 35).

Further, unique workspace alignment due to the influence of technology, brands the virtual team unique in comparison to face-to-face teams.

Interpretation

This exploratory study supports the unique differentiation between virtual and face-to-face teams and renders specific indicators of how a team member would differentiate between these. It supports the theory that in an effective virtual team:

- Collaboration and communication are varied over multi-media (Bergiel *et al* 2008:99-110; Lipnack & Stamps 1993:1-40; 1994:1-264; 1997:1-11; Piccoli *et al* 2004:359-379) (see technology (12, 13 and 23)).
- There are no geographical boundaries (Lojesky & Reily 2008) (see workspace (25, 37 and 43)).

- There is subject-matter expertise (Chudoba *et al* 2005; Lee-Kelly & Sankey 2008) (see knowledge leadership (12 and 27)).

The literature suggests that the following are traits that are normally regarded as part of the package of unique traits of virtual teams:

- The drive towards the deliverable (Cohen & Bailey 1997:239–290) (only one participant supported this (27))
- A small team size—fewer than 15 team members (Ebrahim *et al* 2009a:1575–1590). Although the ideal virtual team size is supported in this empirical study (PUR2), the respondents did not view this as a unique characteristic of a virtual team but rather valued the quality of their extended network as more important (PUR1). Furthermore, the participants viewed self-managed performance as more unique than goal focus and team size as none of respondents indicated an organisational goal to pursue.

This study clarifies subject matter expertise by knowledge leadership (OT3) and independence as self-managed performance as being the main unique traits of virtual teams. It further presents workspace via technology as a distinctive trait of virtual teams.

7.4.1.3 Question: OT3

Overview

The question was: “What is/are the best aspect/s of working in your current team?”

Total number of participants responding to this question in the questionnaire:	19
Total number of participants who gave full responses:	15
Total number of companies presented by the participating respondents:	4
Type of question	This was an open question.
Missing data (Participants moved on to next question without any response to the question):	4 (8, 49, 49, 52)

Presentation of participants’ responses

The responses of the participants are summarised as follows:

Table 7.11: Summary of the responses of the participants regarding evaluation of the best reason to join a virtual team

Participant	Response of participant	Context units	Axial code
5	The best aspect is learning from the other members of the team.	Expert knowledge	<ul style="list-style-type: none"> • Team cohesiveness (27, 14, 32, 35, 37, 40) • Expert knowledge (5, 12, 25, 32, 40) • Time arrangement (12, 13, 15, 40 and 43) • Trust in individual's opinion (27, 28) • Processes defined (30)
9	n/a do not work in a virtual team	Not working virtually	
12	Getting to know each person's capabilities and expertise on an immediate level	Expert knowledge; time arrangement	
13	Fast response	Time arrangement	
14	Freedom to get work done when it's best suited. That could be 20:00 at night. Also, staying home provides for more productivity as there is no traffic to fight! Each team member knows what his/her responsibilities are and stick to that.	Time arrangement	
15	My team is a dynamic and fast moving team, that can deliver many types of services	Team cohesiveness; expert knowledge	
25	Skill set	Expert knowledge	
27	Every member is treated equal[ly] and can be trusted when using his [/her] own judgment in the particular situation.	Team cohesiveness; trust in individual's opinion	
28	I can [take] initiative to make things happen.	Trust in individual's opinion	
30	Defined processes requiring functional roles in team	Processes defined	
32	[s]Synergy and [skillset]skill set combination	Team cohesiveness; expert knowledge	

35	We are a group of [like-minded] people.	Team cohesiveness	
37	I have been working with them for 10 years and Therefore know them well.	Team cohesiveness	
40	Problems can be solved (immediately) without waiting for somebody to first look at their mails which would be the case in a face-to-face team. Problems can be discussed with a team of experts, whereas one tends to get an answer from only one member in a virtual team or only one or two people responds to questions in a virtual team.	Time arrangement; team cohesiveness; Expert knowledge. *Area of concern in virtual team highlighted.	
43	All team members are available	Time arrangement	

Analysis

Four best aspect(s) of working in the current virtual team were noted by participants: team cohesiveness (27, 14, 32, 35, 37 and 40); expert knowledge (12, 25, 32 and 40); time arrangement (12, 13, 15, 40 and 43); and trust (PROC6) in individual opinions (27 and 28). However, these aspects work in synergy and not separately, to create an effective virtual team. It was expected that individual uniqueness would be valued more than team cohesiveness, due to the independent orientation of team members. However, it seems as if team cohesiveness is important to virtual team members.

Interpretation

The best aspect of working in the current team (being a virtual team) was clarified by the responses of the participants in this empirical study. It is evident from the participants' responses that prominence is given to an interconnected, organised, and unified team, which is constructed using a distinctive expertise set. The people in this team place a high value on time management and respect for each other's expert opinions. Members share a similar time orientation (fast and immediate). They share harmony, synergy, and trust. One area of concern was mentioned: *"Problems can be discussed with a team of experts whereas one tends to get [an] answer from only one member in a virtual team or only one or two people respond to questions in the virtual team"*. The researcher interpreted the response of participant (40), in that virtual teams have more than one expert who can be approached, and depending on the nature of the enquiry, not all members will respond, although the enquiring party will obtain a response. The benefits of working virtually as opposed to face-to-face have also been noted in the literature (Bergiel *et al* 2008:99-110; Edwards & Wilson 2004:15-17).

7.4.1.4 Question: OT4

Overview

The open question required participants to respond to: What is the greatest advantage for you as individual, of working in a virtual team?

Total number of participants responding to this question in the questionnaire:	19
Total number of participants who gave full responses:	13
Total number of companies presented by the participating respondents:	4
Type of question	This was an open question
Missing data (Participants moved on to next question without any response to the question):	7 (5, 8, 9, 47, 48, 52)

Although participant (9) responded, it was to alert the researcher that the participant does not believe the team is a virtual team anymore.

Presentation of participants' responses

The responses of the participants are summarised as follows:

Table 7.12: Summary of the responses regarding the greatest advantages for the individual participant, of working in virtual teams

Participant	Response of participant	Context units	Axial code
12	I gain experience and knowledge from peers.	Access to knowledge	<ul style="list-style-type: none"> • Access to knowledge (12, 13 and 30) • Individual professionalism (14, 27, 28, 32) • Personal well-being (35 and 37)
13	Easy access to intellectual property	Access to knowledge	
14	free from office politics concentrate on work to be done	Individual professionalism	
15	There is an abundance of knowledge from many different technology areas	Access to knowledge	
25	(Not) be[ing] location bound	Open location	
27	Trust	Individual professionalism	
28	I can [demonstrate] professional / technical expertise in my role.	Individual professionalism	
30	exposure to various technologies and contracts	Access to knowledge	
32	[Focus] leading to quality	Individual professionalism	
35	I have a serious illness and this allows me [flexibility].	Personal well-being; Location	
37	Not applicable	n/a	
40	The advantage would be that you could structure your time effectively	Time management	
43	We are not a virtual team.	n/a	

Analysis

The opportunity for participants to display and grow their own competency (14, 27, 28, 32) within the space of an environment which supports knowledge creation (12, 13 and 30), supports the empirical theory presented by Martynov and Zhao (2010:223-240), that self-actualisation can be achieved by members of virtual teams (such as the participants in this empirical study), regardless of their position in the team or personal challenges (35 and 40). They do not; however, only perceive personal progression for themselves as being important, but also respect progression in their co-team members (12 and 32). The three biggest advantages for the individual participant, of working in a virtual team, were noted by the participants as:

- Individual professionalism (27, 28 and 32)
- personal well-being (35 and 37)
- access to knowledge (12 and 13)

Interpretation

Although physical benefits (such as the reduction of transport and travelling costs) are hailed in the literature as the main reasons for working virtually, none of the participants described the obvious

benefits (Chapters 3 and 4; Leung, 2010). Instead, and in concordance with their generational characteristics (question B5), the participants suggested a personal alignment with the company paradigm, indicating personal well-being, the freedom to apply their expertise, and access to knowledge as the main benefits (OT3). The researcher interpreted this response as a precursor to a shift from the obvious physical benefits of working virtually, to a more personal association of working (PUR1) within the company paradigm, an indication of the start of a new social order; namely employees who are able to, and qualified, to work with technology, and those who are not. This shift is specifically taking place in the software sector of the South African technology industry, which is more exposed to global trends due to companies being connected to global software companies in the technology industry. South African IT companies will soon need to balance current traditional Human resource practices against global practices, which might influence their competitiveness.

7.4.1.5 Questions: OT5-9

Overview

These open questions required participants to respond to: “How would you know that your team is functioning effectively?”

Total number of participants responding to this question in the questionnaire:	19
Total number of participants who gave full responses:	13
Total number of companies presented by the participating respondents:	4
Type of question	This was an open question.
Missing data (Participants moved on to next question without any response to the question):	5 (5, 8, 47, 48, 52)

Although participant (9) responded, it was to alert the researcher that the participant does not believe the team is a virtual team anymore.

Findings: Presentation of participants' responses

The responses of the participants are summarised as follows:

Table 7.13: Summary of the responses of the participants on how the individual virtual team member would know whether the virtual team is functioning effectively

Participant	Response of participant	Context units	Axial code
5	Progress statistics on monthly reports	Achieve results	<ul style="list-style-type: none"> Objectives materialise <ul style="list-style-type: none"> Explicit (5, 32 and 40) Innovation (12 and 13) Excellence (12 and 32) Revenue (13, 27 and 32) Real change (25 and 32) Accomplished (5, 30, 40, 43) Effort (25, 27, 43) Continuous measurement (25, 35 and 37) Inclusion of subjective input (28, 37) Individual contribution (27 and 37) Team contribution (25, 28, 35, 37)
12	Milestone accomplishments are met.	Targets meet innovative achievement	
13	Quality of output	Excellence yield	
25	We get the results	Achieve results	
27	Financial targets are [being] met meaning each member is delivering his/her part.	Financial targets met; Meet targets; Contribution of individual members	
28	We are open to other people's opinions and ideas.	[Openness] to other [people's] opinions	
30	Output based	Specific output;	
32	[Specific output] leading to workable solutions	Specific output; Effective results	
35	We have SLAs and UAT[s] that determine if we are on track.	Continuous performance measurement	
37	I see them [every day] and Therefore get on-the-job feedback	Continuous performance measurement	
40	When work gets done on time and correct[ly].	Completed work; Time lines met; Meets target	
43	Work gets done	Completed work	

Analysis

The vocabulary utilised to describe how participants would know if the team is functioning effectively, supports their general view of excellence as opposed to mediocrity: words such as "innovation" (12 and 13), "real change" (25 and 32), "excellence" (12 and 32) and "accomplishment" (5, 30, 40, 43), suggest a higher level of expectation of effectiveness to which participants subscribe. Effectiveness is also not reached through vague measurements but by actual, explicit (32 and 40) and revenue (13 and 27) indicators. Continuous effort (25, 27 and 43) and measurement (25, 35 and 37) ensure that objectives materialise. However, for the measurement of effectiveness, specific mention was made of the inclusion of subjective input (28, 37).

Interpretation

Effective virtual teaming relates to the extent to which human beings collaborate to ensure a sustainable and growing business function. Segal-Horn and Dean (2009:41-50, adapted by this researcher) suggest a flexible, multi-dimensional approach to encourage greater flexibility and constant learning in contributing towards a company's competitive edge and sustainability. This empirical study clarifies the essential elements by which team members would know whether the team is effective. These include qualified, technologically skilled and knowledgeable team members, which support the findings of Agrawal *et al* (2011:20-36). Further, actual and explicit measurements, inclusive of financial measurements (financial targets are being met meaning each member is delivering his part), a dislike of mediocrity (quality of output), and an impetus towards innovation, real change and excellence in accomplishment suggest a higher level of expectation of effectiveness to which participants subscribe. It is significant that although individuals contribute through their efforts, the whole team's performance carries greater value. Subjective input suggests an acceptance of logical contributions to enhance the end-result. The regular use of "we" (25, 28, 35 and 37) supports the notion that virtual team effectiveness embraces team effort where each individual effort contributes towards the greater yield (27 and 37).

7.5 FINDINGS REGARDING THE INDIVIDUALS WHO PARTICIPATED IN THE STUDY (GROUP CODE 389)

7.5.1 Orientation to group code

The purpose of information regarding the individual voice of participants in this study is to facilitate a better understanding of virtual team members' voice on the teams themselves. This is achieved by contextualising the individual virtual team member profiles through their responses to 12 questions.

Table 7.14: Summary of the of questions regarding biographical data (code 389)

Question group	Element	Group code	Question code
Biographical data	Individuals	(389)	
Questions			
Gender			B1
Nationality			B2
Population group			B3
Home language			B4
Age			B5
Highest qualification			B6
Work experience in years:			B7
Is there any comment you would like to make which you believe was overlooked or not questioned in sufficient detail, which could enhance insight into best practices in effective virtual teams?			C1
I would like to read the collective report on the findings of the response to this question, in the following media (journal or newspaper):			C2
If you have opted not to answer some of the questions in this questionnaire, would you like to go back to the beginning and complete these?			C3
You have chosen to reconsider your responses to some questions. Please return to the relevant questions by clicking on the "previous button" on the bottom of this page.			C4
Should the researcher need to clarify some of my individual comments, I give permission for the researcher to contact me at the following email address:			C5

Information requested (questions B1-B7) was based on the Census 2011 questionnaire of Statistics South Africa (www.statssa.gov.za: 2013).

Questions relating to biographical data were moved to the end of the questionnaire to counteract questionnaire fatigue and allow for the more important thematic exploration of the study. Information for the participants who declared their data is as follows:

7.5.2 Question: Gender (B1)

Overview

Total number of participants responding to this questionnaire:	19
Total number of participants who gave full responses:	11
Total number of companies presented by the participating respondents:	3
Type of question	This was a menu question.
Missing data (Participants moved on to next question without any response to the question):	8 (5, 8, 14, 15, 30, 47, 48, 52)

Presentation of participants' responses

The responses of the participants are summarised in figure 7.2 as follows:

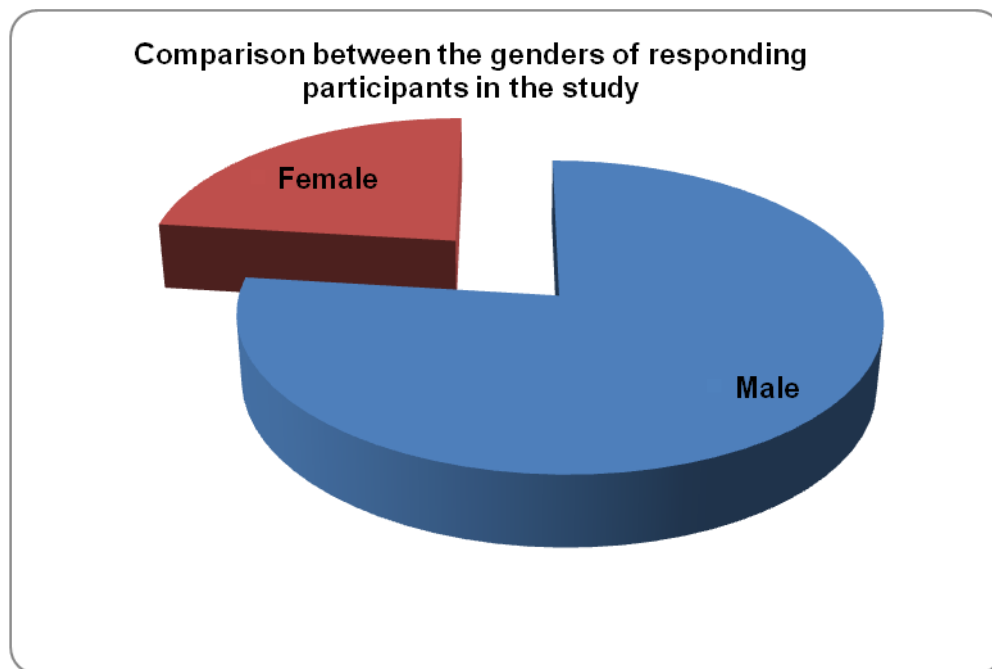


Figure 7.2: Gender of the responding participants

Analysis

The majority of the participants were male (eight) compared to two females (37 and 43). Participant 37 was a white, English-speaking permanent employee working as a business analyst and involved in business change. Participant 43 was forty-four years old permanent employee working in system continuity. Although the participant 43 is German-speaking, the participant is a South African citizen. The participant completed the questionnaire in full.

Interpretation

More males than females chose to respond to this question. One needs to bear in mind that the assigned company HR representatives selected the virtual team of their choice to participate in this empirical study. Not all the participants responded to this question, making a declaration that more males than females participate in virtual teams deceptive. Reasons could not be established but from the STATS Census 2011 report, it should be noted that more males than females work in technical positions in South Africa (STATSSA 2011).

7.5.3 Question: Nationality (B2)

Overview

The purpose of the response to this question was to establish whether virtual teams in the software sector of the South African technology industry have managed to attract international talent.

Total number of participants responding to this questionnaire:	19
Total number of participants who gave full responses:	12
Total number of companies presented by the participating respondents:	4
Type of question	This was a menu question.
Missing data (Participants moved on to next question without any response to the question):	8 (5, 8, 9, 15, 30, 47, 48, 52)

Presentation of participants' responses

All of the participants responding to this question were South African citizens.

Analysis

Although a foreign language (German) was noted (B4), all foreign team members who participated in this study are South African citizens.

Interpretation

Since not all the participants responded to the question, it could not be concluded that all formal virtual teams are confined to the South African borders. A number of reasons come to mind and suggest further investigation: These include the impact of international investment in the local IT

market, which are still vague and unregulated, tax implications for working across borders, and the protection of scarce talent resources in a highly competitive and vulnerable industry (Chapter 1).

7.5.4 Question: Population group (B3)

Overview

This question provided a list of the official population groups as acknowledged in South Africa and verified by Statistics South Africa (STATSSA, 2013).

Total number of participants responding to this questionnaire:	19
Total number of participants who gave full responses:	12
Total number of companies presented by the participating respondents:	4
Type of question	This was a menu question.
Missing data (Participants moved on to next question without any response to the question):	7 (8, 9, 15, 30, 47, 48, 52)

Presentation of participants' responses:

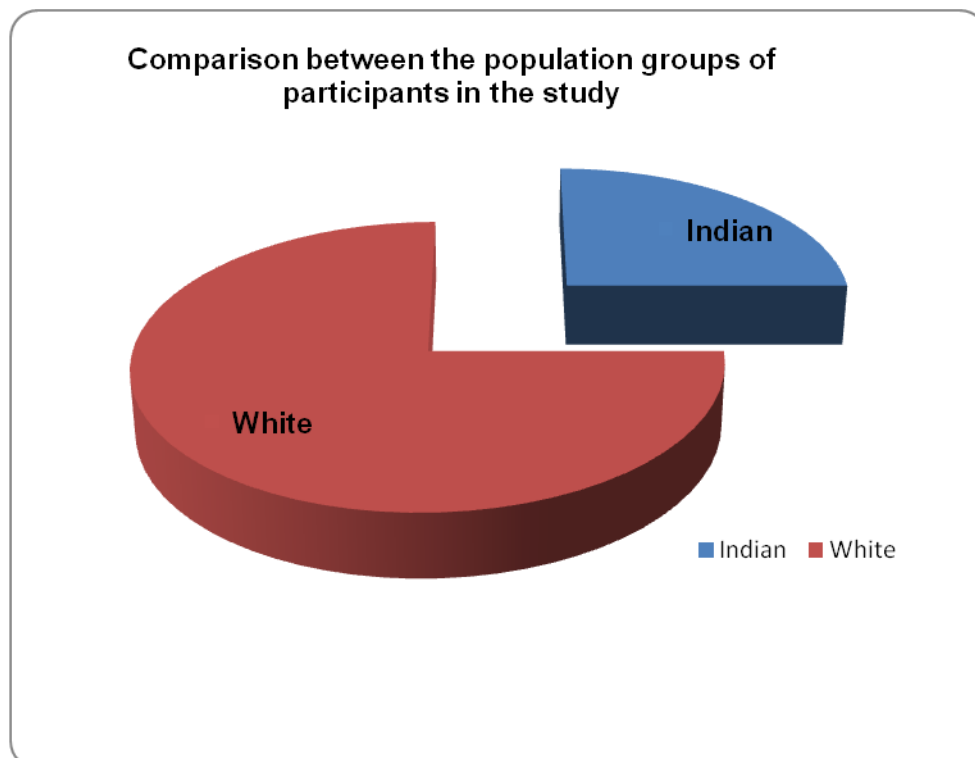


Figure 7.3: Comparison between the population groups of the responding participants

Analysis

Since not all 19 participants responded to the question, it could not be concluded that the majority of population groups represented in formal virtual teams are White. One needs to bear in mind that the assigned company HR representatives selected the virtual team of their choice to participate in this empirical study.

Interpretation

Since not all the participants responded to the question, it could not be concluded that members in formal virtual teams are either White or Indian. A number of reasons come to mind and suggest further investigation. These include an investigation into the pre-requisites for tertiary education and the biographic information of ICT students.

7.5.5 Question: Home language (B4)

Overview

This question relates to the home language of participants.

Total number of participants responding to this questionnaire:	19
Total number of participants who gave full responses (excluding the participant who opted not to participate):	11
Total number of companies presented by the participating respondents:	4
Type of question	This was a menu question.
Number of participants selecting the option "I choose not to participate":	1
Missing data (Participants moved on to next question without any response to the question):	8 (8, 9, 14, 15, 30, 47, 48, 52)

Presentation of participants' responses

The responses of the participants are shown in figure 7.4 as follows:

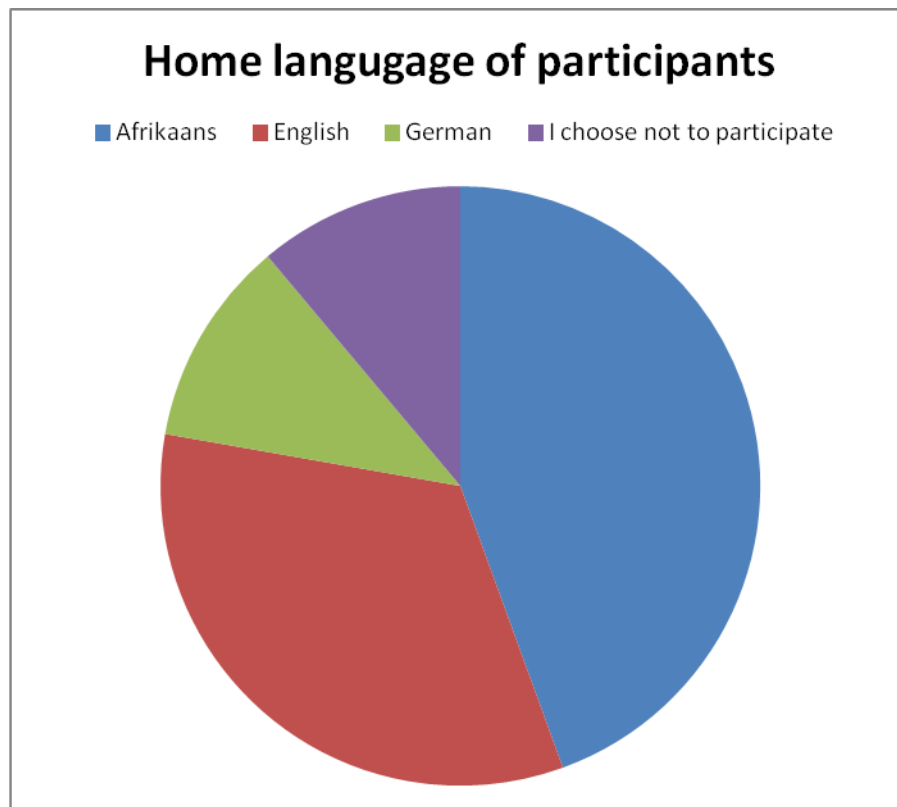


Figure 7.4: Home language of the participants

Analysis

Only one participant would not declare his/her home language group, one participant indicated speaking a non-official language (German), while four participants were English speaking. The majority of the respondents were Afrikaans speaking (five).

Interpretation

It could be concluded that the majority of the responding participants were Afrikaans-speaking. One needs to bear in mind that the company gatekeepers (heads of HR) selected the virtual team of their choice to participate in this empirical study. Not all participants responded to this question, which signifies that the statement that more Afrikaans-speaking people are represented as members of virtual team is deceptive.

7.5.6 Question: Age (B5)

Overview

This question relates to the age of the responding participants.

Total number of participants responding to this question in the questionnaire:	19
Total number of participants who gave full responses:	9
Total number of companies presented by the participating respondents:	3
Type of question	This was a menu question.
Missing data (Participants moved on to next question without any response to the question):	10 (8, 9, 14, 15, 30, 32, 37, 47, 48, 52)

Presentation of participants' responses

The responses of the participants are shown in table 7.14 as follows:

Table 7.15: Summary of the responses of the participants on their age

Participant ID	Year born	Age in 2013	Generation type
5	1981	32	Generation X
27	1980	33	Generation X
12	1976	37	Generation X
25	1973	40	Generation X
43	1969	44	Generation X
40	1966	47	Generation X
28	1964	49	Generation baby boomers
35	1962	51	Generation baby boomers
13	1958	55	Generation baby boomers

Presentation of participants' responses

The responses of the participants are summarised as follows:

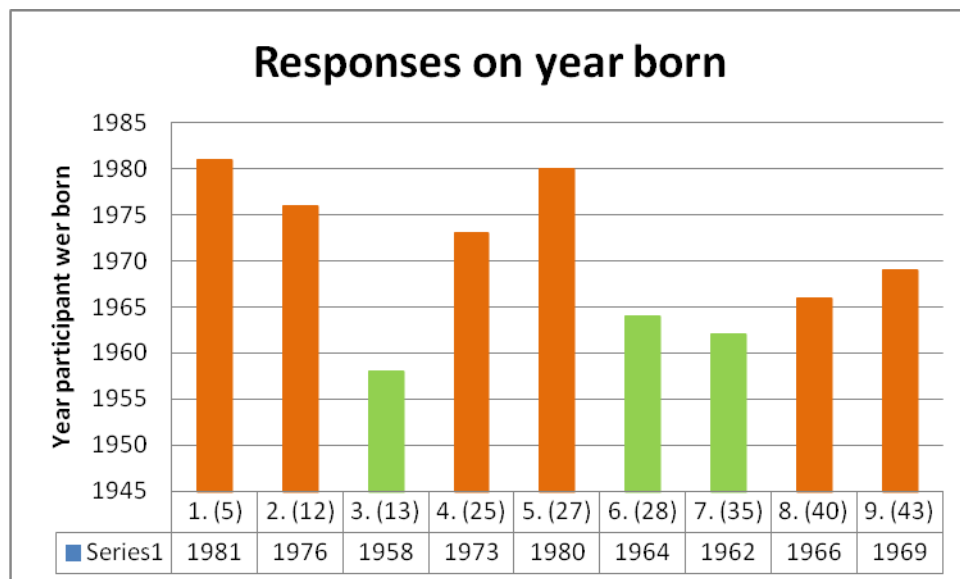


Figure 7.5: Comparison between the age groups of the responding participants

Analysis

The oldest participant was fifty-five years of age and the youngest thirty-two. Two distinct age groups of participants were observed: those between thirty-two and forty-seven years (six participants) and those between forty-nine and fifty-five years (three participants). The average age of the responding participants was 42.36 years. The age distribution of the responding participants is indicative that members in effective virtual teams, who were selected by the HR gatekeepers to represent their companies, are people older in years, which explain the maturity and self-management themes (OT2).

Interpretation

One needs to interpret the ages of the participants against the population group (B4), gender (B1), nature of the job (OD3 and OD8), and education level of participants (B6) within the sensitive context of employment equality in South Africa. As the HR gate keepers were requested to approach the most effective virtual teams in their companies to participate in this empirical study, the researcher could not truthfully support that the selected members of effective virtual teams in the software sector generally belong to generation X, and are educated, White males. Something to be discussed; however, are the characteristics of the generations which contribute to the effectiveness of the virtual team organisational design.

Two generations were represented in the response to this question and are discussed as follows:

Three baby boomers (those born between 1946 and 1964) were noted. Typically, this generation is value driven, individualistic, and prefers meaningful work. Baby boomers embrace environmental, socially conscious, and sustainable business practices, which is supported by the responses to this question. The strong influence of these team members is noted in the virtual team where no “process” is noted, rather only a collection of values in a value system (PROC6).

Seven participants of generation X (those born between 1965 and 1984) were noted. Typically, this generation is more comfortable with technology. They prefer a work/life balance and have a general entrepreneurial spirit. Networking and meaningful work are important to this generation. These workers thrive on independence and flexibility. Loyalty is where the best opportunities are. This is also in support of the findings of Masibigiri and Nienaber (2011).

7.5.7 Question: Highest qualification (B6)

Overview

This question relates to the highest qualifications of the responding participants.

Total number of participants responding to this question in the questionnaire:	19
Total number of participants who gave full responses:	11
Total number of companies presented by the participating respondents:	3
Type of question	This was a menu question.
Missing data (Participants moved on to next question without any response to the question):	8 (8, 9, 14, 15, 30, 47, 48, 52)

Presentation of participants' responses

The responses of the participants are summarised in figure 7.6 as follows:

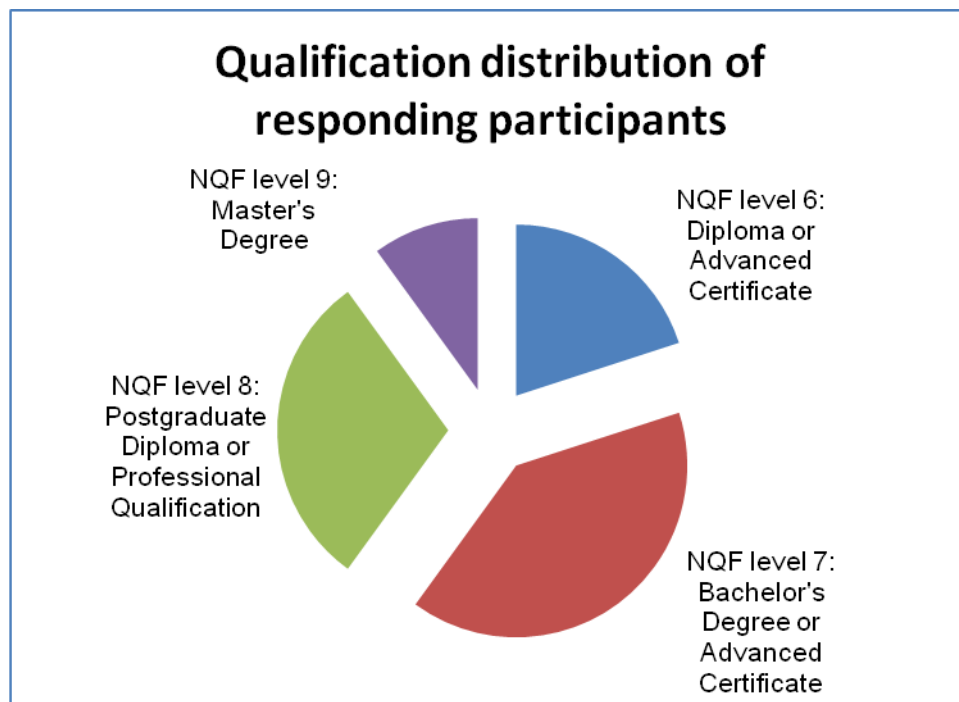


Figure 7.6: Qualifications of the responding participants

Analysis

11 of the responding participants had post-matric qualifications. Qualifications ranged from level 6 (advanced certificate/diploma) to level 9 (master's degree). Level 7 (a diploma or advanced certificate) has a slightly higher representation among participants.

Interpretation

From the preceding, a culture of learning seems to be echoed. These findings support studies that have shown that knowledge workers working in virtual teams are well qualified similar to Drucker (1954:63); Gold (2012:41-5); Pitt *et al* (2012:277-288); Smith (2012:1-156) and TomTom (2012). This tendency indicates that the participants in this study of the software sector already have a high educational level.

7.5.8 Question: Years of working experience (B7)

Overview

This question relates to the total number of working years of participants and should be read with question OD7, which serves to check and reinforce the responses to this question.

Total number of participants responding to this questionnaire:	19
Total number of participants who gave full responses:	19
Total number of companies presented by the participating respondents:	5
Type of question	This was a menu question.

All 19 participants representing five companies gave full responses regarding tenure. The responses between the two questions were found to be reliable and similar.

7.5.9 Questions: General questions (C1-C5)

Overview

These questions were general questions, listed at the end of the Lime Survey 2.0 electronic questionnaire—

- Responses to questions C3 and C4 could not be evaluated because they offered participants the opportunity to change or reconsider their answers to any of the previous questions.
- Is there any comment you would like to make which you believe was overlooked or not questioned in sufficient detail, which could enhance the insight into best practices in effective virtual teams? (C1) No comments were received.
- I would like to read the collective report on the findings of the response to this question, in the following media (journal or newspaper) (C2). Only two participants required notification and will be notified of publications.
- Should the researcher need to clarify any individual comments, I give permission for the researcher to contact me at the following email address (C5). Two responses were received and their comments are included in the appropriated sections.

Interpretation

No participants commented on the question about whether any important information had been omitted or detail not sufficiently explored in the response to this question. Three participants indicated that the outcome of the study should be published, which will be pursued after publication.

7.6 THEMATIC ANALYSIS ON PURPOSE (GROUP CODE 392)

7.6.1 Orientation to the purpose questions

The five questions (which include a clarifying question (PUR4_1)) contained under the purpose theme item, serve to explore how purpose is derived in effective virtual teams.

A summary of team information questions is shown in table 7.15 as follows:

Table 7.16: Summary of the questions regarding the purpose theme (code 392)

Question group	Element	Group code	Question code
Theme	Best practices influencing purpose in virtual teams	(392)	
Questions			
List the top 3 practices, which are needed to establish the purpose of a virtual team most effectively.			PUR1
Should the best practice you indicated in the previous question, be absent, how would the team overcome this to ensure team effectiveness?			PUR2
What are the conditions for the creation of an innovative climate for virtual team members?			PUR3
In the perceived absence of an innovative team climate, the best practice which I have come across to drive new ideas in a virtual team is (current or previous virtual teams)			PUR4

7.6.2 Question: PUR1

Overview

The question was “List the top three practices which are needed to establish the purpose of a virtual team most effectively.”

Total number of participants responding to this question in the questionnaire:	19
Total number of participants who gave full responses:	17
Total number of companies presented by the participating respondents:	5
Type of question	This was a menu question.
Missing data (Participants moved on to next question without any response to the question):	2 (37, 52)

Presentation of participants' responses

The responses of the participants are summarised as follows:

Table 7.17: Summary of the responses of the participants regarding the establishment of purpose

Practices enabling the effective functioning of virtual teams				
	Choice	Responses of participants	Context unit	Axial code
1	The goals of a team change throughout the life cycle of the team.	Somewhat important (12, 25, 43) to very important (13, 27, 28) Balanced	This item is important but due to the Pareto principle, will not be included to identify as best practice for purpose establishment	A management system is available where virtual team members can obtain and store team related documentation and conversations. Very important (12, 13, 25, 27, 32, 35) to critically important (28, 40, 43) Formalised team structure, communication, language and terminology used. Very important (13, 28, 32, 35) to critically important (12, 40, 43)
2	Formal role and responsibility clarification for each team member happens every time the direction of the team changes.	Very important (12, 13, 27, 28, 32, 35, 40)		
3	Formalised team structure, communication, language and terminology used.	Very important (13, 28, 32, 35) to critically important (12, 40, 43)	*	
4	A management system is available where virtual team members can obtain and store team-related documentation and conversations.	Very important (12, 13, 25, 27, 32, 35) to critically important (28, 40, 43)	*	
5	Ideal team size is less than 15 members.	Very important (28, 32, 43) to critically important (12, 13, 27, 40)	*	

6	Personality traits towards a high performance team instead of personality fit is achieved.	Somewhat important (27, 40, 43) to very important (12, 13, 25, 28, 32, 35)	This item is important but due to the Pareto principle, will not be included to identify as best practice for purpose establishment	Clarification on the duties of parties regarding various task and technology aspects: supplier of hardware, quality of internet connection, task specifications, security of information and documentation. Very important 12, 13, 28, 32) to critically important (25, 27, 43) Regular honest feedback on negative as well as positive performance. Very important (32,35,43) to critically important (13, 27, 28) Balanced Ideal team size is less than 15 members. Very important (28,32,43) to critically important (12, 13, 27, 40) Balanced
7	Regular honest feedback on negative as well as positive performance.	Very important (32,35,43) to critically important (13, 27, 28) Balanced	*	
8	Celebration of milestones reached.	Very important (12, 13, 25, 27, 32, 43) to critically important (12, 28); Somewhat important (35, 40)	This item is important but due to the Pareto principle, will not be included to identify as best practice for purpose establishment	
9	Team members are able to work independently and in a group.	Very important (12, 25, 27, 28, 32, 35, 40, 43)	8	
10	Networking with professional companies.	Very important (12, 13, 25, 27, 28, 32, 43)	7	
11	Technical skills, qualification personality, character fit with other team members.	Somewhat important (35, 40, 43); Very important (13, 25, 32, 35) to critically important (12, 27, 28)	This item is important but due to the Pareto principle, will not be included to identify as best practice for purpose establishment	
12	Conditions of service, which include how reward is determined, should be individualised and contractually prescribed.	Not important (25, 27, 35, 43) to somewhat important (12, 13, 28, 40)	This item is important but due to the Pareto principle, will not be included to identify as best practice for purpose establishment	
13	The ideal member of a virtual team is a permanent employee of the company for commitment reasons.	Very important (25, 27, 28, 32, 35, 40, 43)	7	
14	Develop a shared skills inventory of members for team reference, if team members need an expert sounding board.	Somewhat important (13, 25, 27, 28, 32) to very important (40, 43)	This item is important but due to the Pareto principle, will not be included to identify as best practice for purpose establishment	
15	Probation for new virtual team members is ideally first on smaller project.	Somewhat important (12, 25, 28, 40) to very important (13, 27, 32)	This item is important but due to the Pareto principle, will not be included to identify as best practice for purpose establishment.	
16	Periodic rotation of different partnerships in virtual team creates increased collaboration in the virtual team.	Somewhat important (13, 25, 28, 35, 43) to very important (27, 32, 40)	This item is important but due to the Pareto principle, will not be included to identify as best practice for purpose establishment	

17	Common platform for logistics, HR, finance, and other transactions to assist the building of a heritage database on previous teams' successes.	Somewhat important (13, 25, 28, 35, 43) to very important (27, 32, 40)	This item is important but due to the Pareto principle, will not be included to identify as best practice for purpose establishment
18	Team members are trained to professionally master both synchronous and asynchronous communication and the art of communicating electronically.	Somewhat important (13, 32) to very important (25, 27, 28, 35, 40)	This item is important but due to the Pareto principle, will not be included to identify as best practice for purpose establishment
19	Contractual attention is given to the virtual space of where work of a team member is expected to be done.	Somewhat important (12, 13, 28, 35, 40) to very important (25, 32) to critically important (27, 43)	This item is important but due to the Pareto principle, will not be included to identify as best practice for purpose establishment
20	Support systems in the case of technology failure, theft and health and safety of team members.	Somewhat important (12, 13, 25, 40) to very important (28, 32, 35)	This item is important but due to the Pareto principle, will not be included to identify as best practice for purpose establishment
21	Clarification on the duties of parties regarding various task and technology aspects: supplier of hardware, quality of internet connection, task specifications, security of information and documentation.	Very important 12, 13, 28, 32) to critically important (25, 27, 43)	*

Analysis

From table 7.16 it can be seen that although purpose establishment for a virtual team is important, the process of establishing purpose (how) rather than what needs to be established (what) is more important. This notion is supported by the responses to this question. In general, it is noted from the foregoing table that all factors listed which relate to purpose establishment were important. To determine which factors were more important, the researcher approached the question as follows: The greater number of choices made in the range of "very important to critically important" were used to establish the imperative purpose establishment practices for virtual teams. Responses that relate to "somewhat important" were disregarded for establishing the top three best practices.

1. The most critically important factor contributing towards the purpose of a virtual team was the availability of a proper management system which stores important management information and conversations (very important (12, 13, 25, 27, 32 and 35) to critically important (28, 40 and 43)).

2. The second best practice which was selected as important to establish purpose by the responding participants was formalised team structure, communication, language and terminology used (very important (13, 28, 32 and 35) to critically important (12, 40 and 43)).
3. Third place was shared, selected as important for establishing purpose by the responding participants with both:
 - Clarification on the duties of parties regarding various task and technology matters: Supplier of hardware, quality of internet connection, task specifications, security of information and documentation (very important (12, 13, 28, 32), to critically important (25, 27, 43)).
 - Regular honest feedback on negative as well as positive performance (balance between very important (32, 35, 43) to critically important (13, 27, 28)) being noted.

The information in the table 7.16 shows that a collegial spirit of collaboration lays the foundation for evolution of novel ideas and original processes (27, 28 and 32). The collegial spirit is supported in the virtual team by consistent exposure and connection to technology and new creations (25 and 32).

Proper qualifications, skills and personality fit with other team members were valued (12, 27 and 28) (B6) and honest feedback (positive and negative) were appreciated (13, 27 and 28). To reinforce a sustained purpose, the celebration of milestones reached (12 and 28) (PUR1) was noted. In the absence of a physical office space, specific contractual attention should be given to the virtual space where the work of team members is expected to be executed (27 and 43).

Interpretation

The literature suggests that functional collaborative infrastructure and trust are the key pillars that need to exist before a virtual team leader can effectively address the establishment of the virtual team (Edwards & Wilson 2004:70; Gaudes *et al* 2007; Majchrzak *et al* 2000; Ortiz de Guinea *et al* 2005:55-79; Ortiz de Guinea, Webster & Staples 2012:301-308; Staples and Cameron 2005; SynNovation 2012). The response to this question supports and intensifies the theoretical view (see OT3). The study elucidates that the functional collaborative infrastructure should be part of a greater appropriate management system, which stores, supports, and develops important management information (12, 13, 27 and 40). The importance of a management information system over typical team-forming exercises such as mission, vision and objective discussion is in line with the theoretically expected focus of knowledge workers, which is extensive use of

communication technologies, collaboration and foundations, which aid knowledge working (Nonaka & Takeuchi 1995; Timonen & Paloheimo 2011). The study supports the findings in OD9, OT2 and TECH1 where the management system is discussed in more detail. Smaller team size is conducive to a variety of dynamics in the team and contributes towards virtual team effectiveness (12, 13, 27 and 40). This supports the findings of OT2 where team size was discussed in more detail, and shows that the quality of the network of virtual team members is more important than the number of virtual team colleagues.

Honest feedback (positive and negative) is valued by members as sustaining the trust pillar of virtual teams (see OT3). This supports longstanding theoretical knowledge, which holds that the triggers to conflict (see PROC6) are inhibited and a more accurate personal assessment of individual work is attained, if parties know what is expected of them (Bandura 1977; Staples *et al* 2005). The appropriate assessment of individual performance is further energised by an expected celebration of team milestones to retain focus on team activities (see OT5-9). In the absence of face-to-face contact, specific contractual attention needs to be given to the individual workspace (see OT2). The establishment of purpose bridges the virtual distance between the workspace of virtual team members by setting and achieving milestones.

Team members who are able to work independently and in a group were noted as a very important but not critically important best practice in the establishment of purpose in a virtual team. This supports the findings in PUR 4 and PUR4_1.

Networking with professional companies was noted as a very important but not critically important best practice in the establishment of purpose in a virtual team. This important enabling best practice in virtual teams is supported by the responses to this question in PUR3, PROC6, and PEO1-2, where it will be discussed in more detail.

The ideal member of a virtual team member is a permanent employee of the company for commitment reasons and this was noted as a very important but not critically important best practice in the establishment of purpose in a virtual team. This enabling best practice in virtual teams is supported by the responses to this question and in OD3 where it is discussed in more detail.

Specific team dynamics, which are positively influenced by a smaller virtual team size, include the facilitation of trust, team performance, and engagement. This supports Pratt's (2010:91) theoretical notion that "The greater the number of people who need to work together, the more influences needs to be accommodated within the team which impacts on team performance." Thus, team size influences the dynamics of a team such as members' engagement with each other and; therefore,

also the relationship culture and trust between team members (Pratt 2010:91).

Proper qualifications, skills, and personality fit with other team members were valued by other virtual team members (12, 27 and 28). Although the responses of participants supported international practice and literature in this regard, South African labour legislation may cause concerns for implementers of such teams in this industry. Recruitment practices resulting from stringent labour legislation in South Africa are noted by the World Bank as a significant constraint in achieving competitiveness for the country (WCI 2013). This is because areas that are different from proper qualification, skill, and personality fit are accommodated in the recruitment of members to address social change initiatives (the Employment Equity Act). The issue around security with clear roles in ICT practices reflects the growing concern in South African companies around the protection of information. It resonates with the replacement of regulatory compliance with an information security strategy (Deloitte 2013).

7.6.3 Question: PUR2

Overview

The question was: “Should the best practice you indicated in the previous question, be absent, how would the team overcome this to ensure team effectiveness?”

Fewer participants responded to this question and the content of the information became less descriptive. Hence, it was assumed that questionnaire fatigue had set in.

Total number of participants responding to this questionnaire:	19
Total number of participants who gave full responses:	9
Total number of companies presented by the participating respondents:	3
Type of question	This was an open question.
Missing data (Participants moved on to next question without any response to the question):	10 (5, 8, 9, 12, 14, 40, 35, 47, 48, 52)

Presentation of participants' responses

The responses of the participants are summarised as follows:

Table 7.18: Summary of the responses of the participants regarding the best practice to overcome failure to establish purpose in a virtual team

Participant	Response of participant	Context units	Axial code
13	Tighter management communication	Confident management communication	<ul style="list-style-type: none"> • Goal (15, 25, 30, 32) • Communication (13, 43), • Firm management (13) • Team assistance (27) • Work space (28)
15	The minimum would be to ensure that the team at least have a common understanding of its targets, and that they work together to achieve the common goal.	Goal achievement	
25	Measure the delivery of the project	Goal achievement	
27	Team [members] will have to assist each other where there is a lack of skill	Team assistance	
28	Create your own [V]irtual [S]pace [A]nywhere	Work space	
30	Based on function/project/solution, use the best fit framework (ITIL, COBIT, TOGAF) to fulfil responsibilities.	Goal achievement	
32	[c]Clearly defined criteria/scope of expected outcome/deliverables	Goal achievement	
37	Not applicable	n/a	
43	Communication	Communication	

Analysis

The absence of proper management systems and extended networking team size could be overcome by two main best practices: Communication (13 and 43) (TECH3), and goal achievement (15, 25, 30 and 32). Focused management communication was shared as a best practice and overlapped with detailed awareness, and measurement of goals. The goals of teams are realised and sustained by patronage of team members. A unique obligation is placed on individual team members to create personal working spaces tailored to individual needs.

Interpretation

In overcoming the absence of a proper management system, which is supported by formalised team structure, communication, language, and terminology used, and where the duties of virtual team members are vague and feedback irregular, virtual team members presented a combination of solutions in sync with face-to-face teams and also unique to virtual teams.

From the number of diverse responses indicating that an unsuitable management system can be overcome by communication and goal setting, nothing different from a face-to-face team was produced.

In the previous question, goal establishment was evaluated by participants as somewhat important but not critically important for a team to function effectively. Contrary to general management theory, goal setting in virtual teams could be viewed as a support function as opposed to the general face-to-face practice that goal setting would be the first step in organising the team. This is unique to the virtual team setting as it is experienced by virtual team members that a slight process rearrangement (from the purpose establishment process in face-to-face teams) needs to occur when a virtual team is founded to contribute towards effectiveness; namely attention to the management system. This deviation in process gives insight into how and when innovation practices should be approached and supports the theory that it should happen in the formative stages of the team. It further clarifies the fact that goal setting should not be viewed as a specific process step at the formation of the team, but addressed through regular communication (Ebrahim *et al* 2009a). Goal setting, communication and collaboration in symbiosis (rather than each being a process step), strengthen the virtual team. This argument attempts to explain a later finding in the study; namely that members in virtual teams do not wait for someone to remind them of the team goal all the time. Members themselves are expected to notice direction and goal changes and adapt accordingly.

The pre-existence of a proper management system is; therefore, conceived to be the foundation of an effective virtual team, with the goal-setting input of all team members as described by literature which support the findings of Gaudes *et al* (2007) and Lorange (2010:75-101).

Alternatively, some members viewed goal setting and communication as more important than the management system. However, the absence of an electronic management system was viewed by most participants as more challenging to overcome than goal setting and communication.

7.6.4 Question: PUR3

Overview

The question relates to conditions for the creation of an innovative climate for virtual team members.

Total number of participants responding to this questionnaire:	19
Total number of participants who gave full responses:	9
Total number of companies presented by the participating respondents:	4
Type of question	This was a menu question followed by an open question.
Missing data (Participants moved on to next question without any response to the question):	10 (8, 9, 12, 13, 14, 35, 40, 48, 49, 52)

Presentation of participants' responses

The responses of the participants are summarised as follows:

Table 7.19: Summary of the responses of the participants on the conditions for the creation of an innovative climate for virtual team members

Participant	Response of participant	Context units	Axial code
5	A suitable network infrastructure must be considered in terms of connectivity (e.g. 3G, ADSL, etc.)		Network conditions (5, 27, 28, 30 and 32) Technology (25 and 32)
15	Concentration on the required task, and the tolerance of each other as a person, knowing that people are different, and those personal clashes in a team could ruin the effectiveness of that team.	Tolerance Effectiveness	
25	Use the technology and communicate regularly	Technology Communication	
27	If you can be friends and not just colleagues then the members become closer.	Network conditions	
28	[The network] treats everybody equally, respectfully and without discrimination	Network conditions	
30	Synergy	Technology Communication	
32	Networking and exposure to new innovations	Network conditions Technology	
37	n/a		
43	[Don't] know of any		

Analysis

The information above shows that a network conditions (5, 27, 28, 30 and 32) laid the foundation for evolution of novel ideas and original authentic processes through a collegial spirit of collaboration. The collegial spirit is supported in the virtual team by consistent exposure and connection to technology and new creations (25 and 32). The responding participants suggested specific conditions for the creation of an innovative climate for virtual team members; namely the use of networks and technology.

Interpretation

The unique conditions for the creation of an innovative climate for team members in effective virtual teams relate to the use of a varied number of networks and technology. The networking enabler is supported by various other responses to questions in this study: "Information technology networks in the companies were steady and functional" (OD3); "Networking and meaningful work are important to generation X" (B5); networking with professional companies (PUR1); and change in recruitment practices through networking was also noted (PEO1-2). Without the technology enabler, virtual team members may survive in the short term, but its absence will not sustain an innovative climate for team members in effective virtual teams in the long term (see TECH1-5). The influence innovation on the PUR, PEO and TECH themes are indicative that innovation works in "concert" and are integrated across themes.

A respectable management information system includes both elements, which, in the view of participants, contribute to innovation: Firstly, obtain, and store team-related documentation and conversations; further, for the creation of an innovative climate, it must be pre-existing (PUR1 and 2) and contain features such as collaborative tools to communicate and provide access to information (TECH1-5). This "access" was qualified in this question as "access to a network of information". Members do not view this network as a restricted and confined box (Seymour, 2013:7-8). Instead, the responding participants viewed the network as a web, which increases their knowledge and triggers new creations by exposing them to unlimited data (PEO1-2).

Due to the era (1940s before IT became mainstream) in which the diffusion of innovations (DOI) and innovation diffusion theory (IDT) (Chapters 3 and 4) were first outlined, researchers were not in a position to predict the impact of electronic media or the extent of the predictions around social systems at the time (Lazarsfeld *et al* 1944). The realisation that modern-day social systems of companies are no longer confined to teams in companies, suggests that leadership is challenged in managing certain teams beyond the traditional company borders and the safety nets that yield innovative solutions, products, and services in different workspaces (as bridged by participant 30).

7.6.5 Questions: PUR4 and PUR4_1

Overview

The questions were: “in the perceived absence of an innovative team climate, the best practice which I have come across to drive new ideas in a virtual team is (current or previous virtual teams)” (PUR4), and “specify if there are other conditions which could influence the creation of an innovative climate for virtual team members” (PUR4-1).

Total number of participants responding to this questionnaire:	19
Total number of participants who gave full responses:	10
Total number of companies presented by the participating respondents:	4
Type of question	This was a menu question followed by an open question.
Missing data (Participants moved on to next question without any response to the question):	9 (8, 9, 12, 14, 35, 40, 48, 49, 52)

Presentation of participants' responses

The responses of the participants are summarised as follows:

Table 7.20: Summary of the responses of the participants on the best practices to overcome the absence of an innovative team climate for a virtual team

Participant	Response of participant	Context units	Axial code
5	<i>A suitable network infrastructure must be considered in terms of connectivity (e.g. 3g, adsl, etc.)</i>	<i>Technology</i>	<ul style="list-style-type: none"> • <i>Working space (13, 28, 30)</i> • <i>Goal Management (15, 27, 32)</i> • <i>Technology (5, 25)</i>
13	<i>Working in same location</i>	<i>Working space</i>	
15	<i>Concentration on the required task, and the tolerance of each other as a person, knowing that people are different, and those personal clashes in a team could ruin the effectiveness of that team.</i>	<i>Goal Management</i>	
25	<i>Use the technology</i>	<i>Technology</i>	
27	<i>All the members should know what [are] is expected of them without having to point it out in a formal document. This is why trust is such an important factor. Just keep in mind that [T]rust Is [E]arned.</i>	<i>Goal Management</i>	
28	<i>Move to any [V]irtual [S]pace.</i>	<i>Working space</i>	
30	<i>Synergy</i>	<i>Working space</i>	
32	<i>Clear initial goals and scope requirements</i>	<i>Goal Management</i>	
37	<i>Not applicable</i>		

Analysis

It was noted that participants 5, 15, 30 and 37 started to duplicate ('copy and paste') their answers from the previous question. In the perceived absence of an innovative team climate, the unique best practice which responding participants had come across to drive new ideas in a virtual team was their workspace enabled by technology.

A shared environment conducive to the nature of work enables team members to share their ideas (13 and 28). The environment for a virtual team should be technologically favourable (25 and 28) given the type of work (OD3), the team's preferred unique way of working (OT2) and the advantage of working in a virtual team (access to knowledge) (OT4). It is expected that individual members ensure that they are able to recognise changing objectives, and the range of team functions, of the teams they independently work for. (27 and 32) (OT5-9).

Interpretation

As in face-to-face teams, the physical working environment of virtual teams contributes towards effectiveness. However, the specific elements in the physical environment contributing towards innovation differ between face-to-face and virtual teams. In the perceived absence of an innovative team climate, the unique best practice which responding participants have come across to drive new ideas in a virtual team, is workspace-enabling technology. The virtual team environment should be specifically contracted and the use of the environment should be virtual to allow for sharing of ideas between knowledge workers (Nonaka 1991). Within the greater management information plan, individuals should be able to identify the team's goals and be allowed the freedom to work independently and in alignment with the team setting (PROC6) to achieve the purpose of the team (Rahim 2011).

7.6.6 Summary of theme findings

Every virtual team should have a shared purpose and a "shared space" to function within. A dominant feature of effective virtual teams is acquiring knowledge. Knowledge seeking permeates every decision made in a virtual team: The choice and fit of members; the objectives; the support systems needed; and the innovative climate in which the team functions. The network construct of the team, rather than the team size attracts and retains members to access knowledge (such as a management system and various skills and knowledge of peers). A resilient, professional collegial bond develops between members despite physical distance, based on the notion that knowledge supersedes the confines of a team. As members are able to share knowledge outside the team, protection of intellectual property becomes a pertinent aspect and company leaders should explore

mechanisms to guard against the leakage of critical information. Within the confines of a team, independence and expertise of individual members are valued, promoted, and utilised. This independence and expertise; however, is subject to the greater team purpose.

Unlike in face-to-face teams where the manager has to ensure that all team members understand the purpose of the team, the individual in a virtual team ensures to understand the team purpose, the duties of the job, and contributes to achieving specific team milestones. The focus of management lies in enabling members to share detailed information with the team to ensure its effective functioning.

7.7 THEMATIC ANALYSIS OF PROCESSES (GROUP CODE 393)

7.7.1 Orientation to the process questions

The 11 questions contained under this theme serve to explore the practices in virtual teams with regard to experiences of team members of effective processes.

Table 7.21: Summary of the questions on the process theme (code 393)

Question group	Element	Group code	Question code
Theme	Best practices influencing processes in effective virtual teams	(393)	
Questions			
Can a virtual team function effectively without a leader at any point in time during the duration of the team? Please qualify your choice in the comment box.			PROC1
What are the important process practices in virtual team facilitation for functioning most effectively?			PROC2
What are the aspects, which positively influence your performance as a virtual team member?			PROC3
Cultural differences in virtual teams are bridged as follows:			PROC4
What are other methods to bridge cultural differences in virtual teams?			PROC4_1
Discuss the top 3 cultural issues, which your current team faces.			PROC5
What are the top 3 cultural issues, which your current team faces?			PROC5_1
What are the best practices, which you have come across to align, update and integrate processes in a virtual team?			PROC 6
The greatest area of conflict encountered in my current virtual team is:			PROC7
The best practice to solve the conflict identified in question PROC6 is:			PROC7_1
The best way to create a team which is meaningfully engaged in its work is:			PROC8

7.7.2 Question: PROC1

Overview

The question was: Can a virtual team function effectively without a leader at any point in time during the duration of the team? Please qualify your choice in the comment box.

Total number of participants responding to this questionnaire:	19
Total number of participants who gave full responses: (excluding participant who selected not to participate)	12
Total number of companies presented by the participating respondents:	3
Type of question	This was a menu question followed by an open question.
Number of participants selecting the option " I choose not to participate	1 (37)
Missing data (Participants moved on to next question without any response to the question):	6 (8, 9, 30, 48, 49, 52)

Presentation of participants' responses

The responses of the participants are summarised as follows:

Table 7.22: Summary of the responses of the participants on flexible leadership in virtual teams

Participant	Response of participant	Context unit	Axial code
5	Yes	Yes	Yes responses (5, 12, 13, 14, 15, 25, 27, 28, 35, 43) No responses: (32, 40) In summary: Yes responses: 10 No responses: 2
12	Yes	Yes	
13	Yes, if clear [objectives] [are] in place, [leadership is] is less important	Yes	
15	Yes		
25	Yes, as long as [everybody] in the team pulls their own weight.	Yes	
27	Yes	Yes	
28	Yes	Yes	
32	No, dependent on a number of factors to orchestrate effort and outcome	No	
35	Yes	Yes	
40	No	No	
43	Yes, for shorter periods	Yes	

Analysis

Management (13) and HR practitioners (12 and 35) and a number of team members (25, 27, 28 and 43) agree that the dominance of hierarchically assigned leadership is diminished in virtual teams. As indicated earlier, expert knowledge and skills (OT3) are great influencers of the effectiveness of the virtual team, which explains why people leadership rather than knowledge leadership is less important. However, specific conditions were noted under which a team can function without a team leader: “only for shorter periods” (43), “individual commitment and participation” (25) and “clear focus” (13). Two participants (32 and 40) noted that leadership (PROC2) remains important because it “orchestrates effort and outcome”.

Interpretation

From the analysis, it could be inferred that certain prerequisites for working effectively and certain functions of a team facilitator enhance the independent functioning of virtual team members, who in turn results in an effective virtual team. The prerequisites for effective virtual working include “expert knowledge and skills” (people) (OT3); “justifiable focus” (purpose) (PUR2); and “individual commitment and participation” (people) (OT2). The contribution of a team facilitator, which enhances the independent functioning of a virtual team member, was reduced to “the orchestration of effort and outcome (enabler)”. The responses to this question correspond to theory where facilitation rather than management or leadership enables a virtual team specifically (Gratton and Ericson 2011:45-72) to function. This empirical study supports and further clarifies the conditions which allow for transitional leadership (between performing and critical positions) to emerge from within the team as indicated by Alvesson and Spicer (2012:367-390). The study points to expert knowledge workers (as previously explained), who, largely, will be able to technically facilitate a team when needed (as noted in OD3 and OD4). The study also indicates that the power of knowledge to influence (resulting from a facilitation approach), as opposed the power to manage people, is better received by virtual teams. The power of influence in this regard can be seen as the ability and willingness of virtual team members to continue presenting their best work, despite the perceived absence of another person controlling their output and behaviour (OT2). The plasticity in virtual teams (such as a variety of time zones, vague physical boundaries and changing team members during the team life cycle) motivates a transformational facilitation style to accommodate the exchange and processing of information, and supports the theory in this regard (Chang *et al* 2012: 309-318; Follet 1927:249). Emerging Africa-specific facilitation practices could not be distinguished since the researcher regards this industry as being in sync with developed countries (Kempster & Parry 2010:106-120; Kuada 2010:9-24). Both a manager and a member did not answer the question, suggesting experiences where a leaderless virtual team may have plummeted in performance. These experiences indicate that a careful assessment needs to be

made of whether a team would be ready and able to function without a team facilitator. It may further suggest that a proper handover of facilitation tasks from one leader to the next is necessary to avoid team disruptions.

7.7.3 Question: PROC2

Overview

The question was: "What are the process practices important for virtual team facilitation to function most effectively?"

Total number of participants responding to this questionnaire:	19
Total number of participants who gave full responses: (excluding participant who selected not to participate)	3 (5,13,25)
Total number of companies presented by the participating respondents:	3
Type of question	This was a menu question
Missing data (Participants moved on to next question without any response to the question):	16 (8, 9, 12, 14, 15, 27 - 52)

Findings and analysis

Only one virtual team managers (13) gave insight into the role of managers of effective virtual teams. Although one would trust and expect all members to commit to the team (5 and 25), the responsibility for focusing the efforts of members on objectives should be assigned to a dedicated individual in the team. This would bring underlying responsibilities such as the management of performance (discipline and conflict), culture creation, trust, and empathy with team members' personal circumstances (13 and 25). The general absence of team members responding to the question indicates either a disinterest in or non-prominent notion of team facilitation in the different teams.

Interpretation

Virtual team members connect themselves with a network of educated, specialist and committed people. From the earlier purpose questions (PUR1-4), it was inferred that members have a strong desire to increase their knowledge. Put together in a team set-up with people they admire and respect for their knowledge and skills, they are prepared to learn from these individuals. This culture of sharing knowledge can only take place in a trusting relationship if all parties aspire to achieving the same goal. Trust suggests a healthy familiarity with one another and a realisation that all parties can be depended upon. It makes sense that when the team is confronted with an

issue, and the knowledge expertise and the expert are present in the team, their natural behaviour will be to consent to that person facilitating the team efforts for the particular expertise needed. This could lead to conflict between the expert and the hierarchically assigned team manager if the process is not managed well. From time to time, it may transpire that the hierarchical manager must step down and allow the expert to adapt to the leadership role. When this happens, good relationships between the expert as team facilitator and the team members would serve the expert well. If one knows about the personal circumstances and expertise of one's peers in the team, it will be easier to assign work and manage performance for the period in which the expert is the team facilitator. The absence of responses of many participants suggested to the researcher either that this is such a regular phenomenon that it does not need elaboration, or that a process does not exist. This concurs with similar responses in the rest of the study.

7.7.4 Question: PROC3

Overview

The question was related to: "What are the aspects which positively influence your performance as a virtual team member?"

Total number of participants responding to this questionnaire:	19
Total number of participants who gave full responses: (excluding participant who selected not to participate)	2 (25 and 27)
Total number of companies presented by the participating respondents:	1
Type of question	This was an open question.
Number of participants selecting the option " I choose not to participate	2 (5 and 13)
Missing data (Participants moved on to next question without any response to the question):	15 (8, 9, 12, 14, 15, 28 - 52)

Two participants clarified a number of aspects that positively influence their performance as virtual team members. It was noted earlier that where two or more participants shared similar experiences, it was deemed that *theoretical sufficiency* was reached (see section 4.11).

Presentation of participants' responses

The responses of the participants are summarised in table 7.22 as follows:

Table 7.23: Summary of the responses of the participants on those aspects that positively influence their performance as virtual team members

Participant	Response of participant	Context unit	Axial code
25	Monthly individual performance feedback meetings	Monthly individual performance feedback meetings	
27	Monthly individual performance feedback meetings	Monthly individual performance feedback meetings	

Analysis

Two participants (*25 and 27*) responded to this question and indicated that regular monthly individual performance feedback has a positive influence on their performance. The two participants provided very individual and divergent responses to the majority of questions in the rest of the questionnaire, but also shared some similarities.

Interpretation

These two individuals were both involved in dealing with policies and procedures to bring about business change (OD3), were permanent employees in the same organisation (I) and received a non-market related basic pay with commission (OD8). Individual professionalism was important to these two participants (OT4) and they were target and results driven, which could possibly explain their desire to have monthly individual performance feedback. This is supported in PUR1, by their selection that conditions of services – including rewards – should be customised and contractually prescribed. Regular individual feedback on a virtual team member's performance, has a positive influence on the performance of the individual. Whereas face-to-face teams receive clues on their performance by means of physical scanning, virtual teams only receive these at feedback meetings (TECH 2-3).

7.7.5 Questions: PROC4 and PROC4_1

Overview

The questions were related to: “How cultural differences in virtual teams are bridged”.

Total number of participants responding to this questionnaire:	19
Total number of participants who gave full responses: (excluding participant who selected not to participate)	9
Total number of companies presented by the participating respondents:	3
Type of question	This was a menu question.
Number of participants selecting the option “ I choose not to participate	2 (32 and 37)
Missing data (Participants moved on to next question without any response to the question):	8 (8, 9, 14, 15, 30, 48, 49 and 52)

Presentation of participants’ responses

The responses of the participants are summarised as follows:

Table 7.24: Summary of the responses of the participants of processes to bridge cultural differences in a virtual team

Participant	Response of participant	Context unit	Axial code
12	Clarification of individual's world, work and people perspective from the onset of the team.	Clarification of individual's world, work and people perspective from the onset of the team.	Clarification of individual's world, work and people perspective from the onset of the team. (12, 25, 27, 40) Cultural traditions clarified (13, 27, 28, 43) Religious belief system clarified (35)
13	Cultural differences [are] discussed, as it [they] increase [the] incidence of conflict.	Cultural traditions clarified	
25	Clarification of individual's world, work and people perspective from the onset of the team.	Clarification of individual's world, work and people perspective from the onset of the team.	
27	Clarification of individual's world, work and people perspective from the onset of the team. People should not be judged on their cultural traditions and Therefore if you do not question it them there should not be conflict.	Clarification of individual's world, work and people perspective from the onset of the team. Cultural traditions should not be clarified.	
28	Clarification of individual's cultural traditions from the onset of the team. Build and maintain productive working relationships.	Cultural traditions clarified Bridge	

32	Fairness, right person for the right job	Bridge	
35	Clarification of individual's religious beliefs from the onset of the team.	Individual's religious beliefs from the onset of the team.	
37	Participant chooses not to answer the question.		
40	Clarification of individual's world, work and people perspective from the onset of the team.	Clarification of individual's world, work and people perspective from the onset of the team.	
43	Cultural differences discussed, as it they increase the incidence of conflict. Communication	Cultural traditions clarified Bridge	

Analysis

The members of virtual teams expressed a general need for an opportunity in the forming stages of the team, to gain a better understanding of members' personal perspectives on personal issues such as their world, work, people, cultural, and religious viewpoints (12, 13, 25, 27, 28, 40 and 43). The reason for this practice is unknown and speculative. One participant (28) suggested that understanding certain personal aspects of members' lives contributes toward building and maintaining productive working relationships.

The participants qualified their conflict concerns, noting that the existence of cultural differences increases incidences of conflict (13, 27, 28 and 43). However, the bridging practices of cultural differences suggest despondent experiences by certain members during their extended career, regarding cultural prejudice, which led to preconceived notion and judgment (27, 32 and 43).

Interpretation

OT3 provides some insight into suggesting that trust and team cohesiveness were, *inter alia*, the main reasons why the responding participants chose to work in a virtual team. The researcher is of the opinion that some expert members in virtual teams will occasionally step up as the team facilitator (PROC2 read with OD3 and OD4); that social interaction is the lifeline to curb isolation (PEO4 and PEO5), and that understanding and respecting these communicated (43) aspects from each other in a professional relationship (32), contribute to the smooth functioning of the team (28).

From previous experience and basic software development training, the researcher understands that if a person designs or maintains a software program, an extremely concise, exact and logical methodological step-by-step guideline needs to be written and followed, resulting in a particular

electronic language protocol. This enables data to flow from one step to the next. Should the programmer make a mistake, an error causing the program to stop may occur or alternatively the data enters a loop from which it cannot escape without intervention. It is; therefore, logical to the researcher that participants in virtual teams in the software sector follow the same logic of programming in their overview of other members in the virtual team. They want to understand whom they are dealing with before they engage. This understanding assists them in “programming” how they will deal with a challenge, if it occurs. By merging the protocol language of the other individual to the virtual team members’ programming knowledge, these members individually design a series, which will assist them to realign the relationship. For example if an argument is TRUE, then XXX or ‘=ISNA’ (“if value is no”, refer to XXX). However, without understanding the context, from a South African labour perspective, this argument may be challenged out of context against discrimination legislation (EEA). The mentioning of culture and religion as a culture bridge supports the typical characteristics that members associated with an effective, value-driven perspective (OT2).

Further, building and maintaining a productive working relationship and the selection criteria base on knowledge and personality fit (PUR1) contribute in bridging cultural issues.

7.7.6 Questions PROC5 and PROC5_1

Overview

The questions were related to “Cultural issues which your current team faces”.

Total number of participants responding to this questionnaire:	19
Total number of participants who gave full responses:	5 (25, 27, 28, 37 and 43)
Total number of companies presented by the participating respondents:	1
Type of question	This was an open question.
Missing data (Participants moved on to next question without any response to the question):	14 (5, 8, 9, 12, 13, 14, 15, 30, 32, 35, 40, 48, 49, 52)

Presentation of participants' responses

The responses of the participants are summarised as follows:

Table 7.25: Summary of the responses of the participants on cultural aspects influencing virtual teams

Participant	Response of participant regarding general cultural issues in virtual teams	Response of participant regarding cultural issues in their current virtual teams	Context unit	Axial code
25	Muslim	Participant chooses not to answer the question.	Religion	Employment equity (25,28 and 32)
27	NONE NONE NONE	1. Shortage of tools of trade 2. Access to online information between members 3. Mind-set		
28	Generation gap. Religion.	Generation gap Religion	Religion Age	
32	EE BEE BEEE	EE	Affirmative action	
37	NA	NA		
43	None	None		

Analysis

In the virtual teams involved in this empirical study, cultural issues relating to the implementation of the EEA were evident, these being race, age, and the Act itself (25, 28 and 32), as key cultural issues that the responding participants faced. However, these concerns were not raised as unfair discrimination measures but rather as aspects that need to be addressed, as there is currently a lack of processes to address issues relating to these aspects (27 and 32).

Interpretation

The Employment Equity Act 55 of 1998 (EEA) promotes equal opportunity and fair treatment in employment through the elimination of unfair discrimination and the implementation of affirmative action measures to redress disadvantages in employment. Section 6 of the EEA prohibits an employer from discriminating against employees on the following discriminatory grounds: race; gender; sex; pregnancy; marital status; family responsibility; ethnic or social origin; colour; sexual orientation; age; disability; religion; HIV status; conscience; belief; political opinion; culture; language; and birth. Employment practices (other than those based on knowledge, skill and personality fit, PUR1), challenge the value system (PROC6) of team members and might;

therefore, lead members to experience that many cultural, religious and legislative rules are perceived as hampering the effectiveness of the team (PROC4). The sensitivity of a written declaration of virtual team members on cultural issues is noted in the absence of responses and suggests further future research possibilities.

7.7.7 Question: PROC 6

Overview

The question was “What best practice have you come across to align, update and integrate processes in a virtual team is?”

Total number of participants responding to this questionnaire:	19
Total number of participants who gave full responses:	5 (25, 27, 28, 32, 37 and 43)
Total number of companies presented by the participating respondents:	1
Type of question	This was an open question.
Missing data (Participants moved on to next question without any response to the question):	14 (5, 8, 9, 12, 13, 14, 15, 30, 32, 35, 40, 48, 49, 52)

Presentation of participants’ responses

The responses of the participants are summarised as follows:

Table 7.26: Summary of the responses of the participants about the best practice to align, update and integrate processes in a virtual team

Participant	Response of participant	Context unit	Axial code
25	Respect each other	Respect	Value system (25, 27, 28 and 32)
27	Ensure that I do what is expected of me	Trust	
28	Demonstrate and support the C[c]ompan[ie]y’s ethics and values.	Principles	
32	f[F]airness, right person for the right job	Fairness	
37	NA		
43	None		

Analysis

Instead of indicating specific processes to align, update and integrate processes in a virtual team, participants indicated a value system (25, 27, 28 and 32); for example, that processes in virtual teams should support the company's ethics and values (28); that virtual team members should display characteristics such as mutual respect (25); commitment to team objectives (27); and that objectivity in judgments regarding processes should prevail (32).

Interpretation

The responses to this question support the emergence of a new paradigm in HR management regarding alignment in processes (Bodwell & Chermack 2010:193-202). Alignment in processes where knowledge workers are involved stretches beyond administrative processes to a greater value system (based on respect, trust and fairness), as well as honesty (PUR1), and originality (PROC8 and TECH5)), and supports question OD3 regarding the Zachman framework (2008). The overlapping of PUR, PROC and TECH themes in this question shows the integrative nature of alignment in virtual teams. This overview may frustrate many company team members as it could be regarded as a deliberate attempt to undermine current or established processes. This could further lead to conflict, which could, in turn, result in the company losing its most valuable and innovative employees. However, as company leaders are made aware of the changing attitude of specific members of teams in the company, which is actually in harmony with the greater mission and vision of the company, the value system (PUR1) of the company may need to focus more attention on keeping teams together. The typical behaviour expected is the sidestepping of perceived outdated processes, identification, and overloading with work of those individuals who support the logical actions of virtual team members. As virtual team members have a strong affiliation towards networking, automatic logical processes, which spontaneously guide the user, instead of reading through laborious manuals and policies, might assist smooth transitions in the workplace.

7.7.8 Question: PROC7

Overview

The question was "The greatest area of conflict encountered in my current virtual team is".

Total number of participants responding to this questionnaire:	19
Total number of participants who gave full responses:	6 (13, 25, 27, 28, 32, 37, 43)
Total number of companies presented by the participating respondents:	2
Type of question	This was an open question.
Missing data (Participants moved on to next question without any response to the question):	13 (5, 8, 9, 12, 14, 15, 30, 32, 35, 40, 48, 49, 52)

Presentation of participants' responses

The responses of the participants are summarised as follows:

Table 7.27: Summary of the responses of the participants on the greatest area of conflict encountered in their current virtual team

Participant	Response of participant	Context unit	Axial code
13	Resisting change	Change	Lack of expertise (27, 32 and 43) Communication (25 and 28) Change (13)
25	Lack of communication	Communication related	
27	Members not delivering	Lack of expertise	
28	Listens to others and communicates articulately, fostering open communication.	Communication related	
32	A[A]pplying wrong skill set (person)	Lack of expertise	
37	n/a		
43	Incompetence of team members	Lack of expertise	

Analysis

Tension created by people not realising the purpose (PUR2) of the team (27 and 43) and displaying a lack of qualifications (27) (B7), skills (OT3), and personality fit (PUR1) (32) with other team members, are considered to be the greatest areas of conflict in virtual teams. These conflict areas are aggravated by the inability of members to eloquently practise active listening skills (28) and failure to communicate (25) (TECH4).

Interpretation

The active "listening" skills item was confusing to the researcher as virtual team communication generally suggests "written" communication. However, in various questions throughout the questionnaire (such as sections OD1-2, B5 & TECH3-4), team members suggested adjacent and alternative communication methods to enhance communication in the team such as synchronous

and asynchronous communication media (TECH5). Members placed a great deal of emphasis on utilising these communication methods, and failure to utilise them sufficiently is regarded as failure to observe the value systems of the team (PROC6 and TECH3-5).

7.7.9 Question: PROC7_1

Overview

Conflict is a natural occurrence in relationships between people and a number of plausible techniques exist to address it (Chapter 3). This question investigates whether virtual teams use techniques similar to face-to-face teams to resolve conflict.

The question was: “The best practice to solve the conflict identified in question PROC6 in virtual teams is”

Total number of participants responding to this questionnaire:	19
Total number of participants who gave full responses:	7 (13, 25, 27, 28, 32, 35, 37)
Total number of companies presented by the participating respondents:	2
Type of question	This was an open question.
Missing data (Participants moved on to next question without any response to the question):	12 (5, 8, 9, 12, 14, 15, 30, 40, 43, 48, 49, 52)

Presentation of participants' responses

The responses of the participants are summarised as follows:

Table 7.28: Summary of the responses of the participants on the best practice to solve conflict in the current virtual team

Participant	Response of participant	Context unit	Axial code
13	Mediated F[f]ace-to-face discussion	Face-to- face dispute resolution	Face-to face dispute resolution (13 and 27)
25	Touch base regularly	Regular interaction	
27	One-on-one meeting to discuss the responsibility of that member	Face-to-face dispute resolution	
28	Improves existing processes and / introduces new methods	Process improvements	
32	f[F]airness, right person for the right job	Justice	
35	Participant chooses not to answer the question.		
37	NA		

Analysis

Known dispute resolution processes such as meetings (27) or private and voluntary third-party intervention techniques (13) are also utilised in virtual teams. It was clarified through telephonic discussions with participants (27 and 28) that these meetings are generally first conducted in cyberspace. If an appropriate settlement cannot be reached, physical meetings follow. Value systems (32) (PROC6) and continuous process improvements (28) in the team support the expedition of conflict in virtual teams.

Interpretation

As opposed to initial success in face-to-face teams, trust in virtual team grows cohesiveness and conflict resolution as team members think of ideas and challenges as “ours” (Agustina, Sun & Xu 2012; Sun *et al* 2012). This explains why formal grievance procedures, conciliation, and arbitration do not feature as answers in how conflict is dealt with. The unique value system (PROC6) which evolves in each virtual team first utilises the team’s typical communication methods to resolve conflict, thereafter telephonic contact and only as a last resort are face-to-face (even electronic face-to-face) methods utilised.

7.7.10 Question: PROC8

Overview

The question was “The best way to create a team which is meaningfully engaged in its work is”.

Total number of participants responding to this questionnaire:	19
Total number of participants who gave full responses:	5 (27, 28, 32, 37, 43)
Total number of companies presented by the participating respondents:	1
Type of question	This was an open question.
Missing data (Participants moved on to next question without any response to the question):	14 (5, 8, 9, 12, 13, 14, 15, 25, 30, 35, 40, 48, 49, 52)

Presentation of participants' responses

The responses of the participants are summarised as follows:

Table 7.29: Summary of the responses of the participants on the best method to create a meaningfully engaged virtual team

Participant	Response of participant	Context unit	Axial code
12, 13, 25, 35, 40	Missing data		
27	t[T]o give them the freedom [to] delivering their own way	Independence	
28	Understands and uses the workings, structure, climate and culture of the company to achieve results	Synergy in expertise	
32	Correct skill sets leading to synergy and least tension	Synergy in expertise	
37	n/a		
43	Leadership	Leadership	

Analysis

In exploring ways in which virtual team members willingly commit themselves to the values (PROC6) and purpose (PUR1) of the team in a company context, this empirical study indicates that members appreciate an integrated understanding of leverage between various components influencing the team, its results and the company (28 and 32), throughout the performance cycle (OD8, OT2, OT5, PUR1). This understanding suggests a comprehensive communication system (TECH3) that feeds information amongst the team (PUR1). By understanding the interaction between the various components, team members are able to, and should be allowed autonomy to achieve objectives (27). Meaningful engagement in teams where a great deal of significance is placed on knowledge creation (PUR2), suggests a right afforded to experts (32) to excel and achieve (28 (OT5), with vague boundaries (27) and compliance with a matured value system (PROC6 and OD3). The overlapping of PUR, PROC and TECH themes in this question shows the integrative nature of meaningfully engaged virtual teams.

Interpretation

The establishment of a cooperative environment, influencing creativity and arranging for remuneration are core elements for sustaining effective virtual teams (Siebdart *et al* 2009:63-68) (TECH5, PROC6 and OT5). This empirical study clarifies the components necessary to enhance meaningful engagement in virtual teams. These components are mature qualified experts (OT4,

TECH1, OD3) who are driven to excel and achieve (PUR1) with the freedom to work in an unbounded environment where there is room for innovation and artistic realisation (OT2, OT5 and PUR2).

7.7.11 Summary of theme findings

In the software sector of the South African technology industry where members follow abstract and logical processes in order to accomplish their objectives, best practices regarding processes in virtual teams rely on leverage between knowledge creation and values. Expert knowledge and skills suggest periodic changes in leadership reliant on specific conditions. The role of management is to focus team efforts, but great responsibility is placed on individual members to identify and achieve individual objectives. Regular individual feedback contributes to the participants' performance. On-boarding of virtual team members suggests honesty and respect towards many personal characteristics, as team members may at stages also act in a facilitation role. The sharing of personal information promotes healthy working relationships and companionship in cyberspace. The communication of personal information serves to clarify cultural differences and potential conflict resulting from the implementation of statutory legislation. Value systems (PROC6) in teams include respect, trust, fairness, commitment, and objectivity in sharing expert judgments and are utilised to align processes. With knowledge creation, being the main purpose of the team, failure to present ingenious knowledge-creation products and processes, suggests an area of ineffectiveness in the team, which is not appreciated by other members who aspire to excellence. Communication through both synchronous and asynchronous communication methods is an important vehicle for sharing information. Conflict resolution techniques in virtual teams are similar in nature to those in face-to-face teams, but differ practically in terms of the space in which they are applied. Meaningful engagement in virtual teams suggests that the impact of abstract thought in knowledge creation, allows for members to individually and independently consider leverage between various information elements and react to these accordingly. Freedom to explore is crucial for virtual team members.

7.8 THEMATIC ANALYSIS OF PEOPLE (GROUP CODE 394)

The three questions under this theme serve to explore people in effective virtual teams. The questions are explored as follows:

7.8.1 Orientation to the people questions

Table 7.30 Summary of the questions regarding the people theme (code 394)

Question group	Element	Group code	Question code
Theme	Best practices: people in effective virtual teams	(394)	
Questions			
Can a virtual team function effectively without a leader at any point in time during the duration of the team? Please qualify your choice in the comment box.			PEO1-2
People practices important in virtual team facilitation to function most effectively			PEO3-4
Aspects which positively influence your performance as a virtual team member			PEO5

7.8.2 Questions: PEO1-2

Overview

The questions were related to the selection of virtual team members.

Total number of participants responding to this questionnaire:	19
Total number of participants who gave full responses:	11 (5, 12, 13, 25, 27, 28, 32, 35, 37, 40, 43)
Total number of companies presented by the participating respondents:	3
Type of question	These were open question supplementing each other.
Missing data (Participants moved on to next question without any response to the question):	8 (5, 12, 13, 30, 35, 48, 49, 52)

Presentation of participants' responses

The responses of the participants are summarised as follows:

Table 7.31: Summary of the criteria on which virtual team members should be selected

Participant	Response of participant	Context unit	Axial code
12	Specialised skills	Specialised skills	<ul style="list-style-type: none"> • Specialised skills (12, 27, 28) • Specialised knowledge (13, 25, 32, 35, 43) • Traditional recruitment procedures (40)
13	Specialist knowledge	Specialised knowledge	
25	Specialist knowledge	Specialised knowledge	
27	Specialised skills	Specialised skills	
28	Specialised skills	Specialised skills	
32	Specialist knowledge	Specialised knowledge	
35	Specialist knowledge	Specialised knowledge	
37	Participant chooses not to answer the question		
40	Traditional recruitment procedures should be followed where individuals apply for an advertised position, and follow the interview process.	Traditional recruitment procedures	
43	Specialist knowledge	Specialised knowledge	

Analysis

Traditional recruitment practice may still be a feature in the technology industry (40), but the members of virtual teams do not universally value it and its application in the industry is questioned (PROC 4 and 6). None of the HR participants in this empirical study indicated the use of traditional practices in recruitment. The possible reason for one manager (40) using traditional recruitment practices may be compliance with South African labour legislation such as the Labour Relations Act 66 of 1995. However, specialised knowledge (13, 25, 32, 35 and 43), supported by specialised skills (12, 27 and 28) and OT3 were nearly unanimously regarded by the responding participants as the key criteria for inclusion in a virtual team. It is suspected that someone entering the team through traditional recruitment procedures and not having either specialised skills or knowledge would not be valued as team member (PROC6).

Interpretation

In an innovative workspace (OT2) where knowledge accumulation supports business acumen and sustainability, the competition to associate with the people most likely to enhance one's career and lead the team to top achievement, becomes vital (OD3 and PROC8). This supports the notion of

Nohria and Eccles (1992:304-305), but further elucidates that talent management should focus on specialised knowledge, and technical and technological skills (OT3), and not only on a general overview, as this may be an area of conflict (OT7). Although sufficiency could not be supported by the responses to this question (40), observed change in recruitment practices through networking was noted. This observation could signal a potential new phase in South African recruitment practices aligning (PROC6) with current global practice, despite rigid labour legislation and supports similar findings in Oosthuizen and Nienaber (2010:41:47); Ready and Conger (2007:69-77); and Sake24 (2009:12). The researcher posited that the perceived act of nepotism could be challenged by outsiders, implying that the set-up of the technology industry in South Africa could be influenced by networking capabilities of the people in the network. This empirical study supports that virtual team members value their alignment with objective criteria such as knowledge and proven skills (OT3), as opposed to people who still need to study to gain knowledge or skills. This implies that a virtual team organisational design may not be an ideal training space for the unsophisticated technology novice with few skills or little experience. The relationship realignments through the networking arrangement could signal security concerns, which will be addressed in the next theme.

7.8.3 Questions: PEO3-4

Overview

The questions were related to: “Do you think the nature of virtual teams may leave members with a sense of isolation? Explain.”

Total number of participants responding to this questionnaire	19
Total number of participants who gave full responses (excluding participants who selected the option not to participate):	10 (5, 12, 13, 25, 27, 28, 32, 35, 40, 43)
Total number of companies presented by the participating respondents:	3
Type of question	These were open questions supplementing each other.
Number of participants selecting the option “ I choose not to participate”:	1 (37)
Missing data (Participants moved on to next question without any response to the question):	8 (8, 9, 14, 15, 30, 48, 49, 52)

Presentation of participants' responses

The responses of the participants are summarised as follows:

Table 7.32: Summary of whether virtual team members experience a sense of isolation

Participant	Response of participant		Context unit	Axial code
	<i>Virtual team members experience social bonding</i>	<i>Virtual team members experience sense of isolation</i>		Sense of isolation: (25,28, 40) Sense of belonging (5,12,13, 27, 32 43)
5	Yes	No	Sense of belonging	
12	Yes	No	Sense of belonging	
13	Yes	No	Sense of belonging	
25	Yes	Yes	Sense of isolation	
27	Yes	No	Sense of belonging	
28	Yes	Yes	Sense of isolation	
32	No	No, not today, perhaps 20 years earlier. New generation achieves more in managed isolation	Sense of belonging	
35	Yes	No	Sense of belonging	
40	Yes	Yes	Sense of isolation	
43	No	Don't experience social bonding in virtual team	Sense of isolation	

Analysis

People who share common interests usually bond socially with each other, irrespective of the nature of their team. This social nature of humanity spread out to the workplace. The majority of participants indicated that they experienced a sense of belonging (5, 12, 13, 27, 32 43) by working in a virtual team. A significant number (25, 28 and 40) indicated that virtual working might leave members feeling isolated. In anticipation of feelings of isolation, companies and team leaders in particular, leaders should be aware of the possibility of members feeling separated from the team and engage in practices to manage (PROC2 and PROC6) this isolation (32) and the feeling of disconnectedness through meaningful engagement (PROC8).

Interpretation

A subtle positive change between 2004 and 2013 was noted in that fewer virtual team members

feel isolated while working in electronic spaces which is consistent with Sarker and Sahay (2004:3-20). The effect of this change may be because of an atmosphere of natural, approachable, and open collaboration promoted by a team culture as proposed by Mark (2001) and Huang (2009). In virtual teams, the necessary formalised management system (PUR1) and performance monitoring (OD8) may contribute towards a sense that personal interest is lost in the younger generation (Y) (B5). Further, the work-life balance may be disturbed in generation X, causing members in these two generations to feel disconnected from the team (PROC8). The feeling of isolation may particularly affect members in generation X, even with extensive employment histories in this context (B7). This generation is most likely to show perceived disloyalty and join other teams (as participant 30 did). The sense of isolation may signal an area of risk (TECH3) as information leakage is the most likely result. The art of unleashing human capital lies in social networks (Brown 2011:243). These networks (TECH1) rely on healthy social relationships and behavioural patterns (PROC6) of members and contribute toward decision making in the team (PROC1), which supports the findings of Welch (1993:86-93) and Brown (2011:244).

7.8.4 Summary of theme findings

Due to legislative requirements, traditional recruitment practices may still be observed in the technology industry. However, an increasing demand of team members themselves, for the appointment of people with specialised skills and knowledge, may advance new recruitment practices fit for progression in the industry. Courageous team members, who embrace virtual team working, realise that individuals may experience isolation, resulting in a disconnection from the knowledge of the team. However, social interaction is prominently valued by virtual team members to contribute towards team effectiveness. The nature of the social interaction is concurrent with the nature of work.

7.9 THEMATIC ANALYSIS ON TECHNOLOGY (395)

The five questions under this theme serve to explore technology in effective virtual teams.

7.9.1 Orientation to the technology questions

Table 7.33: Summary of questions regarding the technology theme (code 395)

Question group	Element	Group code	Question code
Theme	Best practices influencing technology usage in effective virtual teams	(395)	
Questions			
In your experience is there any way that a virtual team will still function effectively in the absence of technology?			TECH1
Importance of the practices known to keep virtual teams technologically up to date.			TECH2
The best practice which I have come across to keep team members abreast of the latest technology in a virtual team is:			TECH3
Is communication a problem in your virtual team?			TECH4
How does your virtual team overcome communication problems?			TECH5

7.9.2 Question: TECH1

Overview

The question was: “In your experience is there any way that a virtual team will still function effectively in the absence of technology?”

Total number of participants responding to this questionnaire	19
Total number of participants who gave full responses (excluding participants who selected the option not to participate):	10 (5, 12, 13, 25, 27, 28, 32, 35, 40, 43)
Total number of companies presented by the participating respondents:	3
Type of question	This was a menu question.
Number of participants selecting the option “ I choose not to participate”:	1 (37)
Missing data (Participants moved on to next question without any response to the question):	8 (8, 9, 14, 15, 30, 48, 49, 52)

Presentation of participants' responses

The responses of the participants are summarised as follows:

Table 7.34: Summary of responses by virtual team members of whether an effective virtual team will be able to function without technology

Participant	Response of participant	Axial code
5, 12, 13, 25, 28, 32, 40, 43	No	No (5, 12, 13, 25, 28, 32, 40, 43) Yes (27, 35)
27 and 35	Yes	

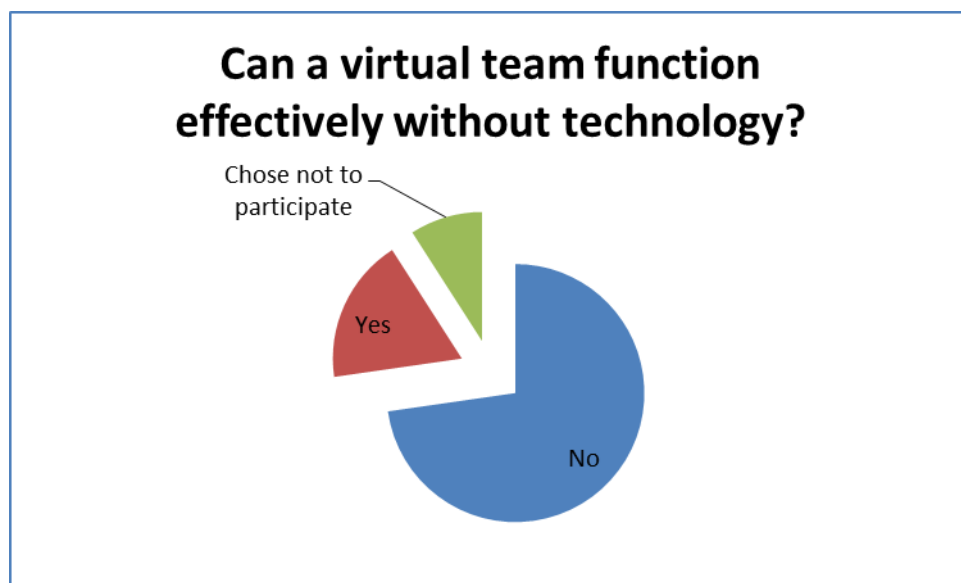


Figure 7.7: Comparison by responding participants whether a virtual team can function effectively without technology

Analysis

The sentiment was shared by the majority (12, 13, 25, 28, 32, 40 and 43) of the participants that an effective virtual team will not be able to function without technology.

Interpretation

The very nature of a virtual team is grounded on the availability of electronic technology. For the majority of virtual team members, the vision of surviving despite their respective environments having perished seems unimaginable. The importance of technology availability in virtual teams should; however, be evaluated against a number of factors, such as the nature of the participant in the team, and hierarchical position. The nature of the job (OD3) read within Zachman's framework

(2008) in question PROC 6 supports the extensive use of technology in this organisational design. If the focus of the participant is to ensure a sustained network, a non-functional network is considered as the team member not doing his/her part to ensure a sustainable network. If; however, the function is maintenance, the non-availability of the network can be seen as failure to perform from another team member (PROC6). For virtual team members in this empirical study who were mostly involved in network and business change (OD3), it makes sense that some of the responding participants could still foresee the possibility of functioning effectively without network connectivity being fully functional (maintenance). This sheds light on the conditions for previous studies, which indicate that the lack of availability to communicate is not regarded as a total catastrophe (Chapters 2 and 3). The use of differential communication tools, platforms, infrastructure, and ICT “clouds” creates sustainable alternatives for the ability to continue being effective which is in line with Lanubile *et al* (2010:52-55); Moreno-Vozmediano *et al* (2012:1) and ; Wang *et al* (2010:138). The imaginative and practical view (OT5 and PUR2) of a minority of virtual team members was transparent in the study. It suggests a maturity (OD3), experience and bridging attitude to overcoming the seemingly impossible, and reminds of the participants who phoned the researcher during the study to share some of their concerns and suggestions when the Lime Survey 2.0+ electronic questionnaire did not work (section 6.2.2). The researcher regards this attitude as a validation that, despite the current state of technology infrastructure in South Africa, there are effective experts (OT4) who are driven (PUR1, OD8) to explore communication solutions (PUR2 and PROC8) in times of communication crises. It leaves a hopeful expectation that the software sector of the South African technology industry retained some promising and talented IT experts. It suggests that this minority of positive participants are linked through knowledge with the ability to connect in the absence of technology.

7.9.3 Question: TECH2

Overview

The question was: “What are the important practices known to keep virtual team technologically up to date?”

Total number of participants responding to this questionnaire	19
Total number of participants who gave full responses	3 (27, 32, 35)
Total number of companies presented by the participating respondents:	1
Type of question	This was an open question.
Missing data (Participants moved on to next question without any response to the question):	16 (5, 8, 9, 12, 13, 14, 15, 25, 27, 28, 32, 40, 43, 48, 49, 51)

Presentation of participants' responses

The responses of the participants are summarised as follows:

Table 7.35: Summary of whether responding virtual team members are able to keep virtual team technology up to date

Participant	Response of participant	Context unit	Axial code
5, 8, 9, 12, 13, 14, 15, 25, 27, 28, 32, 40, 43, 48, 49, 51	Missing data	Difficult to function without technology	Difficult to function without technology (12, 13, 25, 28, 37, 40, 43) Qualified: updating (27, 32, 35)
27	Phones	Qualified: updating	
32	Not in a Third World country	Qualified: updating	
35	As long as the [interruption] isn't long lasting.	Qualified: updating	

Analysis

The majority of the participants found this question difficult to answer (5, 8, 9, 12, 13, 14, 15, 25, 27, 28, 32, 40, 43, 48, 49, and 51). Two participants indicated that the utilisation of other communication media such as telephones (27) and the duration of the interruption (35) could relieve pressures in the absence of technology. Since two responding participants in this study were regarded as *theoretically sufficient*, the researcher accepted the indication of a variety of communication tools.

Interpretation

The importance of the practices known to keep virtual teams technologically up to date was highlighted. For this question, the participants answered as if they were responding to a technological catastrophe rather than indicating how they keep themselves up to date with the latest technological developments. In the absence of a creative alternative for communicating, it is evident that patience in waiting for technology to be restored and communicating by means of telephones aligns critical relationships (OT5 and PROC6).

7.9.4 Question: TECH3

Overview

In this question the importance of certain aspects to keep team members abreast of the latest technology in a virtual team were.

Total number of participants responding to this questionnaire	19
Total number of participants who gave full responses	10 (5, 12, 13, 25, 27, 28, 32, 35, 40 and 43)
Total number of companies presented by the participating respondents:	1
Type of question	This was an open question.
Missing data (Participants moved on to next question without any response to the question):	8 (8, 9, 13, 14, 15, 30, 48, 49, 51)

Presentation of participants' responses

The responses of the participants are summarised as follows:

Table 7.36: Summary of responding virtual team members on the best practices, to keep them abreast of the latest technology

Practices enabling the effective functioning of a virtual team	
The choice of collaboration tools fits the purpose for which they were intended.	To a great extent (10 participants)
Availability of a common platform for logistics, HR, finance, and other transactions in your company assist the formation of a heritage database on previous teams' successes.	To some extent (10 participants)
Contractual attention is given to the virtual space where work of a team member is done for the purpose of inclusion in labour legislation protection and protection of company assets.	To some extent (10 participants)
Risk behaviour of team members regarding cyber-crime should be carefully monitored and addressed.	To some extent (10 participants)

In addition to this question:

- forums (13)
- knowledge sharing via emails (27)
- identify opportunities and take action to build professional relationships between own area and other areas (28)

were offered as the best practice the researcher encountered to keep team members abreast of the latest technology in a virtual team.

Analysis

The majority of participants (10 participants) agreed to a greater extent that the choice of collaboration tools should fit the task. A common logistical platform (where management

information lies) (PUR1), to some extent, contributes to keeping the virtual team technologically up to date. To some extent (10 participants), formal contractual attention should be given to employment laws as well as health and safety arrangements to ensure technologically feasible practices. To some extent (10 participants), risk behaviour in relation to cybercrime should be carefully assessed.

Interpretation

This question follows from the expected poor response to the previous question and focuses on some of the best practices, which participants encountered to keep team members abreast of the latest technology in a virtual team. The onus is on the employer to ensure that team members have access to the latest developments in technology via a management system (PUR1). This extends use of the management system from a mere administrative tool to an engaging tool which also explains the value that virtual team members place on having access to this very special system. However, further research in this regard is necessary, as it is not clear why the management system should not be a common platform. The management tool could influence personal repositories and companies should ensure that risk behaviour is managed to ensure that team intelligence is protected, which resonates the findings of Kim *et al* (2011:41–62) and Wang *et al* (2010:138). This could be done through a spirit of cooperative automation and computational intelligence, enhancing social and emotional team intelligence, as suggested by Bell (2007:595-615); Holten (2001:36-47) and Taylor (1985).

7.9.5 Question: TECH4

Overview

The question was “Is communication a problem in your virtual team?”

Total number of participants responding to this questionnaire	19
Total number of participants who gave full responses (excluding the participants who selected the option I choose not to participate”:	9(5, 12, 13, 25, 27, 28, 35, 40 and 43)
Total number of companies presented by the participating respondents:	1
Type of question	This was a menu question.
Number of participants selecting the option “ I choose not to participate”:	2 (32 and 37)
Missing data (Participants moved on to next question without any response to the question):	8 (8, 9, 14, 15, 30, 48, 49, 51)

Presentation of participants' responses

The responses of the participants are summarised as follows:

Table 7.37: Summary of responding virtual team members on whether there is a communication challenge in the virtual team

Participant	Response of participant	Context unit	Axial code
25 and 40	Yes	Yes (2)	Yes (25 and 40)
5, 12, 13, 27, 28, 35, 43	No	No (7)	No (5, 12, 13, 27, 28, 35, 43)

Analysis

Only two virtual team members noted that communication was a problem in the virtual team. These were qualified that written communication may sometimes be misunderstood or only read too late. However, the majority of the respondents did not have any challenges with communications. Two participants offered methods, which may be utilised to increase communication in the virtual team:

- [Everyone communicates as they are expected to] (27)
- [Voices own views during meetings and social events] (28)

Interpretation

Communication is not perceived to be a challenge for virtual team members in the team structure. With management and communication in teams identified as the key challenge in virtual teaming, the contemporary virtual team in this industry seems to have overcome these challenges which align this study to the findings of Lurey and Raisinghani (2001:523-544) and Nemiro *et al* (2008:1-50). This empirical study clarifies the findings on cost, team construction, and focus of the team, restraining communication in virtual teams, by suggesting professional relationship realignment as put forward by Boxall and Macky (2009:2-23) and Martins *et al* (2004).

7.9.6 Question: TECH5

Overview

The question was “How does your virtual team overcome communication problems?”

Total number of participants responding to this questionnaire	19
Total number of participants who gave full responses:	4 (27, 28, 32, 37)
Total number of companies presented by the participating respondents:	1
Type of question	This was an open question.
Missing data (Participants moved on to next question without any response to the question):	15 (5, 8, 9, 12, 13, 14, 15, 25, 30, 35, 40, 43, 48, 49, 51)

Presentation of participants' responses

The responses of the participants are summarised as follows:

Table 7.38: Summary of responding virtual team members on how communication challenges in the virtual team are overcome

Participant	Response of participant	Content unit	Axial code
27	Phones	Creative professional solutions	Creative professional communication solutions (27, 28)
28	Professionalism		
32	No valid experience in this regard as yet		
37	n/a		

Analysis

Only two participants (27, 28) illuminated this question by indicating the creative professional solutions that would assist members in addressing communication challenges. Since two participants offered a solution on how to overcome communication challenges, the researcher regards their responses as theoretically sufficient.

Interpretations

Virtual team communication problems are overcome by integrated relationship realignment by means of a sophisticated, professional, and interconnected network of collaboration between individuals (PEO 1-2). This question clarified collaboration by indicating professional solutions which contract assigned roles and responsibilities (PUR1), a team culture (PROC4 and PROC5) and alignment (PROC6) with the team's focus and management system which supports the findings of Brown (2011); Loch *et al* (2006:68) and Montoya *et al* (2011:451-476).

The integrated nature of communication between the four themes is highlighted in this question.

7.9.7 Summary of theme findings

The main enabling tool for an effective virtual team is electronic technology. It is possible to function without electronic technology, but only for a short period of time and with the aid of telecommunications technology. Echoing the underlying knowledge search of virtual team members, access to advanced technologically collaborative tools, an effective management information system and professional connections to experts in the field of operations, contribute to the effectiveness of the virtual team. Formal contractual agreements with virtual team members seek to curb possible risk behaviour with regard to information protection. Human collaboration and professional connections enable virtual team members to reinforce and sustain knowledge development.

7.10 CHAPTER CONCLUSION

The most significant finding in this chapter was that all four themes are integrated, making analysis difficult.

Every team should have a shared purpose and a shared space within which to function. A dominant feature of effective virtual teams is knowledge acquirement. Knowledge seeking permeates every decision made in a virtual team: The choice and fit of members; the objectives and support systems needed; and the innovative climate in which the team functions. The team should preferably be not too large, but members are attracted to, and remain linked to each other through access to knowledge (such as a management system and various skills and the knowledge of peers). A resilient, professional, collegial bond develops between members, despite physical distance, based on the notion that knowledge supersedes the confines of a team. Since members are able to share knowledge outside the team, protection of intellectual property becomes a pertinent factor and company leaders should explore mechanisms to guard against the leakage of critical information. Within the confines of a team, the independence and expertise of individual members are valued, promoted and harvested. Independence and expertise; however, are subject to the greater team purpose. Unlike the situation in face-to-face teams where the manager has to ensure that all team members understand the purpose of the team, the individual in a virtual team must ensure that the team purpose and duties of the job—and thus contributes to achieving the specific milestones of the team—is understood. The focus of management lies in ensuring and enabling members to share detailed information that the team needs for its effective functioning.

Due to legislative requirements, traditional recruitment practices may still be observed in the software sector of the South African technology industry. However, an increasing demand of team

members themselves, for the appointment of people with specialised skills and knowledge, may advance new recruitment practices fit for progression in the industry. Courageous team members who embrace virtual team working do realise that the individual, resulting in a disconnection from the knowledge of the team, could experience isolation from the team. However, virtual team members to contribute towards the effectiveness of the team prominently value social interaction. The nature of social interaction is expected to be concurrent with the nature of the team's work.

The main enabling tool for an effective virtual team is electronic technology. Without enabling electronic technology, it is possible to function, but only for a short period, and by means of telecommunications technology. Echoing the underlying knowledge search of virtual team members, access to advanced technologically collaborative tools, an effective management information system and professional connections with experts in the field of operations, contribute to the effectiveness of the virtual team. Formal contractual agreements with virtual team members seek to curb possible risk behaviour with regard to information protection. Human collaboration and professional connections enable virtual team members to reinforce and sustain knowledge development.

In the final chapter, conclusions are drawn for the entire study.

CHAPTER 8

RESEARCH CONCLUSIONS

8.1 INTRODUCTION

This chapter follows the framework for concluding a study as suggested by Trafford and Leshem (2008:130-136). It presents the factual, conceptual and knowledge conclusions. Readers are reminded that because this was a qualitative study, the researcher did not always follow the known quantitative procedural conventions.

This framework serves to remind readers of the linkage between the problem investigated, research aim and objectives (Chapter 1), literature review (Chapters 2 and 3) and how the empirical study was designed and conducted (Chapters 4-7). It aligns the research scope and reasoning. Furthermore, the chapter presents the main and secondary emerging factual, conceptual and knowledge findings, and critiques the research approach and methodology, where necessary. The recommendations were based on making sense of the factual findings, conceptualising the effectiveness of the themes (purpose, process, people and technology) according to the theoretical foundation and interpreting these themes. An attempt is made to justify the approach used by the empirical study to explain how the knowledge gap was filled. Finally, the study explains the limitations, discusses the scholarly contribution of this study to the literature corpus of research on virtual teams and proposes a future research agenda.

The summary structure of Chapter 8 is depicted in figure 8.as follows:

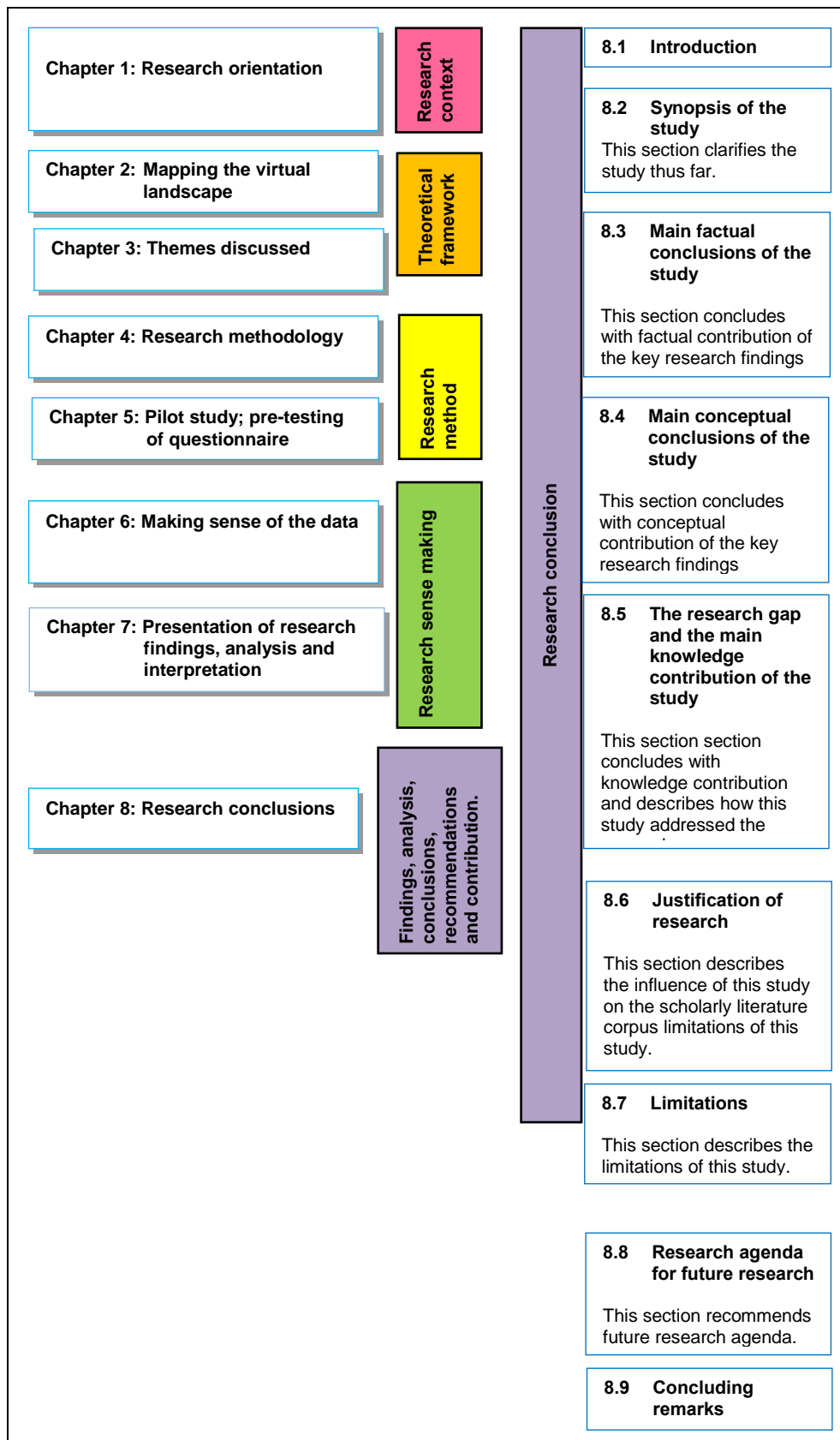


Figure 8.1: Structure of Chapter 8

8.2 SYNOPSIS OF THE STUDY

Thus far, this study has addressed the following:

In an increasingly technology-infused business environment, organisations are challenged to explore innovative but sustainable practices to retain and grow their competitive advantage (see section 1.2.1).

Modern challenges relating to urbanisation, globalisation, environmental hazards and work-life balance, increasingly compel organisational leaders to seek an organisational design that promotes team effectiveness while reaping the benefits associated with electronic technology (see section 1.2).

This study endeavoured to explore the best practices in the functioning of effective virtual teams (see section 1.4). Only noting what the best practices are, without understanding why and the extent to which these practices contribute to effectiveness would simply not provide a meaningful competitive advantage or direction to anyone implementing such practices (see section 1.2). Hence this journey to explore the best practices in the functioning of effective virtual teams first examined the phenomenon of virtual teams by focusing on the theoretical findings of previous and current researchers in the field (see section 1.9). Utilising advanced information retrieval and processing skills (see section 1.9), an independent, critical, comprehensive and systematic literature review on virtual teams and best practices in the functioning of effective virtual teams was conducted and presented in Chapter 2.

In an effort to gain a holistic overview on best practices in effective virtual teams, this study found an array of fragmented research on various themes and elements relating to virtual teams. With the integration of this research into a comprehensive understanding of virtual teams, a fundamental historical timeline emerged (see section 2.3). This timeline indicated that the focus and perimeter of each period were ambiguous and overlapped with the next and previous period, but a distinction could be made based on parallels with the development of electronic technology. It can; therefore, be concluded that significant changes in technology could inspire new developments in this historical timeline.

While collecting information to narrow down the themes according to which the possible best practices could be categorised, the trend of ambiguity continued. In these theoretical foundations, a number of repetitive themes were noted (see figure 1.1). The most prominent of these themes was encapsulated by the work of Bal and Teo (2001) which was extended by a literature framework conducted by Ebrahim *et al* (2009) (see section 1.9). During the investigation into the

principal literature corpus, three repetitive themes (process, people and technology) were confirmed (see section 1.8.3.1) with the same 12 specific elements which Ebrahim *et al* (2009) extended with their literature survey. The latter studies related to different organisations in a variety of industries. Hence, the researcher realised that these three themes could be generalised across various organisations, using the virtual team organisational design. However, the fourth prominent repetitive theme of purpose was observed in the work of Gaudes *et al* (2007), Maynard *et al* (2012:342-365) and Ortiz de Guinea *et al* (2005). The current study thus included this theme, which in essence extended the Ebrahim *et al* model (see figure 1.1). The current study expanded on the work of Ebrahim *et al* (2009) by theoretically identifying and including the principal literature corpus of the wider knowledge spectrum on virtual teams (see section 1.9). Overlapping and supporting research in the Ebrahim *et al* (2009) model produced a new, empirically verified framework (see figure 1.1) signalling the four most central but also integrated themes (purpose, process, people and technology) in terms of which best practices could be studied (see Chapter 3).

However, in this study, the ambiguity and overlapping of boundaries for each theme and element were regarded as a reinforcement of the nature of virtual teams, infused by the advancement of electronic technology, and not regarded as a limitation. Although one could argue that this outlook does not really clarify, but in fact creates confusion about the boundaries of the themes and elements, one needs to appreciate this in terms of the profound networking and knowledge evolution at the time. The complexity of each theme and element was strengthened by the delicate interaction between them when explaining the fragmented research. For instance, communication was dealt with theoretically under the people theme, but its impact permeated through various dimensions in all the themes under different elements; for example, “Formalised team structure, communication, language and terminology used” (PUR1); “feedback” (PROC3); and “Identify opportunities and take action to build professional relationships between own area and other areas” (TECH4). This showed that not only are the themes (as posited by Ebrahim *et al* 2009) linked, but the specific elements as identified are linked as well. This “extended” Ebrahim *et al* (2009) model (which includes all four prominent themes) was empirically examined in Chapter 7.

The population was selected because the companies are representative of companies, which are the creators of software, which in turn enables virtual working. From this population, virtual teams were purposefully selected by each organisation’s gatekeeper (see sections 3.4 and 5.2.1). Further, participation in the study for each of the organisations was negotiated and the most convenient time to participate was agreed upon (see section 3.3).

Because the participants’ work preferences were electronic, the researcher utilised the same work practice, that is, an electronic questionnaire, in order to improve participation (see section 3.4).

During the empirical part of the study, the researcher described and followed an ethical process to enhance the truthfulness of the study (see section 3.6.2).

The purpose of the electronic questionnaire was to ensure that all participants received the same questions relating to the four identified themes, in a particular timeframe, without face-to-face intervention by the researcher. The questionnaire was aimed at gaining insight into the nature and extent of best practices in effective virtual teams. The smooth functioning of the electronic questionnaire was tested in a pre-study of similar participants in the same industry and subsequent modifications were made (see Chapter 4). These modifications included a reorganisation of questions to combat questionnaire fatigue, rephrasing of some questions and the inclusion of more grid-like, pre-considered responses to match the participant's preferred communication style, as it was noted that this type of knowledge worker (participants from the software sector) does not particularly like to write (see section 3.2.1). The Lime Survey 2.0+ electronic questionnaire data collection instrument was deemed compatible with the electronic communication style of the participants (see sections 3.2.1 and 5.3.1).

As with the completion of the questionnaire, all responses to questions were voluntary because participants and their companies had the option to participate or not; continue to the next question or not; choose any option on menu-based questions including the option not to participate or choose the option not to participate in open questions. Participants could also choose not to answer any of the questions, answer a particular question or select the option not to answer (see Annexure "F").

Although evidence shows that participants did consider all the questions in the questionnaire, it was found that the majority completed the questions on the purpose theme and thereafter participation deteriorated, but remained theoretically sufficient. Only in question OT7 with participant 30 international participation was noted. This one participant's responses falls within the norm set for qualitative studies (see section 4.11).

The delicate and integrated complexity of the themes and elements suggests a number of reasons: it could be concluded that the essence of best practices in the functioning of effective virtual teams might have been captured in the purpose theme; question fatigue may have set in; or confirmation that the participants do not particularly like to write (see section 3.2.1).

Despite the entire researcher's effort to encourage participation in this study, it was not anticipated that the extent of non-participation would be so adverse, resulting in a poor but saturated response rate (see section 5.3.2). A number of reasons for the poor response rate were, for example: Access to many of the organisations and participants was formally denied, even though original

approval had been obtained (see section 5.2.1); the questionnaire-support electronics and server were unavailable for extended periods (section 5.2.2); very few participants completed the questionnaire in full, despite many requests to participate; and the questionnaire may also have been too complex.

Responses to the questionnaire were descriptively analysed utilising Krippendorff's (2013) content analysis method (see section 5.5 and Chapter 6). The responses of the participants were interpreted in terms of their "usefulness" and "significance" until "theoretical sufficiency" was reached (Marshall & Rossman 2011) (see Chapter 6).

8.3 MAIN FACTUAL CONCLUSIONS OF THE STUDY

This section represents the conclusions on the basic and specific knowledge that was forthcoming from the study. In order to explore best practices, the four themes and their elements was separated. However, this study concludes that these themes and the respective elements are integrated with each other, making the process to separate the findings for best practices complex.

In order to answer the research question the researcher pursued a qualitative interpretivist

The themes presented four main factual conclusions; namely:

- On the purpose theme: The pre-existence of an electronic management system surpasses any vision, mission and strategy phase at the establishment of a virtual team.
- On the process theme: The "how to" theme is regarded as the most pressing of all the themes as it presented the most questions. However, not one single step or process was revealed by the participants. Processes could; therefore, be viewed part of effective virtual team's competitive advantage and the reason why companies in this industry offered intellectual property considerations as reasons for non-participation. Although no step or processes were revealed, a value system was revealed. Aspects such as:
 - Dependability and maturity (PROC3)
 - individual uniqueness
 - time management and respect for one an others' expert opinions (OT3)
 - honesty (PUR1)
 - respect, fairness and principles (PROC6)
 - independence but synergy in expertise (PROC8) was highlighted

- On the process theme: The refrain of sustaining knowledge was highlighted. All the people practices such as talent management, performance, socialisation, engagement and collaboration are geared towards sustaining knowledge, which in turn presents a competitive advantage in this industry.
- On the technology theme: A seamless interface between the various technology applications, platforms and infrastructures on various information systems is the preferred and most effective contributor to the functioning of effective virtual teams. Security was acknowledged as an area of risk, which should caution organisations. Knowledge and skills development for virtual team members was highlighted as a continuous area for virtual team member development.

8.4 MAIN CONCEPTUAL CONCLUSIONS OF THE STUDY

This section represents the conclusions on the knowledge forthcoming from the study, on the interrelations among the factual elements and themes within the larger framework that enabled them to function together. Virtual teams are an organisational design, which evolved specifically to bridge global functionality between organisations and their members.

This study set out to review and expand the literature in order to develop concepts that will build the final framework consisting of themes of best practices in the functioning for effective virtual teams:

- The literature was reviewed and a presentation of a primary literature corpus (see section 1.9) delivered, resulting in the presentation of an integrated summary of theoretical perspectives that could influence virtual teams (see Annexure "C").
- The literature was expanded and a baseline for the three historic phases of virtual teams (see section 2.3) was proposed.
- The qualitative, inductive, phenomenological, interpretivistic approach of the integrated summary of theoretical perspectives (Annexure "C") proposed repetitive themes which was utilised to construct themes and elements the final framework for best practices in the functioning for effective virtual teams (see figures 1.1 and 8.3).

This study also set out to explore the themes that play a role in establishing best practices for the functioning of effective virtual teams as informed by the literature study.

- To explore the best practices for the implementation and maintenance (functioning) of effective virtual teams in the software sector of the technology industry of South Africa requires a qualitative interpretivistic research approach. This approach provided insight

into the best practices in the functioning of effective virtual teams by means of a qualitative multi case study design (see section 4.5.1).

- The data collection instrument utilised to explore the best practices for the implementation and maintenance (functioning) of effective virtual teams in the software sector of the technology industry as a semi-structured web based electronic questionnaire (see section 4.7.4). This method of obtaining information from the participants accommodated their preference not to write, yet was in line with their normal working arrangement (working virtually online) (see sections 4.2 and 3.2.1).

Hence, the overall research objective of this exploratory study; namely to combine the virtual team literature into a principal literature corpus and empirically explore the resulting theoretical framework relating to best practices was reached.

8.5 THE FILLING OF THE RESEARCH GAP AND MAIN KNOWLEDGE CONCLUSIONS OF THE STUDY

The research gap was identified as a need on the part of decision makers to understand the best practices in the functioning of effective virtual teams, which will promote sustainable and effective business decisions (see section 1.3).

This study addressed this complex research gap by providing credible and dependable information on the following to ensure scientific value (see section 6.4):

- A first time, unique historical timeline, which encapsulates the origins and development of virtual teams, was constructed (see section 2.2.3).
- Insight was given into the underlying principal literature corpus on the subject for identifying the borderless overlapping of a variety of scientific disciplines, in particular human resources; psychology, management and technology (see section 1.8).
- Through rigorous exploration, the main virtual team theorists were identified as six research teams contributing to the framework (Wade 2006; Ebrahim *et al* 2009) and literature review (Martins *et al* 2004; Powell *et al* 2004; Schiller & Mandviwalla 2007; Gaudes *et al* 2007). These authors are the main virtual team contributors. Their contributions were subsequently reorganised according to the Ebrahim *et al* (2009) framework and presented as an integrated and holistic table (see Annexure "C").
- Complementing the main virtual team theorists, the contributions of current research were incorporated, and an adapted but contemporary framework of best practices evolved (see figure 8.2). The new contemporary framework highlights the purpose theme as an additional theme.

Further, the elements were critically revised and extended in both theoretical and empirical sufficiency. New elements emerged such as collaboration and other elements were linked such as rewards and performance, while others were moved to a more appropriate domicile such as training see (figure 8.2).

The importance of remuneration practices in virtual teams presents a significant connection with higher effectiveness and performance, and highlights an area for further research.

These elements were investigated thematically and empirically, and although the response rate was low (see section 4.11) theoretical sufficiency was reached, in all but one element; namely finding sufficient empirical evidence to support multiple organisation virtual team membership:

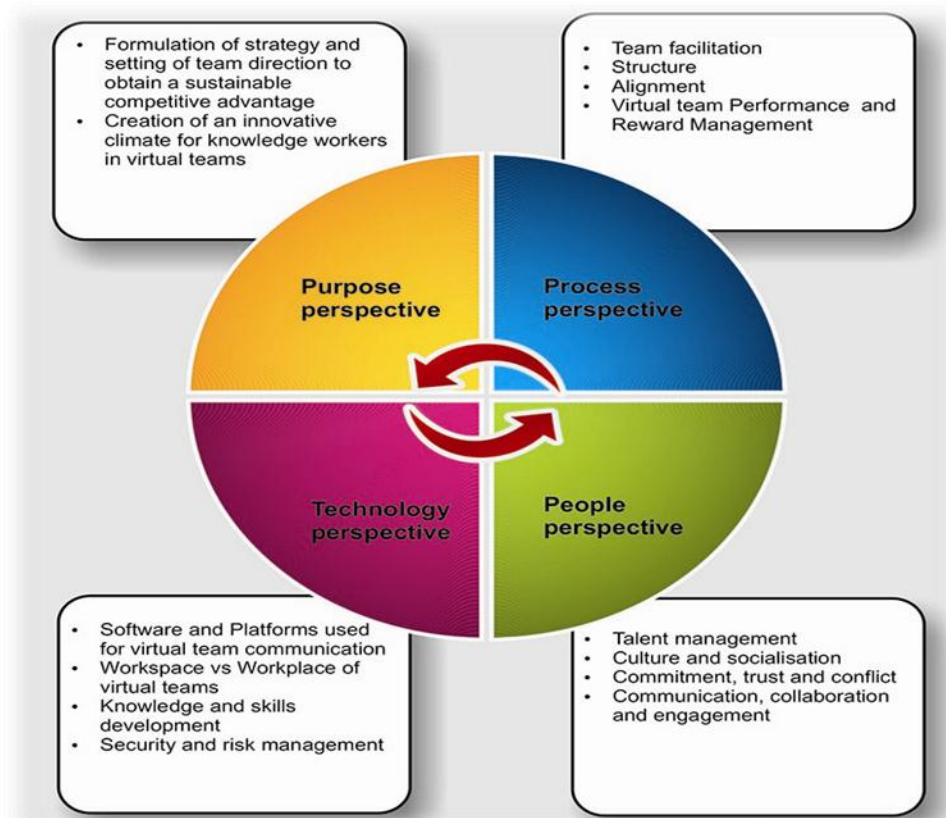


Figure 8.2: Author’s contemporary framework for best practices in the functioning of effective virtual teams in the software sector of the technology industry in South Africa

- Since the natural way for participants in this study is working virtually, utilising physical focus groups to obtain the information would have been inappropriate. Furthermore, using a questionnaire with only open questions would have been inappropriate because the participants were averse to elaborative writing communication protocols.

Hence, the conventional research instrument of a paper questionnaire and a focus group were modified and combined in an electronic questionnaire to explore the best practices in the functioning of effective virtual teams in an industry, which is typically associated with quantitative studies.

- Researchers should consider alternative methods (than approaching gatekeepers and electronic questionnaires) to gain access and information in the software sector of the technology industry in South Africa. The researcher experienced a high turnover of human resource managers, who acted as gatekeepers, and access had to be renegotiated more than once.

A contemporary and authentic electronic questionnaire was designed to investigate and extend the framework of Ebrahim *et al* (2009). This questionnaire was pre-tested and altered before utilisation in the empirical study to accommodate the need of knowledge workers in the technology industry not to write extensively, yet to provide insightful knowledge. The data analysing technique (see sections 3.7 and 4.4) typically associated with case studies is “content analysis” (Richards & Morse 2013:207). This data analysis research technique, provides “replicable and valid descriptions and interpretations of the written productions of a society or social group” (Krippendorff 2013:24; Marshall & Rossman 2011:161), and in this study, helped to determine the presence of certain effective themes (purpose, process, people and technology), words and concepts (best practices, functioning, effective virtual teams, the software sector of the South African technology industry) in text, such as the questionnaire, by coding the text in manageable sections. The outcome of the content analysis was used to make deductions about the meaning in the text with reference to the participants (see section 5.3 to 5.8). The analysis technique was found to be useful although contradictory to customary process and could thus be utilised in future research. The contradictory process in this study which was followed required that where information provided normally leads to a theme conceptualisation in qualitative studies, this study found the specific best practices while approaching in reverse (working from the contemporary theme descriptions to explore best practices), which might confuse the inattentive reader.

- Dealing with all four themes simultaneously was challenging and complex but provided a baseline for future research to focus on only one theme at a time to gain even greater insight into the already established realm of the adapted from Ebrahim *et al* (2009) model.

A sampling method for the technology industry in South Africa was produced.

The software sector of the technology industry in South Africa to a great extent follows international technology industry protocols such as sector of the industry, technology terminology used, means for collaborating and communicating; dealing with the risk of losing valuable, talented people, and applications and platforms:

- A specific research technique allowed the participants to communicate in a medium with which they are comfortable and acquainted to. The electronic questionnaire approach allowed the participants space to offer short answers, or to expand. The manner in which the participants secured their identity was sufficient for them to participate.
- The traditional process, firstly to create a team vision, mission and strategy, is not the leading step in the establishment of purpose for an effective virtual team and is changeable over time through communication. Instead, organisations need firstly to ensure that an integrated electronic management system exists with different associated platforms and quality networks before the implementation of virtual teams.
- Despite the underlying flexibility that the virtual team organisational design presents, specific unique virtual team decorum (which may differ from team to team) needs to be observed, which includes the protocol language used, members' roles, quality of hardware and software access, security regulations and extensive personal details about co-members because these serve as effectiveness enablers in the team.
- A strong value system between virtual team members instead of a range of specific processes and elements supports the functioning of effective virtual teams.
- The pursuit to sustain knowledge is a key enabling best practice in the functioning of people in effective virtual teams.
- Empirical evidence was produced to support the existence of virtual teams in the software sector of the technology industry in South Africa. The existence of the virtual team organisational design bridges time and geographical boundaries with technology, despite barriers to technology development, communication and collaboration on the African continent and in South Africa in particular.
- Security and risk concerns in this study were shared and understood by the participants. Vulnerability to security and risk was highlighted in that people who do not contribute to the technological knowledge and existing members frowned upon skills of the team.
- This study extends the Ebrahim *et al* (2009) model (figure 7.2) by adding new and contemporary insights into the best practices of virtual teams (figure 7.3).
- This contribution clarifies four categories of themes contributing towards best practices in effective virtual team, which set the scene for future research. The contribution is based on theoretical sufficiency (known in quantitative circles as "theoretical

saturation”) (Gibbs 2007:4; Marshall & Rossman 2011:220), obtained during analysis of the data.

- The qualitative research design and transcendental, phenomenological orientation to the interpretivistic research philosophy provided insight into the “invisible” processes, which in turn provided a baseline for the implementation of processes in virtual teams.
- In an effort to obtain a holistic overview on best practices in effective virtual teams, this study found an array of fragmented research on various themes and elements regarding virtual teams. A fundamental historical timeline was established by integrating this research into a comprehensive understanding of virtual teams (see section 2.4).

Upon reflection of this study, its findings can be regarded as universally applicable (despite the technological proliferation) and supporting the essence of the ethical theory of Immanuel Kant. A discussion on the Kant theory falls outside the ambits of this study. This ethical theory establishes that people (like the team members in effective virtual teams) have an individual purpose orientation towards life of what they want to achieve. People (participants) are likely to follow rational principles rather than a set of rules and regulations. They act according to a value system of pride in their work, respect for each other and sharing of information and commitment (Johnson 2008). In so doing, the participants in this study appeared to pursue their goal of knowledge acquisition to achieve an even higher goal of self-actualisation (Maslow, 1954:), in that participants were prepared to share in their insight and knowledge on the technology supporting this study, despite there be no rewards in it for them or their organisation.

8.6 CHIEF RECOMMENDATIONS OF THE STUDY

These recommendations are intended for the context of the software sector of the South African technology industry and their application could encourage best practices in the functioning of effective virtual teams in this sector in future.

The recommendations derived from the empirical study are set out as follows:

8.6.1 Purpose

The recommendations following, attempt to address the secondary research question: How does the primary research question contribute towards the unique purpose orientation of best practices in the functioning of effective virtual teams (theme 1)?:

- A pre-existing functional collaborative infrastructure should be part of a greater appropriate management system that stores, supports, develops important management information, and is regarded as the primary step in founding an effective virtual team. The integrated electronic management system should comprise different associated platforms and quality networks to augment creativity, but these platforms and networks should be integrated and interface with each other and provide access to people's expert abilities. This access is increasingly vital for the professional survival of team members and virtual teams.
- Formalities such as language use, team structure, virtual team member roles, and the quality of hardware, internet access, security regulations, and extensive personal details of co-members should be observed because they function as effectiveness enablers in the team.
- If formalities or processes are viewed by team members as unwise, duplicative or redundant, they are highly likely to disregard them. Organisational leaders should; therefore, take heed of the number and quality of processes, and the value added by them (current and new) to the effectiveness of the organisation where virtual teams are involved.
- In accordance with the adapted definition of Berry (2011:186-206), it is recommended that a more interactive and wide-ranging management information plan be established to enable individuals to differentiate between their goals and other people's goals, and they should be allowed the freedom to work independently.

8.6.2 Process

The recommendations set out in the following, attempt to address the secondary research question: In the light of some of the distinctive elements in the functioning of effective virtual team processes, how do elements influence the best practices in the functioning of processes (theme 2)?

Organisational leadership should be to embrace a holistic value system approach encapsulating specific elements (as indicated in the study), which guides the behaviour of organisational members and process conformity:

- It is evident from the study that the traditional hierarchical role and purpose of a team leader and team manager could be compromised in virtual teams (PROC1). A dual differential role between leading the performance of the virtual team and traditional administration was noted.

- Team facilitation based on specialised skills and knowledge (PEO1-2) may emerge parallel to the traditional management role, and clarification of each is needed to avoid conflict. It is recommended that organisations be aware of this tendency, and instead of forcing the managerial role, rather encourage natural development and leadership in the team.
- When selecting and appointing virtual team members, it is recommended that knowledge experts—obtained through human networks—are either selected, or developed, prior to when the necessity to assume such a role occurs to assume a leadership role in the virtual team.
- Although there is no indication that the typical hierarchical role of a virtual team manager has become obsolete, the roles and responsibilities of managers need to be formally specified and clarified.
- The Zachman information systems architecture for team structure in this industry is relevant, and should be considered in aligning the functions of virtual teams.
- Differing from Edwards and Wilson (2004:19), this study found and recommends that individual performance is invigorated by an expected celebration of team milestones to retain the focus on team activities.
- Regular, honest, monthly performance feedback of virtual team members is highly valued by members and is recommended. However, this study provided insight into the reason for this, as members have few other means of tracking their performance.
- Reward structure should allow for acknowledgement of individual, team and organisational performance.

8.6.3 People

The recommendations following attempt to address the secondary research question: What are the people practices that contribute to effective virtual teams (theme 3)?:

- Human networking to obtain talented and scarce human resources (such as experts in virtual teams) is regarded as the preferred sustainable method of recruitment in this industry.
- Sensitive transformational and strategic recruitment and induction practices for effective virtual teams need to be developed (Breagh *et al* 2008:45-82; Kepes & Delery 2007:385).
- Creative methods need to be found to accommodate South African labour legislation and yet give virtual team members clarification on the individual worlds of co-members, their work and their perspectives on people, which include cultural and religious

elements. This would promote written, sensitive, transformational working arrangements.

- Induction practices in virtual teams need intensive attention to allow for effective virtual teaming.
- Employers should be aware that the members of virtual teams are strongly independent, performance driven and have a high ethical value system orientation. Also, virtual teams are not recommended as the preferred or ideal working environment for all employees.
- Employers who decide to virtually link employees, who lack expertise and knowledge, are not performance driven or have a strong inclination towards dependency, are cautioned that such employees may contribute to conflict in the team, with the risk that they will be isolated.
- Time should be allowed to enable virtual team members to develop a shared value system (based on respect, trust, fairness and honesty).
- In dealing with the two main areas of conflict in a virtual team (lack of expertise and communication), it is recommended that third party dispute resolution processes (which are similar to those in traditional teams; i.e. private and voluntary meetings), are first utilised in virtual spaces (through synchronous and asynchronous communication), and that only the final steps are taken face-to-face if this is still necessary. In this respect, virtual team conflict resolution techniques seem to be similar to those suggested in the literature (Agustina, Sun & Xu 2012; Rahim 2011).
- In the creation of a virtual team that is meaningfully engaged in its work, it is recommended that organisations pay attention to selecting a healthy fit between team members for the collaboration between expertise in terms of knowledge, qualification, skills and people skills (PROC8), as is suggested for high-performing face-to-face teams (Akgün *et al* 2008:221-226; Siebdart *et al* 2009:63-68).
- It is recommended that organisations invest in presenting the availability of adjacent and alternative communication methods to enhance communication methods in the virtual team such as synchronous and asynchronous communication methods.
- Professional networking opportunities and organisational encouragement to participate in professional forums, knowledge sharing, and professional network opportunities, which support collaboration, communication and knowledge-increasing prospects, are recommended.
- It is recommended that proper qualifications, skills and personality fit with other team members should be encouraged in the talent management practices of virtual teams. These factors were valued by other virtual team members in the study and are similar to face-to-face teams because they contribute to the building of knowledge capacity in a team (Farmer 2008:125; Brown *et al* 2007:37-40).

- It is recommended that organisational leaders ensure that technological infrastructure, healthy social relationships and behavioural patterns as well as a trusting culture are created to increase connectedness and social bonding between virtual team members (Huang 2009; Powell *et al* 2004).

8.6.4 Technology

The following recommendations attempt to address the identification of best practices for staying conversant with and relevant to the latest technological changes, thus ensuring effective virtual team functioning (theme 4):

- The boundaries and shared workspaces of the virtual team environment should be specifically contracted (Clough & Nutbrown 2012:63; Lojesky & Reily 2008; Nemiro *et al* 2008:1–50). This addresses both security concerns of organisations and privacy between team members.
- Although synchronous and asynchronous communication may assist virtual teams to function in the short term, the effectiveness of the team will be severely compromised unless organisational leaders ensure that the quality technology required is provided as a matter of urgency (Lanubile *et al* 2010:52–55). It is recommended that the technology needs of virtual teams should be reviewed regularly.
- Virtual team members should be provided with a choice of the latest technological collaboration tools, which should fit the purpose for which they are intended (Lanubile *et al* 2010:52–55; Majchrzak *et al* 2000) to make smooth working transitions possible.
- Due to networking opportunities (both between people and technology), the risk behaviour of team members regarding cybercrime should be carefully monitored and suitably addressed and the cyber management should form part of the greater organisational risk management system (Maguire *et al* 2011:157; Hitchcock 2012:98–101).

8.7 JUSTIFICATION FOR THE RESEARCH

The justification for this exploratory study developed from a need by business to integrate technology into its competitive advantage and sustainability strategies in the design of organisations (see section 1.2.1). In addition, this study was necessitated by increasingly flexible work practices in teams sustained by the networking and technological adaption combination and shortages of skilled employees, leading the organisational design of virtual teams (see section 1.2.1). By providing directions on the functioning of effective virtual teams as substantiated by the

current perceptions of responding virtual team members, such best practices could overflow to other virtual teams.

A paucity of literature on best practices in the functioning of effective virtual teams in a BRICS country (South Africa) and the technology industry (the software sector in particular) made it difficult to establish these best practices (Beranek & Clairborne 2012:1–13).

Although many studies have investigated one or more themes, elements or features (Martins *et al* 2004; Powell *et al* 2004; Wade 2006; Schiller & Mandviwalla 2007; Gaudes *et al* 2007) of best practices in the functioning of effective virtual teams since the 1990s, an integrated compilation of the four effectiveness themes, as identified in this empirical study, has been lacking; hence the attempt made in this study (see figure 1.1).

During the attempt to provide a chronological summary of the history of the organisational design of virtual teams (see section 2.2.3), a wealth of controversial and diverse opinions of researchers were noted, which contributed to the complexity of the concept (Bergiel *et al* 2008:99–110; Lipnack & Stamps 1993:1–40; 1994:1–264; 1997:1–11; Miles & Snow 1986:62–73; Powel *et al* 2004:359–379).

To some degree (three perspectives), the results of this study confirmed the strength and explanatory power of the Ebrahim *et al* (2009) model for effective virtual teamwork regarding the process and people themes.

Lastly, there is a void in qualitative studies in the technology industry. This empirical study attempted to narrow the gap by providing scientific research (see section 8.6).

8.8 LIMITATIONS OF THIS STUDY

This research presented original, detailed and empirical clarification of the best practices in the functioning of effective virtual teams in the study context, following an established research design and methodologies, to conceptualise the significance of the data and make sense of it. Inevitably, in the realm of social science, making sense of research needs to be considered against the limitations of the study.

The aim of this research was to explore best practices in the functioning of effective virtual teams within the perimeters of the software sector of the South African technology industry and how these practices contribute to the secondary research objectives proposed as four themes (i.e. purpose, processes, people and technology) if at all.

Although the universal applicability of the four themes was endorsed in this study (see Chapter 3), one of the limitations of the empirical part of this research is that it should be appreciated within the presented context and cannot be generalised as was highlighted by GLAFAD credibility and member-checking (section 6.5.1).

The population and sample range of this study might be small, but is in line with the norms for qualitative case studies (see section 4.8.2).

Ideally, empirical research should be collected by means of an interview or focus group. However, given the virtual nature of the phenomenon under investigation and working in harmony with virtual team members; namely electronically, the research only offers a written description of the best practices in the functioning of effective virtual teams and limited evaluation of the themes to determine their effectiveness (see section 3.2.1). This was because the only two participants who were prepared to be contacted to clarify questions offered no new or different information than that already provided.

The research findings are positioned within the lived experiences of the participants and may or may not represent the experiences or views of the entire cadre of effective virtual teams in the software sector of the South African technology industry, despite the observation of theoretical data sufficiency (saturation) (see section 4.11).

Context units were shared in the axial code column with the participants' identification code to support theoretical sufficiency (see section 6.4.3: audit trail). These theoretically sufficient similarities are discussed under the "findings" heading following each table. However, in longer textual responses, the researcher attempted to understand the participants' experiences against certain theories, and certain substantiated deductions with (by the researcher) were made (Gibbs 2007:5) (see section 5.5).

The questionnaire was pre-tested (see Chapter 5) and modified to bridge potential barriers before final use. A number of challenges were experienced during both the pretesting and empirical study, which was beyond the control of the researcher (see section 5.2.2). The questionnaire was received as trustworthy (see section 5.4), but could be shortened if researchers only wish to focus on a single theme or element, which could attract a greater response rate.

Finally, this study is also limited because it presents snapshot-like descriptions of perceptions, practices, experiences, interpretations, and views over a particular time interval and may change at another point in time and in a different context (see section 4.6).

8.9 RESEARCH AGENDA FOR FUTURE RESEARCH

The following items constitute a research agenda which future research could address:

- This study sets the baseline for future research. Although the specific profile of the participating virtual team members required a qualitative, open-ended, electronic questionnaire to obtain their responses, the manner in which information was obtained needs attention as the response rate declined from start to finish of the questionnaire.
- The scale of this empirical study was limited to the software sector of the South African technology industry (as listed on the JSE). There is a need for more case studies in the greater software sector of the South African technology industry and comparison between the software sectors of the technology industries of each of the BRICS countries. However, this would only be possible if a trustworthy and credible population and sample size could be established for the industry.
- Dealing with all four themes simultaneously was challenging and complex. It is recommended that future research should only focus on one theme at a time to gain even greater insight.
- The use of a more user-friendly and electronically stable version of the same questionnaire could result in a greater number of respondents.
- The role of HR practitioners in virtual teams is unclear and represents a possible area for future research (OD4).
- Some teams had more than one manager, indicative of either dual, mentoring or co-management roles. The reason for this phenomenon is unclear and it is recommended as a possible area for future research (OD2).
- This study highlighted two main roles for managers of effective virtual teams in the software sector of the South African technology industry; namely administrative and relationship management. Other possible roles could also be explored.
- The flexible role and interaction between the manager assigned to deal with administrative duties and experts assuming leadership roles when specific fields of expertise arise, need to be explored and best practices in this regard investigated.
- Remuneration practices in effective virtual teams could be further investigated (PROC8).
- The sensitivity of a written declaration of virtual team members on cultural issues is noted in the absence of responses and it is recommended that this be further explored (PROC5).
- The applicability of the questionnaire in virtual teams in other knowledge working environments such as accounting, banking and law could be explored (B6).

- Further research into contractual protection of information to which virtual team members have access is a possibility for future research.

8.10 CONCLUDING REMARKS

The study started by identifying a gap in the literature that culminated in an explicit research question, which was investigated by using the conceptual framework of (primarily) Ebrahim *et al* (2009). This question was: What are the best practices in the functioning of effective virtual teams in the software sector of the South African technology industry and how do these practices contribute to the four proposed themes (i.e. purpose, processes, people, and technology), if at all?

The most appropriate research design employed in this instance was a qualitative multiple-case research design. The most appropriate research methodology to investigate the research question was a non-probability (judgmental) sample (Salkind 2012:96-103; Saunders *et al* 2012 262-281) of the effective virtual teams in the software sector. The measurement instrument used in the study was a descriptive questionnaire. An electronic questionnaire data collection instrument was used to gather data in a cross-sectional time horizon. Content analysis was applied to process the data obtained. This study was the first of its kind to investigate a collection of the four central themes as well as their chief constituent components. Previous studies investigated either fewer themes or fewer components of the themes.

It was found that the purpose, processes, people and technology themes are applicable to a greater or lesser degree to the understanding of best practices in the functioning of effective virtual teams. In the previous chapter, extensive feedback was given on the findings, interpretation and feedback pertaining to the purpose, process, people and technology themes. This chapter merely highlighted the critical best practices regarding the most important two themes of this study (namely, purpose, and process).

Although all the themes are interwoven, purpose and process played the most important role in the understanding of best practices in the functioning of effective virtual teams. This is in accordance with the conceptual framework of Ebrahim *et al* (2009) who specifically addressed process, although they did not investigate it to the extent of this study. In the purpose theme, an electronic management system, and in the process, theme knowledge, expansion, and protection were identified as the primary constituent components.

In all, the evidence of this empirical study, closed the research gap, (albeit marginally). In addition to the framework of Ebrahim *et al* (2009), the research framework of Wade (2006) and the

literature reviews of Martins *et al* (2004), Powell *et al* (2004), Schiller and Mandviwalla (2007) and Gaudes *et al* (2007) were confirmed to play a role in best practice.

The population in this study; namely software companies, where the designers of the software also gain access to other organisations' sensitive information, increasingly engage in strict security practices to protect valuable information. Future researchers in the technology industry need to discover novel ways to gain access to valuable information for research purposes. Overall, the aggregate change of the business technology landscape is undeniable, and business leaders need to explore innovative means to juggle seemingly incongruent interests.

ANNEXURE "A": THE FTSE INTERNATIONAL LIMITED (FTSE)/JSE GLOBAL CLASSIFICATION FOR ICT (OCT 2011)

Economic group	Sector	Subsector
Information technology in South Africa (90)	Information technology hardware (93)	Computer hardware (932) <i>Manufacturers of computers and associated electronic data processing equipment and accessories</i>
		Semiconductors (936) <i>Semiconductor capital equipment, wafer and chip manufacturers</i>
		Telecommunications equipment (938) <i>Manufacturers of digital equipment used in telecommunications, including mobile telephones, exchanges and microwave systems</i>
	Software and computer services (97)	Computer services (972) <i>Providers of computer services. Consultants for information technology not classified elsewhere (e.g. education, business training & employment agencies - 583)</i>
		Internet (974) <i>Access providers, internet software, on-line service providers</i>
		Software (97) <i>Producers of computer software</i>

ANNEXURE "B": BREAKDOWN OF SOUTH AFRICAN ORGANISATIONS LISTED ON THE JSE IN THE TECHNOLOGY INDUSTRY (NOV 2011)

Industry (MRK)	Sector (STS)	Sub-sector (SCT)	Instrument full name (FNM)	Latest financial year (FIN)	Latest market cap R (CAP)	5-year beta (BTA)	Last 5-year high closing price (HI5)	Last 5-year low closing price (LO5)
Technology	Technology, hardware & equipment	Computer hardware	MUSTEK LIMITED	Jun-11	576218087	0.42651	1115	102
Technology	Technology, hardware & equipment	Computer hardware	PINNACLE TECHNOLOGY HOLDINGS LTD	Jun-11	1908022746	0.88166	1075	140
Technology	Technology, hardware & equipment	Telecommunications equipment	AFRICA CELLULAR TOWERS LIMITED	Feb-11	29622982	0.35326	380	7
Technology	Technology, hardware & equipment	Telecommunications equipment	FONEWORX HOLDINGS LIMITED	Jun-11	131921979	0.77446	158	26
Technology	Technology, hardware & equipment	Telecommunications equipment	HUGE GROUP LIMITED	Feb-11	73883526	0.05815	549	30
Technology	Technology, hardware & equipment	Telecommunications equipment	POYNTING HOLDINGS LIMITED	Jun-11	13688141	-0.17132	120	5
Technology	Software & computer services	Computer services	ADAPTIT HOLDINGS LIMITED	Jun-11	65220243	0.36727	89	31
Technology	Software & computer services	Computer services	BUSINESS CONNEXION GROUP LIMITED	Aug-11	2146354080	0.34314	810	305
Technology	Software & computer services	Computer services	COMPU-CLEARING OUTSOURCING LIMITED	Jun-11	125299335	0.02733	325	185
Technology	Software & computer services	Computer services	CONVERGENET HOLDINGS LIMITED	Aug-11	228778985	0.29492	136	7
Technology	Software & computer services	Computer services	DATACENTRIX HOLDINGS LIMITED	Feb-11	892905721	0.54307	560	242
Technology	Software & computer services	Computer services	DATATEC LIMITED	Feb-11	7246887999	1.1023	4461	1050
Technology	Software & computer services	Computer services	EOH HOLDINGS LIMITED	Jul-11	2170101069	0.39452	2380	530
Technology	Software & computer services	Computer services	FARITEC HOLDINGS LIMITED	Jun-09	56746337	0	171	2
Technology	Software & computer services	Computer services	GIJIMA GROUP LIMITED	Jun-11	619748722	1.04676	126	32
Technology	Software & computer services	Computer services	ISA HOLDINGS LIMITED	Feb-11	169481481	0.46408	92	18
Technology	Software & computer services	Computer services	PARACON HOLDINGS LIMITED	Sep-11	653970245	0.78688	295	103
Technology	Software & computer	Computer services	PBT GROUP LIMITED	Aug-11	394557545	-0.32054	150	8

	services							
Technology	Software & computer services	Computer services	SECUREDATA HOLDINGS LIMITED	Jul-11	123160135	1.07991	215	23
Technology	Software & computer services	Computer services	SQUARE ONE SOLUTIONS GROUP LIMITED	Dec-09	4439441	0	128	8
Technology	Software & computer services	Software	TOTAL CLIENT SERVICES LIMITED	Feb-11	7802693	-0.17931	38	1
Technology	Software & computer services	Software	ALLIANCE MINING CORPORATION LIMITED	Feb-09	233300834	0	890	160
Technology	Software & computer services	Software	IFCA TECHNOLOGIES LIMITED	Dec-13	30187500	0.01318	58	2
Technology	Software & computer services	Software	SILVERBRIDGE HOLDINGS LIMITED	Jun-11	49389690	0.21243	405	40
Technology	Software & computer services	Software	UCS GROUP LIMITED	Sep-11	168171874	0	545	32

ANNEXURE "C": INTEGRATED SUMMARY OF RESEARCH CONTRIBUTIONS TOWARDS BEST PRACTICES IN VIRTUAL TEAMS 1788-2013

Data basis contributor	Theory contributor	Year	Effectiveness indicator in VT	Theory name	Brief theory description	Fellowship theory	Ebrahim, Ahmed and Taha (2009a;b) 12 factors describing VT working	Contribution towards VT best practice	Input technology (Hackman & Morris in 1957)	Input task (Hackman & Morris)	Input composition (Hackman & Morris)	Process planning (Hackman & Morris)	Process action (Hackman & Morris)	Process interpersonal (Hackman & Morris)	Team outcome affective (Hackman & Morris)	Team outcome performance (Hackman & Morris)
Wade (2006)	Latour	1986		Actor network theory (ANT)	Objects such as technology are treated as part of social networks											
Martins, <i>et al</i> (2004); Piccoli <i>et al</i> (2004)	Giddens	1984		Adaptive structuration theory (AST)	AST followed ST (1980) by Giddens (1980). Changes to the use, application and role of technology in teams' work activities influence the perception of teams and how they respond and adapt to it.	Krumpel (2000)		Group knowledge production possible in VT. Groups engaged in knowledge production would do better with a leader.					X	X		X
Martins <i>et al</i> (2004); Piccoli <i>et al</i> (2004)	Giddens	1984		Adaptive structuration theory (AST)	AST followed ST (1980) by Giddens (1980). Changes to the use, application and role of technology in teams' work activities influence the perception of teams and how they respond and adapt to it.	Qureshi & Vogel (2001)		Provide framework of adaptation and organisational challenges in VTs. Review of current research on adaptation.			X		X			
Wade (2006); Martins <i>et al</i> (2004); Piccoli <i>et al</i> (2004)	Giddens	1984		Adaptive structuration theory (AST)	AST followed ST (1980) by Giddens (1980). Changes to the use, application and role of technology in teams' work activities influence the perception of teams and how they respond and adapt to it.	Archer (1990)		VT took longer to reach decision, but had equal quality and satisfaction.								

Wade (2006); Martins <i>et al</i> (2004); Piccoli <i>et al</i> (2004)	Giddens	1984		Adaptive structuration theory (AST)	AST followed ST (1980) by Giddens (1980). Changes to the use, application and role of technology in teams' work activities influence the perception of teams and how they respond and adapt to it.	Majchrzak <i>et al</i> (2000)		Using collaborative technology creates several misalignments with pre-existing structure and environment. VTs need to adapt all 3 structures – technology, organisational environment, and work group structures.		X						X
Wade (2006); Martins <i>et al</i> (2004); Piccoli <i>et al</i> (2004)	Giddens	1984		Adaptive structuration theory (AST)	AST followed ST (1980) by Giddens (1980). Changes to the use, application and role of technology in teams' work activities influence the perception of teams and how they respond and adapt to it.	Maznevski & Chudoba (2000)		Using collaborative technology creates several misalignments with pre-existing structure and environment. VTs need to adapt all 3 structures – technology, organisational environment, and work group structures.					X			X
Wade (2006); Martins <i>et al</i> (2004); Piccoli <i>et al</i> (2004)	Giddens	1984		Adaptive structuration theory (AST)	AST followed ST (1980) by Giddens (1980). Changes to the use, application and role of technology in teams' work activities influence the perception of teams and how they respond and adapt to it.	Sarker, Lau & Sahay (2001)		Communication, collaboration, social norms all adapt and change in different stages of team development			X					
Wade (2006); Piccoli <i>et al</i> (2004); Schiller & Mandviwalla (2007)	Giddens	1984		Adaptive structuration theory (AST)	AST followed ST (1980) by Giddens (1980). Changes to the use, application and role of technology in teams' work activities influence the perception of teams and how they respond and adapt to it.	Chidambaram, Bostrom & Wynne (1991)		Social structure is viewed as rules and resources provided through technology as the basis of human activity. Social structure in VT is difficult to identify due to the liquidity of social team members. Conflict resolution and cohesiveness both initially better in CT, by								

								time 4, VT better at both and VT more likely to think of ideas as "ours".								
Wade (2006)	Alchian & Demsetz	1972		Agency theory (principal-agent problem)	There are difficulties in inspiring one party (the "agent"), to act in the best interests of another (the "principal") rather than in agent's own interests, as they have different interests and different sources of information.	Game theory		There are difficulties in inspiring one party (the "agent"), to act in the best interests of another (the "principal") rather than in agent's own interests, as they have different interests and different sources of information.								
Wade (2006)	Toulmin	1958		Argumentation theory (Toulmin, 1958)	Agreements are reached through logical reasoning, which includes elements of communication such as persuasion, debate, conversation and dialogue.			Agreements are reached through logical reasoning, which includes elements of communication such as persuasion, debate, conversation, and dialogue.								
Schiller & Mandviwalla (2004)	Balthazard, Potter & Warren	2004		Big five personality model	The big five are bipolar dimensions of personality that have been found to form the taxonomic (and factorial) core of personality models and also capture a layperson's description of personality as found in everyday language. These dimensions or factors are extraversion, agreeableness, conscientiousness, openness and neuroticism.			Theory provides a basis for explanation of human interaction between VT members. Because these members are dispersed, personality may contribute more to the effectiveness of communication, compared to face-to-face teams.								

Martins et al (2004); Piccoli et al (2004)	Axelsson	2003		Business action theory (BAT)	Engagement in business processes over an extended period contributes towards stable business relationships.	Axelsson (2003)		Virtual team engagement in business processes over an extended period contributes towards stable business relationships in virtual teams.	X							X
Wade (2006)	Hartmanis & Stearns	1965		Chaos theory (dynamical instability, entropy theory, complexity Theory, computational complexity theory)	Behaviour in dynamic systems is highly sensitive to initial conditions. These conditions may yield widely diverging results.											
Martins et al (2004)	Hartmanis & Stearns	1965		Chaos theory (dynamical instability, entropy theory, complexity Theory, computational complexity theory)	Slight changes in initial conditions of dynamic teams, could render an unpredictable outcome.	Lorenz, Yorke, Mandelbrot & Gleick (1993); Poincaré		Behaviour in different systems is very sensitive to new conditions. Small changes in initial conditions could acquiesce to great deviations in outcomes.					X	X		
Wade (2006)	Festinger	1957		Cognitive dissonance theory (CDT) (dissonance theory, cognitive consistency theory)	In building a particular belief system, individuals will strive to reduce elements, which are in discord with that belief system.	Vessey (1991)		People direct their behaviour to bring alignment between what they experience and their reality.								
Martins et al (2004); Schiller & Mandviwalla (2004)	Schmidt, Montoya-Weiss & Massey	2001		Commitment theory	Members or employees who have strong commitment towards the organisation can be trusted to use their discretion to perform job tasks in ways that are consistent with organisational goals.			In virtual teams, commitment theory can partially explain why some team members are trusted more than others, especially in consideration of the assignment of VT			X			X		

								leadership. Construct of commitment is very "fuzzy" and difficult to measure or manipulate. It is probably too vague to be used as a subjective measure of virtual team members.								
Piccoli <i>et al</i> (2004)	Montoya-Weiss, Massey & Song	2001		Conflict management behaviour theory	The manner of conflict resolution results in positive and negative outcomes.			Avoidance, compromise and conflict have a negative relationship with performance. Process structure weakens negative effect on performance for avoidance, compromise and conflict. Competition, collaboration conflict has a positive relationship with performance.						X		X
Martins <i>et al</i> (2004); Piccoli <i>et al</i> (2004)	Paul, Seetharaman & Mykytyn	2004		Conflict management behaviour theory	The five conflict-handling modes would have different B handling modes to describe conflict management in organisational work groups: avoidance, accommodation, competition, collaboration, and compromise, which affect performance in virtual teams. The theory provides possible ways to resolve conflicting effects.			In the process of virtual teamwork, it is very likely that these conflict-handling modes are interrelated. Thus, it is difficult to distinguish between them, which lead to difficulty of analysis.			X			X	X	
Wade (2006)	Fiedler	1964		Contingency theory of leadership effectiveness	Theory proposes that group performance is a result of interaction between two factors: leadership style and situational favourableness.			Theory predicts that using computer-mediated communication to accomplish complex collaborative work will be difficult, especially for tasks that require interactive, expressive, communication. Team effectiveness depends on the most suitable								

							complement between the demands of the situation and the leader's style and traits. The challenge is how to assess situational favourableness in virtual teams. There are some factors; for example, characteristics of tasks, availability of time, and communication technologies that may change the situation fundamentally. Therefore, it is not easy to separate and analyse the effects of these factors.									
Piccoli <i>et al</i> (2004)				Contingency theory of leadership effectiveness		Galegher & Kraut (1994)	CT more effective planning, revising/writing, perceived fairness, communication quality. VT had more total communication. No difference in project performance. VT requires and spends more time communicating. VT has more coordination difficulty, fewer social conversations.				X	X	X			
Martins <i>et al</i> (2004); Piccoli <i>et al</i> (2004)				Contingency theory of leadership effectiveness		Kayworth & Leidner (2000)	VTs using more communication methods are more satisfied and more successful. Cultural differences intensify communication and coordination problems. Effective leadership needed, richer communication facilitates socialisation.					X	X			X

Schiller & Mandviwalla (2004)				Contingency theory of leadership effectiveness		Belanger, Collins & Cheney (2001)										
Martins <i>et al</i> (2004)	Piccoli & Ives	2003		Control theory	Parameters of behaviour in a system or team can be manipulated towards a desired effect.									X		X
Wade (2006)	Habermas	1971		Critical social theory (CAST) (critical theory, critical theory of society) (Raymond) (Geuss, 1981)	Mutual understanding could be achieved by following universal pragmatic principles.	Aristotle's hermeneutic theory										
Martins <i>et al</i> (2004); Piccoli <i>et al</i> (2004)	Buber	1958		Dialogue theory	In dialogue, there is no attempt to win or prevail in a discussion, it requires an "empty place" to give all participants the necessary space to talk, and it reflects the communicator's ethics.	Tan, Wei, Huang & Ng (2000)							X		X	
Wade (2006)	Lazarsfeld, Berelson & Gaudet	1949		Diffusion of innovations (DOI) (Innovation diffusion theory (IDT))	New ideas and technology spread cultures through the communication channels in the organisation's social system.											
Wade (2006)	Barney	1986		Dynamic capabilities (DC) (dynamic capabilities perspective)	The ability of an organisation to create, integrate and regenerate internal and external competences to address rapidly changing environments.											
Wade (2006)	Darwin	1859		Evolutionary theory (theory of natural selection)	Natural selection of the stronger beings of the species occurs naturally to counteract the demands of competition.	(Gould, 2002)										
Wade (2006)	Oliver	1977		Expectation confirmation theory (ECT); Expectation disconfirmation theory (EDT)	Expectations reflect anticipated behaviour and are predictive, indicating expected product attributes at some point in the future.											

Wade (2006)	Wollstonecraft	1988		Feminism theory (Wollstonecraft, 2003)	Genders should be treated as rational beings to create a social order based on reason.											
Wade (2006)	Von Neumann & Morgenstern	1944		Game theory (theory of games; theory of social situations)	For decision making a balance needs to be found in terms of conflict and cooperation between the decision makers.											
Wade (2006)	Von Bertalanffy	1934		General systems theory (GST) (systems theory; open systems theory; systemic theory)	Character of people is complex. The combined character of team members is bigger than that of the individual and could Therefore be considered to be new and complex.											
Wade (2006)	Langer	1995		Illusion of control (IOC)	There is a tendency for people to overestimate their ability to control events. Feedback on successes enhances the illusion, while negative feedback decreases the effect.											
Wade (2006)	Miller	1956		Information processing theory (IP theory; IPT)	Individuals acquire, remember, process and share information differently.											
Wade (2006)	Kiesler, Siegel, & McGuire	1984		Inputs-processes-outcomes (I-P-O) model	Data has to flow into the system in some form: input, process, output, storage							X	X			
Wade (2006)	Selznick	1948		Institutional theory (INT) (Institutionalism; adaptation theory)	Organisational arrangements and social norms influence the organisation and team.											
Martins <i>et al</i> (2004)	Barney, Grant, Kogut, Zander & Nonaka	1996		Knowledge-based theory of the firm (KBT; KBV) (Knowledge-based view of the firm; knowledge-based perspective of the firm)	Knowledge as the most strategically significant resource of an organisation. Resources are socially complex, difficult to imitate and are a basis for building a sustained competitive advantage and superior corporate performance.	Social-cognitive model of behaviour (S-C)				X					X	
Martins <i>et al</i> (2004); Piccoli <i>et al</i>	Robey, Khoo & Powers	2000		Learning theories	Information is absorbed, processed, and retained differently among individuals					X						X

(2004)					during learning.			improves coordination. CT meetings are needed to gain respect, trust, and interpersonal relations. Choice of technology based on many factors. Learning can be effectively accomplished in VT if training is not confined to the process before the start of virtual teamwork and is also more likely to be effective if used during the process of work with other members.								
Wade (2006)	Daft & Lengel	1984		Media richness theory	This knowledge is embedded and carried through multiple entities, including organisational culture and identity, policies, routines, documents, systems and employees.											
Martins <i>et al</i> (2004); Piccoli <i>et al</i> (2004); Schiller & Mandviwalla	Daft & Lengel	1984		Media richness theory (MRT)	MRT suggests that media vary in levels of richness according to the number of cues they are able to convey, the timeliness of feedback, and the capacity for natural expression. The commonly used media are face-to-face communication, phone, text, fax, e-mail and video conference.	Majchrzak <i>et al</i> (2000)		CT or phone used for ambiguous tasks, managing conflicts, brainstorming, clarifying goals, etc. VT used for routine tasks of analysis, project status. CT meetings early on created a shared language between members – this enabled ambiguous tasks to be completed later by CT.		X						X
Martins <i>et al</i> (2004); Piccoli <i>et al</i> (2004); Schiller & Mandviwalla	Daft & Lengel	1984		Media richness theory		Warkentin & Beranek (1999); Zack & McKenney (1995); Lee (2000); Pauleen & Yoong (2001); Lowry & Nunamaker		By mid-point of VT life, teams with communication training had higher trust, commitment to team goals, openness of expression and better interaction processes.						X	X	X

					(2003)												
Martins <i>et al</i> (2004); Piccoli <i>et al</i> (2004)	Daft & Lengel	1986		Media richness theory		Ramesh & Dennis (2002)		VTs may operate better as object-oriented teams – decoupling team members through use of well-defined processes, inputs, and/or outputs rather than trying to tightly couple members may improve coordination in VTs.	X		X	X	X	X			X
Martins <i>et al</i> (2004); Schiller & Mandviwalla (2004)	Murthy & Kerr	2003		Media synchronicity theory (MST)	State in which individuals are working together at the same time with a common focus using specific media	Peffer & Tuunanen (2005)								X			
Martins <i>et al</i> (2004)	Wakefield, Leidner & Garrison	2008		Model of conflict, leadership, and performance in virtual teams	The leader of a virtual team should exhibit different roles to reduce conflict such as assuming the role of monitor and coordinator of activities.									X			
Martins <i>et al</i> (2004)	Hiltz, Johnson & Turoff	1986		No specific theory utilised as base						X				X			X
Martins <i>et al</i> (2004)	Siegel, Dubrovsky, Kiesler & McGuire	1986		No specific theory utilised as base					X					X	X		X
Martins <i>et al</i> (2004)	Sproull & Kiesler	1986		No specific theory utilised as base							X			X	X		
Martins <i>et al</i> (2004)	Feldman	1987		No specific theory utilised as base										X			
Piccoli <i>et al</i> (2004)	Eveland & Bikson	1988		No specific theory utilised as base				In face-to-face teams greater leadership stability. VT leadership fluctuated more. VT created unique structure. VT satisfaction continually increased. CT satisfaction									

								remained same. VT communicated more.								
Piccoli <i>et al</i> (2004)	Sharda, Barr & McDonnell	1988		No specific theory utilised as base				VT more effective and took longer to make decision. No difference between VT and CT on confidence, alternatives generated.								
Martins <i>et al</i> (2004)	Jarvenpaa, Rao & Huber	1988		No specific theory utilised as base					X				X		X	X
Martins <i>et al</i> (2004)	Zigurs, Poole & DeSanctis	1988		No specific theory utilised as base									X			
Martins <i>et al</i> (2004)	Connolly, Jessup & Valacich	1990		No specific theory utilised as base										X	X	X
Martins <i>et al</i> (2004)	Spears, Lea & Lee	1990		No specific theory utilised as base										X		
Martins <i>et al</i> (2004)	Dubrovsky, Kiesler & Sethna	1991		No specific theory utilised as base									X	X		
Martins <i>et al</i> (2004)	Jessup & Tansik	1991		No specific theory utilised as base									X		X	
Martins <i>et al</i> (2004)	Poole, Holmes & DeSanctis	1991		No specific theory utilised as base								X	X	X		
Martins <i>et al</i> (2004)	Gallupe, Dennis, Cooper, Valacich, Bastianutti & Nunamaker	1992		No specific theory utilised as base							X				X	X
Martins <i>et al</i> (2004)	Lea & Spears	1992		No specific theory utilised as base							X					
Martins <i>et al</i> (2004)	Valacich, Dennis & Nunamaker	1992		No specific theory utilised as base							X		X			X
Martins <i>et al</i> (2004)	Weisband	1992		No specific theory utilised as base												X

Martins <i>et al</i> (2004)	Daly	1993		No specific theory utilised as base						X						X
Martins <i>et al</i> (2004)	Straus & McGrath	1994		No specific theory utilised as base						X					X	X
Martins <i>et al</i> (2004)	Valacich, Dennis & Connolly	1994		No specific theory utilised as base							X				X	X
Martins <i>et al</i> (2004)	Valacich, George, Nunamaker & Vogel	1994		No specific theory utilised as base							X					X
Martins <i>et al</i> (2004)	Aiello & Kolb	1995		No specific theory utilised as base										X	X	X
Martins <i>et al</i> (2004)	Hinds & Kiesler	1995		No specific theory utilised as base					X				X			
Martins <i>et al</i> (2004)	Valacich & Schwenk	1995		No specific theory utilised as base									X		X	X
Martins <i>et al</i> (2004)	Weisband, Schneider & Connolly	1995		No specific theory utilised as base							X					
Martins <i>et al</i> (2004); Piccoli <i>et al</i> (2004)	Savicki, Kelley & Lingenfelter	1996		No specific theory utilised as base							X		X	X		
Martins <i>et al</i> (2004)	Bouas & Arrow	1996		No specific theory utilised as base							X			X		
Martins <i>et al</i> (2004)	Lebie, Rhoades & McGrath	1996		No specific theory utilised as base								X	X	X		
Martins <i>et al</i> (2004)	Saphiere	1996		No specific theory utilised as base										X		X
Martins <i>et al</i> (2004)	Shepherd, Briggs, Reinig, Yen & Nunamaker	1996		No specific theory utilised as base									X			X
Martins <i>et al</i> (2004)	Straus	1996		No specific theory utilised as base							X		X		X	X
Martins <i>et al</i> (2004)	Bhappu, Griffith & Northcraft	1997		No specific theory utilised as base							X		X			

Martins <i>et al</i> (2004)	Gefen & Straub	1997		No specific theory utilised as base						X					
Martins <i>et al</i> (2004)	McLeod, Baron, Marti & Yoon	1997		No specific theory utilised as base						X		X			
Piccoli <i>et al</i> (2004)	Burke & Aytes	1998		No specific theory utilised as base				No difference between VT and CT in cohesiveness, performance, and equality of participation. Leadership better in CT, VT better at coordination at start.							
Martins <i>et al</i> (2004)	El-Shinnawy & Vinze	1998		No specific theory utilised as base					X	X					
Martins <i>et al</i> (2004)	Graetz, Boyle, Kimble, Thompson & Garloch	1998		No specific theory utilised as base					X						
Martins <i>et al</i> (2004)	Hedlund, Ilgen & Hollenbeck	1998		No specific theory utilised as base								X			X
Martins <i>et al</i> (2004)	Sosik, Avolio & Kahai	1998		No specific theory utilised as base											X
Martins <i>et al</i> (2004)	Tan, Wei, Watson, Clapper & McLean	1998		No specific theory utilised as base						X	X			X	
Martins <i>et al</i> (2004); Piccoli <i>et al</i> (2004)	Johansson, Dittrich & Juustila	1999		No specific theory utilised as base				Communication and coordination: power, doing it predictability and culture.					X		
Martins <i>et al</i> (2004)	Bordia, DiFonzo & Chang	1999		No specific theory utilised as base									X	X	
Martins <i>et al</i> (2004)	Weisband & Atwater	1999		No specific theory utilised as base						X					X
Ebrahim <i>et al</i> (2009a;b)	Bal & Gundry	2000		No specific theory utilised as base				Virtual team working: people point of view							

Ebrahim <i>et al</i> (2009a;b)	Bal & Gundry	2000		No specific theory utilised as base			Virtual team working: people point of view - reward structure									
Ebrahim <i>et al</i> (2009a;b)	Bal & Gundry	2000		No specific theory utilised as base			Virtual team working: People point of view- Meeting training									
Ebrahim <i>et al</i> (2009a;b)	Bal & Gundry	2000		No specific theory utilised as base			Virtual team working: Process point of view- Alignment									
Gaude, Hamilton-Bogart, Marsch & Robinson (2007)	Warkentin & Beranek	1999	Leader, Organisation, Project	No specific theory utilised as base				Establishment of a team leader. Identification of appropriate team members. Incorporation of channels for social cues.								
Martins <i>et al</i> (2004); Ebrahim <i>et al</i> (2009a;b) ; Piccoli <i>et al</i> (2004)	Kaiser, Tullar & McKowen	2000		No specific theory utilised as base				To improve performance in VT: intermediate goals as well as final goals, similar training for all, clear structure, team maintenance activities/team building.			X				X	X
Martins <i>et al</i> (2004); Piccoli <i>et al</i> (2004)	Majchrzak <i>et al</i>	2000		No specific theory utilised as base				Three management practices contribute to success of VT: strategy setting, technology use should facilitate shared knowledge and collaborative use, restructuring work without changing core needs.		X					X	X

Martins et al (2004); Piccoli et al (2004)	Van Rysson & Godar	2000		No specific theory utilised as base				Cultural differences created problems for under-grad students in areas of socialisation, communication, coordination. Training needed both in how to communicate and in how to use technology.	X				X			
Martins et al (2004)	Maznevski & Chudoba	2000		No specific theory utilised as base						X			X			X
Martins et al (2004)	Tidwell & Walther	2000		No specific theory utilised as base									X	X		
Ebrahim et al (2009a;b)	Wong & Burton	2000		No specific theory utilised as base			Virtual team working: process point of view - meeting structure									

Martins <i>et al</i> (2004); Piccoli <i>et al</i> (2004)	Galvin & Ahuja	2001		No specific theory utilised as base				Newcomers to team engage in greater info seeking, established members engage in more info providing. Established members engage more in seeking norms and values info. New members more likely to seek out this type of info from "private" source.			X		X			X
Martins <i>et al</i> (2004); Piccoli <i>et al</i> (2004)	Lurey & Raisinghani	2001		No specific theory utilised as base				Team processes and member relations had strongest relationship to performance and satisfaction. Selection procedures and executive leadership style moderately related to performance and satisfaction.		X	X	X			X	X
Martins <i>et al</i> (2004); Piccoli <i>et al</i> (2004)	Mark	2001		No specific theory utilised as base				Key challenges of VT of participation, team culture, and integrating remote work discussed.			X		X	X	X	
Martins <i>et al</i> (2004); Piccoli <i>et al</i> (2004)	Suchan & Hayzak	2001		No specific theory utilised as base				Communication most important factor for success, seen as strategic activity to be considered daily. Mentoring program enabled socialisation of members. Leaders used CT meetings to help develop trust. Culture and reward system supported information-sharing.	X			X	X	X		
Gaudes, Hamilton-Bogart, Marsch & Robinson (2007)	Staples	2001	Individual organisation	No specific theory utilised as base				Action-oriented individuals, diversity in the team, the development of policies and procedures in the organisation, communication and trust important in teams. Team leaders to avoid hands-on management approach, should empower and give feedback to team members, set goals and direction of team. Team leader should also time appropriate team leading approaches.								

Martins <i>et al</i> (2004); Piccoli <i>et al</i> (2004)	McDonough, Kahn & Barczak	2001		No specific theory utilised as base				Behavioural challenges greatest in global VT, then VT, then CT, project management challenges least in VT. Performance greatest in CT, then VT, then global VT. Greater project management challenges are associated with lower performance for all three types of teams. Project management challenges more a function of distance between members than cultural differences.			X	X	X	X		X
Martins <i>et al</i> (2004)	May & Carter	2001		No specific theory utilised as base					X							X
Martins <i>et al</i> (2004)	Mortensen & Hinds	2001		No specific theory utilised as base						X	X			X		X
Martins <i>et al</i> (2004)	Ratcheva & Vyakarnam	2001		No specific theory utilised as base									X	X	X	
Martins <i>et al</i> (2004)	Schmidt, <i>et al</i>	2001		No specific theory utilised as base							X			X	X	X
Martins <i>et al</i> (2004)	Yoo & Kanawattanachai	2001		No specific theory utilised as base									X	X	X	
Ebrahim <i>et al</i> (2009a;b)	Bal & Teo	2000		No specific theory utilised as base			Virtual team working: technological point of view - security									
Ebrahim <i>et al</i> (2009a;b)	Bal & Teo	2000		No specific theory utilised as base			Virtual team working: people point of view - reward structure									
Ebrahim <i>et al</i> (2009a;b)	Lurey & Raisinghani	2001		No specific theory utilised as base			Virtual team working: people point of									

							view - reward structure									
Ebrahim <i>et al</i> (2009a;b)	Bal & Teo	2000		No specific theory utilised as base			Virtual team working: people point of view - meeting training									
Martins <i>et al</i> (2004); Piccoli <i>et al</i> (2004)	Sarker & Sahay	2004		No specific theory utilised as base				Strategies for dealing with challenges involved with VTs		X			X			X
Martins <i>et al</i> (2004)	Andres	2002		No specific theory utilised as base										X	X	X
Martins <i>et al</i> (2004)	Baker	2002		No specific theory utilised as base					X				X	X		X
Martins <i>et al</i> (2004)	Burgoon, Bonito, Ramirez, Dunbar & Kam	2002		No specific theory utilised as base					X			X				X
Martins <i>et al</i> (2004)	Cappel & Windsor	2002		No specific theory utilised as base					X						X	X
Martins <i>et al</i> (2004)	Huang, Wei, Watson & Tan	2002		No specific theory utilised as base								X		X	X	X
Martins <i>et al</i> (2004)	Johnson, Suriya, Yoon, Berrett & La Fleur	2002		No specific theory utilised as base										X		
Martins <i>et al</i> (2004)	Kanawatta nachai & Yoo	2002		No specific theory utilised as base										X		X
Martins <i>et al</i> (2004)	Morris, Marshall & Rainer	2002		No specific theory utilised as base					X					X	X	

Martins <i>et al</i> (2004)	Nemiro	2002		No specific theory utilised as base									X			
Martins <i>et al</i> (2004)	Potter & Balthazard	2002		No specific theory utilised as base							X			X	X	X
Martins <i>et al</i> (2004)	Sharifi & Pawar	2002		No specific theory utilised as base					X				X	X		X
Martins <i>et al</i> (2004)	Sole & Edmondson	2002		No specific theory utilised as base									X			X
Martins <i>et al</i> (2004)	Thompson & Coover	2002		No specific theory utilised as base											X	
Ebrahim <i>et al</i> (2009a;b)	Bell & Kozlowski	2002		No specific theory utilised as base			Virtual team working: technological point of view - location									
Ebrahim <i>et al</i> (2009a;b)	Bell & Kozlowski	2002		No specific theory utilised as base			Virtual team working: people point of view									
Ebrahim <i>et al</i> (2009a;b)	Kayworth & Leidner	2002		No specific theory utilised as base			Virtual team working: people point of view - specify objective									
Ebrahim <i>et al</i> (2009a;b)	Kayworth & Leidner	2002		No specific theory utilised as base			Virtual team working: process point of view - meeting structure									

Martins <i>et al</i> (2004)	Alge, Wiethoff & Klein	2003		No specific theory utilised as base						X		X	X		X
Martins <i>et al</i> (2004)	Aubert & Kelsey	2003		No specific theory utilised as base				X		X				X	X
Martins <i>et al</i> (2004)	Gonzalez, Burke, Santuzzi & Bradley	2003		No specific theory utilised as base									X		X
Martins <i>et al</i> (2004)	Leenders, van Engelen & Kratzer	2003		No specific theory utilised as base					X	X		X			X
Martins <i>et al</i> (2004)	Nowak	2003		No specific theory utilised as base						X		X			
Martins <i>et al</i> (2004)	Sarker, Valacich & Sarker	2003		No specific theory utilised as base							X		X	X	X
Martins <i>et al</i> (2004)	Workman, Kahnweiler & Bommer	2003		No specific theory utilised as base				X					X	X	
Martins <i>et al</i> (2004)	Ahuja & Galvin	2003		No specific theory utilised as base						X		X			
Ebrahim <i>et al</i> (2009a;b)	Massey <i>et al</i>	2003		No specific theory utilised as base			Virtual team working: process point of view - meeting structure								
Ebrahim <i>et al</i> (2009a;b)	Massey <i>et al</i>	2003		No specific theory utilised as base			Virtual team working: process point of view - team facilitation								
Gaudes, Hamilton-Bogart, Marsch & Robinson	Gaudes	2003	Organisation	No specific theory utilised as base				Organisations should have focus, an indication of timeframe duration, precision and volition. Organisational scope and stability are important.							

(2007)																
Gaudes <i>et al</i> (2007)	Martins <i>et al</i>	2004	Individual , team, leader, organisation, project, technology	No specific theory utilised as base	Application of model, meant for stable VT, but where members have both interaction with vocal team and co-located others			Team composition, size, membership characteristics and participation in the team important. The team should have an identity and be able to interact informally. The leader should time and plan events. The organisation should allow for social integration.								
Gaudes <i>et al</i> (2007)	Piccoli <i>et al</i>	2004	Individual , team	No specific theory utilised as base				Culture, team design, communication and relationship building play important roles in team effectiveness.								
Martins <i>et al</i> (2004)	Kirkman, <i>et al</i>	2004		No specific theory utilised as base							X			X		X
Ebrahim, <i>et al</i> (2009a;b)	Furst <i>et al</i>	2004		No specific theory utilised as base			Virtual team working: process point of view - meeting structure									
Ebrahim, <i>et al</i> (2009a;b)	Kirkman <i>et al</i>	2004		No specific theory utilised as base			Virtual team working: process point of view - performance management									
Gaudes <i>et al</i> (2007)	Ortiz de Guinea <i>et al</i>	2012	Individual , team, leader, organisation, project	No specific theory utilised as base				The degree of membership virtuality and disposition towards trust contribute to the effectiveness of virtual teams, as well as supervisory behaviour and the organisational context. The task design for virtual teaming, the ability of team members to seek support and information further contribute towards effectiveness of a virtual team.								

Ebrahim, <i>et al</i> (2009a;b)	Mikkola <i>et al</i>	2005		No specific theory utilised as base			Virtual team working: technological point of view - selection									
Gaudes <i>et al</i> (2007); Ebrahim <i>et al</i> (2009a;b)	Hertel, Geister & Konradt	2005	Individual, team, organisation, project, technology	No specific theory utilised as base			Virtual team working: technological point of view - training	Personnel selection, the mission and goal statement, defined rules and objectives of the team, task design contribute towards effective virtual teams. The ability of the leader to assess the needs in the team contributes further. The organisation should have a kick-off workshop for the team and be able to manage knowledge.								
Ebrahim <i>et al</i> (2009a;b)	Shin	2005		No specific theory utilised as base			Virtual team working: process point of view - meeting structure									
Gaudes <i>et al</i> (2007)	Nembhard & Edmondson	2006	Individual, leader	No specific theory utilised as base				The professional status and leadership inclusiveness in the team contribute to virtual team effectiveness.								
Gaudes <i>et al</i> (2007)	Gibson & Gibbs	2006	Individual, team	No specific theory utilised as base				Individual trust, psychological safety, team openness towards each other contributes towards virtual team effectiveness.								
Gaudes <i>et al</i> (2007)	Webster & Staples	2006	Individual, team, leader, organisation, project, technology	No specific theory utilised as base				The stages of team development and team autonomy, expectations of the team leader, the ability to move between transactional and transformational leadership, the organisational reward system and team cohesion contribute towards an effective virtual team.								

Ebrahim <i>et al</i> (2009a;b)	Fuller <i>et al</i>	2006		No specific theory utilised as base			Virtual team working: technological point of view - training									
Gaudes <i>et al</i> (2007)	Polzer, Crisp, Jarvenpaa & Kim	2006	Team	No specific theory utilised as base				Geographic dispersion of team members and face-to-face launch of the team contribute towards the effectiveness of a virtual team.								
Gaudes <i>et al</i> (2007)	Walczuch, Lemmink & Streukens	2007	Individual , technology	No specific theory utilised as base				Discomfort with ICT and the need to control negatively affect virtual team membership while comfort with innovation, ease of use, and usefulness of ICT contribute towards virtual team effectiveness.								
Gaudes <i>et al</i> (2007))	Thomas, Bostrom & Gouge	2007	Technology	No specific theory utilised as base				The effective use of ICT contributes towards effective virtual teams.								
Ebrahim <i>et al</i> (2009a;b)	Walvoord <i>et al</i>	2008		No specific theory utilised as base			Virtual team working: technological point of view - selection									
Ebrahim <i>et al</i> (2009a;b)	Dekker <i>et al</i>	2008		No specific theory utilised as base			Virtual team working: technological point of view - selection									
Ebrahim <i>et al</i> (2009a;b)	Anderson <i>et al</i>	2008		No specific theory utilised as base			Virtual team working: technological point of view - selection									

Ebrahim <i>et al</i> (2009a;b)	Anderson <i>et al</i>	2008		No specific theory utilised as base			Virtual team working: technological point of view - training									
Ebrahim <i>et al</i> (2009a;b)	Hunsaker & Hunsaker	2008		No specific theory utilised as base			Virtual team working: Technological point of view- Security									
Ebrahim <i>et al</i> (2009a;b)	Hunsaker & Hunsaker	2008		No specific theory utilised as base			Virtual team working: people point of view									
Ebrahim <i>et al</i> (2009a;b)	Shachaf	2008		No specific theory utilised as base			Virtual team working: process point of view - meeting structure									
Wade (2006)	Galbraith	1973		Organisational information processing theory (OIPT)	Organisations need quality information strategies to cope with environmental uncertainty and improve their decision making such as developing buffers to reduce the effect of uncertainty, and implementing structural mechanisms and											

					information processing capabilities to enhance the information flow, thereby reducing uncertainty											
Wade (2006)	Polanyi	1962		Organisational knowledge creation (OKC) (theory of knowledge creation, dynamic theory of organisational knowledge creation)	Different types of knowledge are transferred differently. Codified knowledge is handed over through channels of systematic communication. Tacit knowledge is knowledge which is delivered in a particular context through personal involvement, commitment and interaction between people.											
Piccoli <i>et al</i> (2004)	Berdahl & Craig	1996		Proportional, social role, expectation states	No specific theory			Participation more central-ised in VTs. In VTs, males in majority-female teams had more influence; males in majority-male teams had less influence than females.								
Wade (2006); Piccoli <i>et al</i> (2004) (2004); Schiller & Mandviwalla (2007)	Eldredge & Gould	1972		Punctuated equilibrium theory	Groups experience relatively stable periods of activity punctuated by intense changes in behaviour that occur at the halfway mark of a group's life. The halfway point is thus the critical juncture, where a group's	Chidambaram (1996)		Policy and procedure changes regarding possible areas of conflict should be introduced during periods of stability, as unexpected disruptions could lead to radical change. Over time, VT members will exchange enough information to develop relational ties. Over time, attitudes improve as one's satisfaction with outcomes. This theory provides a ground for analysing behaviours of virtual team members on the change of team activities, such as the approaching of a deadline and the increasing complexity of tasks.								

					equilibrium is shattered and a new level of activity and a different set of behaviours are established.											
Wade (2006)	Black & Myron	1973		Real options theory	Utilising the correct method of acquiring an asset to reduce risk.											
Wade (2006)	Pfeffer & Salancik	1978		Resource dependency theory (RDT)	External resources of organisations affect the behaviour of the organisation											
Wade (2006)	Barney	1986		Resource-based view of the firm (RBV) (resource-based theory)	Competitive advantage lies in the application of the bundle of valuable interchangeable and intangible or tangible resources at the firm's disposal.											
Martins <i>et al</i> (2004)	Ahuja, Galletta & Carley	2003		Role theory	Human behaviour is guided by expectations held both by the individual and by other people.			The theory emphasises interactions dependent on roles and Therefore can be used in explaining and predicting some of the activities of leaders and team members. The roles of virtual team members are likely to be dependent on the nature of tasks and the information technologies used. In some cases, the lack of face-to face communication can change the occurrence of different roles, both positively and negatively.	X				X			X

Wade (2006); Schiller & Mandiwalla (2007)	Bandura	1977		Self-efficacy theory (SET); Computer self-efficacy (CSE)	Self-efficacy theory is an important component of social cognitive theory, which suggests that an individual's behaviour, environment and cognitive factors (i.e. outcome, expectations and self-efficacy) are all highly interrelated.	Staples, Hulland, & Higgins (1991)		Self-efficacy judgments can be used to determine how much effort team members will spend on a task and how long they will persist with it. Virtuality of team environment may increase the difficulty of judgments of self-efficacy. It can also reduce the positive effect of self-efficacy in performance.								
Wade (2006)	Parasuraman, Berry & Zeithaml	1985		SERVQUAL (Service quality)	Customers evaluate a firm's service quality by comparing their perceptions with their expectations on a number of issues.											
Wade (2006)	Coleman	1973		Social capital theory (Coleman, 1988)	Social networks have value and increase productivity.											
Wade (2006)	Bandura	1977		Social cognitive theory (SCT)												
Martins <i>et al</i> (2004), Schiller & Mandiwalla (2004)	Sia, Tan & Wei	2002		Social comparison theory (SCT)	SCT is a normative explanation for group polarisation that has received empirical support. It argues that group polarisation occurs because people are motivated to present themselves in a socially desirable			It is demonstrated that communication cues can in turn effect group communication. Social presence is dependent on three types of communication cues: visual; verbal; and textual. However, communication between virtual team members is largely based on texts; for example, e-mails, rather than on visual images and verbal communication. It is a challenge to compare social presence change due to the unbalanced cues.					X		X	

					light during discussion. People do this by continually comparing their opinions with those of others and adjusting their opinions in the direction valued by others.											
Wade (2006)	Homans	1958		Social exchange theory (exchange theory/ rational choice theory)	In making decisions to join and stay in a team or network, people consider the costs and benefits associated with that decision, in comparison with available alternatives.											
Wade (2006); Martins <i>et al</i> (2004); Schiller & Mandviwalla (2007)	Cramton	2001		Social identity or deindividuation theory (SIDE)	SIDE theory argues that people categorise themselves as part of either the in-group or the out-group based on the characteristics of others in the group.	Jarvenpaa <i>et al</i> (1998); Scott & Timmerman (1999)		Five types of communication problems identified from failure to create mutual knowledge in VT. In virtual teams, when individuating cues about others are limited, individuals build stereotypical impressions of others based on limited information. It is not clear yet whether the self-categorising of team members will have a positive effect on team performance. The boundary of virtual teams is more intangible than the boundary of face-to-face teams. Hence it is more difficult to establish the social identity of virtual team members.			X		X	X	X	X

Wade (2006); Martins <i>et al</i> (2004); Schiller & Mandviwalla (2007)	Walther & Burgoon	1992		Social information processing theory (SIP)	SIP implies that computer-supported teams will take longer to exchange information than F-T-F teams. These restrictions tend to slow the process of developing relational intimacy.	Walther (1994; 1995); Chidambaram & Bostrom (1993); Walther (1994; 1997); Chidambaram (1996); Warkentin & Beranek (1999)		No difference between teams' decision quality. VT more equal participation, task focus, more alternatives generated. VTs increased in several relationship dimensions to more positive levels – approaching or surpassing CT levels. CT better at first in conflict management, cohesiveness; by midpoint, VT had surpassed CT. Initially the computer medium hinders rational intimacy between members who do not know each other. However, VTs became less task oriented and less formal over time. VTs perceived greater immediacy /affection / inclusion, communication of attitude likeness than CTs.	X				X	X		
Wade (2006)	Barnes	1954		Social network theory (SNT) (network theory, network analysis)	Organisations and people seek to explore an optimal route to build relationships and structures to their benefit.											
Martins <i>et al</i> (2004); Piccoli <i>et al</i> (2004)	Ahuja & Carley	1999		Social network theory (SNT) (network theory, network analysis, network and organisation form theory)	The theory presents the dimensions of degree of hierarchy and centralisation. It also concentrates on task characteristics, network structure, fit and network performance.			VTs can be hierarchical and centralised from a communication standpoint. Fit between task and structure not associated with objective performance, but is associated with satisfaction.	X				X	X		X

Wade (2006); Martins <i>et al</i> (2004); Piccoli <i>et al</i> (2004) (2004); Schiller & Mandviwalla (2004; 2009)	Walther & Burgoon	1992		Social presence theory (SPT), and media richness	The fewer the available channels in a medium, the less attention is paid by the users to the presence of other social participants' interactions. Also, social presence declines as messages become more impersonal.	Burke & Chidambaram (1996); Lind (1999); Warkentin & Beranek (1999); Majchrzak <i>et al</i> (2000); Pauleen (2003-2004)		CT reported greater social presence, communication effectiveness, and ease-of-use. No difference in performance between VT and CT. Women more satisfied, felt more included and greater team cohesiveness with the VT experience than men. No difference in quality of work between VT and CT. Less socio-emotional content is exchanged in VT due to lack of visual and social clues and is Therefore perceived to be lacking normative reinforcement and being impersonal. Social presence in the establishment and maintenance life cycle of VT still needs to be established.	X			X	X	X	X	X
Wade (2006)	Cherns	1976		Socio-technical theory (STS or STT) (socio-technical systems)	The design of organisation regarding its people and technical systems regarding how they treat and respect each other											
Wade (2006)	Checkland	1981		Soft systems theory (SSM) (soft systems methodology)	Different methods of dealing with situations perceived as problematic with both hard and soft issues.											
Wade (2006); Martins <i>et al</i> (2004); Piccoli <i>et al</i> (2004); Schiller & Mandviwalla (2004; 2009)	Jarvenpaa, Knoll & Leidner	1998		Swift trust	Swift trust de-emphasises interpersonal dimensions relations to trust and states that trust is initially based on broad social structures and later on action.	Jarvenpaa & Leidner (1999)		Integrity early on important to development of trust and benevolence over time. In the absence of choice of team members, the effect of trust in work performance will be suppressed. Team building increased knowledge about team members, but did not directly increase trust. VTs with high trust also had: social			X		X	X		

								communication; enthusiasm; predictable communication; substantial and timely feedback; ability to cope								
								with tech uncertainty; initiative; social to task focus; positive leadership; and phlegmatic response to crises. Swift trust is likely a result of communication								
Wade (2006); Piccoli, <i>et al</i> (2004); Schiller & Mandviwalla (2007)	McGrath	1984		Task circumplex model	Categorisation of team tasks into four activities: generating; choosing; negotiating; and executing.	Hollingshead, McGrath & O'Connor (1993); Majchrzak <i>et al</i> (2000)		VT may benefit from identifying tasks, which will lead members to select appropriate processes, tools, methods and skills. No difference between VT and CT for generating and decision making tasks, CT better for negotiation and intellectual tasks early on. Multitasking complicates categorisation.								
Martins <i>et al</i> (2004); Schiller & Mandviwalla (2004)	Hollingshead, McGrath & O'Connor	1993		Task-media fit theory	Fitting tasks and media depends on choosing information and communication technology in VT	Hollingshead (1996)		Relationship between task and technology performance more dependent on experience with technology and team membership rather than task type.		X						X
Wade (2006)	Goodhue & Thompson	1995		Task technology fit (TTF)	IT is more likely to have a positive impact on individual performance and will be used if the capabilities of the IT match the tasks that the user must perform.											
Martins <i>et al</i> (2004); Schiller & Mandviwalla (2004)	Griffith, Sawyer & Neale	2003		Team knowledge transfer model	Application of model meant for stable VT, but where members have both interaction with vocal team and co-located others.			Members will share and focus their knowledge to such an extent that eventually they will be able to share explicit knowledge rather than tacit knowledge.							X	X

Wade (2006)	Davis	1986		Technology acceptance model	Perceived ease-of-use (PEOU) and perceived usefulness (PU) influence users when they are presented with a new technology.											
Martins <i>et al</i> (2004)	Bergiel, Clenney & Duane	2009		The theory of the impact of knowledge coordination on virtual team performance over time	No specific theory				X						X	
Wade (2006)	Berger & Luckman	1967		The social construction of reality	Individuals and teams adapt themselves in social contest regarding. their own reality, knowledge and learning	Aristotle's hermeneu=tic theory		Teams and team members interact with each other in a social system. This social system contains theoretical and scientific knowledge which could necessitate unconventional and complex networks of experts. The roles and customs of these expert teams are created over time and in understanding how members could or do react towards each other.								
Wade (2006)	Cohen & Levinthal	1990		Theory of absorptive capacity	Absorptive capacity is a firm's ability to identify, assimilate, transform and apply valuable external knowledge.											
Wade (2006)	Simon	1957		Theory of administrative behaviour (bounded rationality satisfying)	In making decisions about the direction and structure of an organisation, attention should be given to a											

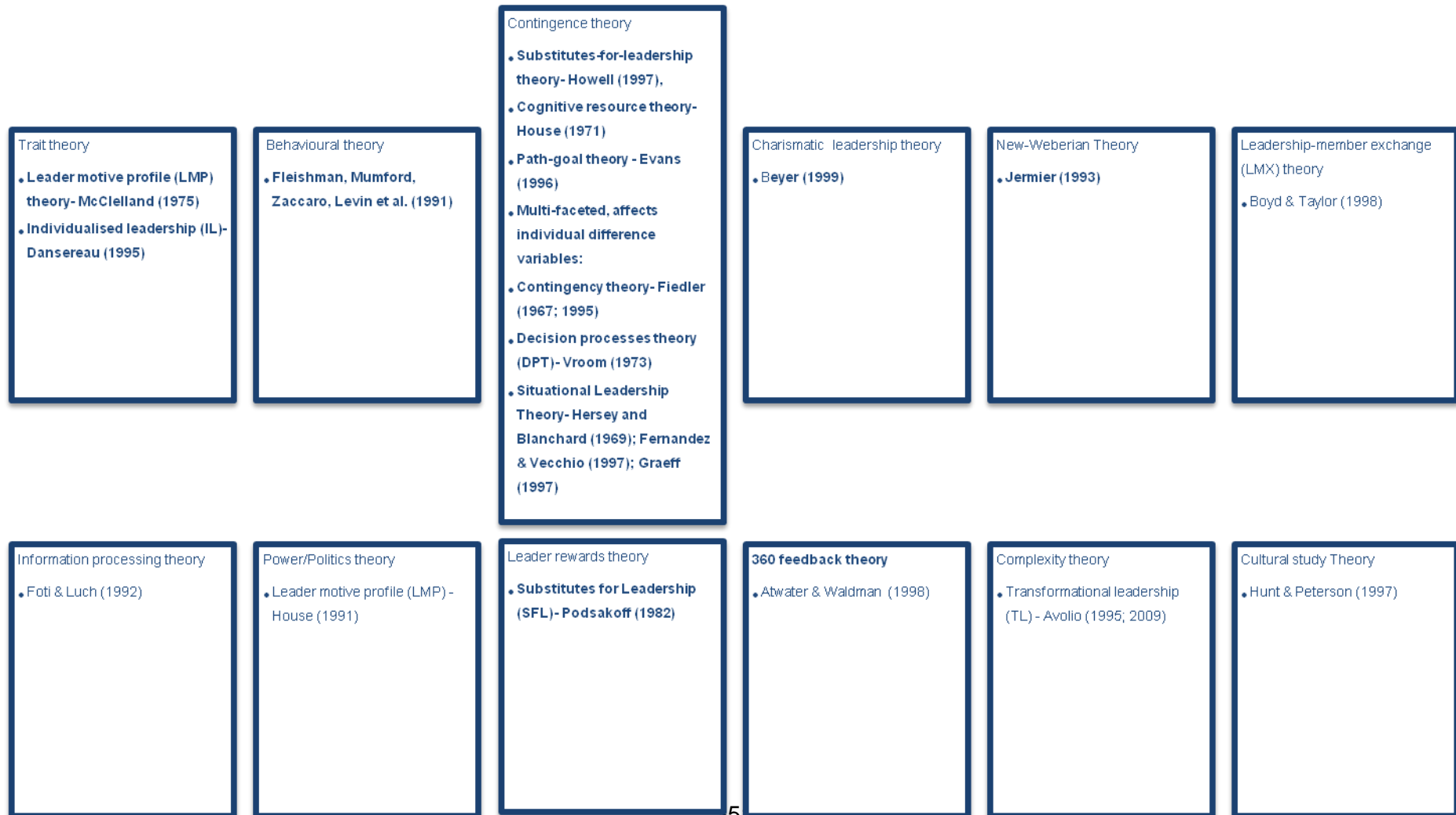
					number of factors such as efficiency, information, development of people and authority.											
Wade (2006)	Porter	1979		Theory of competitive strategy (five-forces model; competitive forces; Porter's five forces; Porter's framework for competitive analysis)	Five micro forces in an organisation which influence its ability to serve its customers and make a profit											
Wade (2006)	Ajzen	1985		Theory of planned behaviour (TPB)	People evaluate the suggested behaviour as positive (attitude), and if they think others want them to perform the behaviour (subjective norm), this results in a higher intention (motivation) and they are more likely to do so.											
Wade (2006)	Fishbein & Ajzen	1975		Theory of reasoned action (TRA)	A team member's norms, attitude and perception of how others will react predict his/her behaviour.											

Martins <i>et al</i> (2004); Piccoli <i>et al</i> (2004); Schiller & Mandiwalla	Warkentin, Sayeed & Hightower	1997		Time, interaction and performance theory (TIP)	The development of relational links between teams involves performing related activities.	Warkentin & Beranek (1999); Warkentin, Massey, Montoya-Weiss & Hung (2001; 2003)		CT had higher relational links, performance. No differences between CT and VT on effectiveness of info exchange. Three types of group functions may be used to analyse relational links.			X		X	X	X	X
Wade (2006)	Coase	1937		Transaction cost economics (TCE) (transaction cost theory; theory of the firm, markets and hierarchies; electronic hierarchies and electronic markets)	Different costs are associated with acquiring an asset such as transaction costs associated with the enforcement of an agreement; bargaining cost to attain an agreement; policing and enforcement cost to oblige the party to perform within the agreement.											
Wade (2006)	Wegner	1986		Transactive memory theory	Members are able to benefit from each other's knowledge and expertise if they develop a good, shared understanding of who knows what in the group/unit. A transactive memory system is built on the distinction between internal and external memory encoding.											

Martins <i>et al</i> (2004)	Rusman, Van Bruggen, Sloep & Koper	2011		Trust worthiness antecedents schema (TWAN)	The media of team communica= tions shape the kind of trust, cohesiveness and conflict experienced in team collaborations.									X		X
Martins <i>et al</i> (2004)	Venkatesh, Morris, Davis & Davis	2003		Unified theory of acceptance and use of technology (UTAUT)	The user intentions to use an information system influence the subsequent usage behaviour.									X	X	

ANNEXURE "D": DIMENSIONS OF FACE-TO-FACE THEORIES ON LEADERSHIP IN THE PREVIOUS MILLENNIUM

For the purposes of this study, the classical approaches towards leadership are summarised as those theories that were designed before the year 2000. These are shown as follows:



ANNEXURE "E": EMAIL INVITATION

This Annexure "F" contains the email invitation sent to potential respondents.

...leading to research excellence!

Department of Human Resource Management
College of Economic and Management Sciences
P.O. Box 392
Pretoria
0003

Researcher: Ms Anita de Bruyn

Tel: 012 429 4098

Email: dbruyaj@unisa.ac.za

Supervisor: Prof. H. Nienaber

Tel: 012 429 4031

Email: nien@unisa.ac.za

June 2013

Dear Sir/Madam

I am Anita de Bruyn, a doctoral student at the University of South Africa (Unisa).

The purpose of my study is to

“collect information about best practices in the functioning of effective virtual teams within the software sector of the South African technology industry”.

Only a very small number of participants were chosen to participate. I kindly request your voluntary assistance in completing a questionnaire.

The questionnaire is designed to make completion as *easy and fast* as possible and should not take more than 20 minutes of your time. I anticipated a number of responses on which you merely need to click at each question. However, for the study to be more meaningful, I left an option where you can elaborate on or add your experiences regarding the question asked.

- The completed questionnaire must please be returned electronically no later than 15 June 2013 by pressing the **Submit button** at the end of the questionnaire.
- Each page contains a number of questions and has a **Save button** at the end for intermediate saving of the information. Should you for some reason have completed the page but would like to continue with the questionnaire at a later stage, without losing information already submitted, please save the information on that page by clicking on the save button and not by alternative saving techniques.
- As the questionnaire is completed on the Unisa Server, non-activity on any page screen for more than 17 minutes will close the window resulting in the loss of unsaved data.

If you have any queries about the questionnaire or the research in general, please do not hesitate to contact me or my thesis supervisor at the above telephone numbers.

I look forward to receiving your responses.

Yours faithfully



Ms Anita de Bruyn (Researcher)

For the purposes of the research ethicality guiding this study, please click on the link button below indicating that you accept the following:

- Your participation in this study is voluntary.
- All information you provide may only be utilised for academic purposes.
- Your responses will be anonymous (responses will not be individualised).
- Your responses will be treated as confidential. (The technical possibility of identifying your unique response [IP address] is not important to the researcher or to this study and will not be revealed by the researcher.).

- The responses will be dealt with collectively in the research report.
- No reimbursement will be given for participation in this study.

Click on link: <http://survey.unisa.ac.za/index.php/125492/lang-en>

ANNEXURE "F": LIME SURVEY 2.0+ QUESTIONNAIRE

This Annexure shows the Lime Survey 2.0+ welcome page.

INSTRUCTIONS FOR THE COMPLETION OF THE QUESTIONNAIRE

- By clicking on the next button you agree that you are participating in this study voluntarily, confidentially and anonymously.
- There are four sections that need to be completed.
- After completion of each page you need to save the data by pressing the **save button**.
- Although each question has an option, “I choose not to answer this question”, the researcher encourages you to only use this option when you seriously have conscientious objections to choosing any of the other options, as the option negatively impacts on the study.
- If any aspect of the questionnaire is not clear, or if you have any queries, please contact the researcher by any of the means set out as follows:

Ms Anita de Bruyn

Department of Human Resource Management

College of Economic and Management Sciences

Tel: 012 429 4098

Cell: 072 612 6840

Fax: 086 642 2060

Email: dbruyaj@unisa.ac.za

Thank you for your participation

ANNEXURE "G": CONTENT OF QUESTIONNAIRE (CODES, CATEGORIES, THEMES, INDICATORS, TYPES OF QUESTIONS AND RELEVANCE)

SECTION A: BEST PRACTICES IN THE FUNCTIONING OF VIRTUAL TEAMS

This section explores the best practices in the functioning of effective virtual teams. It consists of 27 questions. Please provide comments to provide better insight into how an effective virtual team functions.

BPG General

BPG1 Have you ever participated in a face-to-face team?

- 1 Yes
- 2 No
- 3 I choose not to answer this question.

Please select: ____

BPG2 The organisation in which you are involved selected your team as being representative of a “virtual team”. What makes the way that you currently work unique in comparison to traditional face-to-face teams?

Specify: ____

I choose not to answer this question.

Please select: ____

BPG3 What is/are the best aspect(s) of working in your current virtual team?

- 1 Specify: ____
- 2 I choose not to answer this question.

Please select: ____

BPG4 What is the greatest challenge working the way you do?

- 1 Specify: ____
- 2 I choose not to answer this question.

Please select: _____

BPG5 **What is the greatest advantage for you as an individual of working in a virtual team?**

1 Specify: _____

2 I choose not to answer this question.

Please select: _____

BPG6 **How do you know that your team is functioning effectively?**

3 Specify: _____

4 I choose not to answer this question.

Please select: _____

BPG6 **List the top five current best practices that make your present virtual team (to which you devote most of your time) function more effectively than others (with 1 being the first best practice):**

1 Specify: _____

2 Specify: _____

3 Specify: _____

4 Specify: _____

5 Specify: _____

6 I choose not to answer this question.

BPG7 **Why did you choose number 1 as the current best practice for the effective functioning of your virtual team?**

1 Specify: _____

2 I choose not to answer this question.

BPG8 **List the top five current practices in your team without which the team would still be able to function effectively (with 1 being the first practice that could be terminated).**

1 Specify: _____

2 Specify: _____

- 3 Specify: _____
 4 Specify: _____
 5 Specify: _____
 6 I choose not to answer this question.

BPG9 Explain how your team could overcome the listed number 1 removable current practice.

- 1 Specify: _____
 2 I choose not to answer this question.

Please select: _____

Insert save button

BPG7 Consider the following 29 practices and list the top five that enable a virtual team to function effectively.(1 being the top best practice)

Best practice	1 To the greatest extent	2 To a great extent	3 To some extent	4 No influence
1 The goal or direction of a team changes throughout the life cycle of the team				
2 Formal role and responsibility clarification for each team member happen when the purpose or direction of the team changes				
3 Formalised team structure				
4 Formalised communication, language and terminology used				
5 A management system is available where virtual team members can obtain and store team-related documentation and conversations				
6 Personality traits rather than personality fit contribute towards an effectively functioning team				
7 Regular honest feedback on negative as well as positive performance				
8 Formal celebration of event when milestones are reached				
9 Team members are able to work				

independently				
10 Team members are able to work in a group				
11 Networking with professional technology organisations				
12 Technical skills fit with other team members				
13 Qualification fit with other team members				
14 Personality and character fit with other team members				
15 Conditions of service are individualised				
16 Conditions of service are contractually prescribed				
17 A bonus system is formally included in conditions of service				
18 The ideal member of a virtual team is a permanent employee of the organisation for commitment reasons				
19 A shared skills inventory of members for team reference, if team members need an expert sounding board				
20 Probation for new virtual team members is ideally first on smaller projects				
21 Periodic rotation of different partnerships in virtual team creates increased collaboration in the team				
22 Common platform for logistics, HR, finance and other transactions to assist with the building of a heritage database on previous teams' successes				
23 Team members are trained to professionally master both synchronous and asynchronous communication and the art of communicating electronically				
24 Team members are trained to				

professionally master the art of communicating electronically				
25 Contractual attention is given to the virtual space where work is expected to be done				
26 Support systems exist in the case of technology failure, theft and health and safety for virtual team members				
27 Clarification on the processes and duties of parties regarding suppliers of hardware exists.				
28 Clarification on the processes and duties of parties regarding the quality of internet connection exists.				
29 Clarification on the processes and duties of parties regarding task specifications, security of information and documentation exists.				

BPG8 The ideal virtual team size is _____ members

I choose not to answer this question.

Insert Save button

BPPTHEME 1: PURPOSE OF A VIRTUAL TEAM

BPP1 In considering the following practices, list the top five practices that establish the purpose of a virtual team (this or other virtual teams you have been working in). (1 being the top best practice)

- 1 The virtual team's purpose is derived from the organisational vision, mission and strategy.
- 2 The virtual team aligns its direction, purpose, resources (people) and design with that of the organisation.
- 3 The purpose of my current virtual team changes throughout the life cycle of the team.
- 4 The purpose in virtual teams is best described as a written, specific, quantifiable goal.
- 5 The purpose in virtual teams is best described as a clear, quantifiable direction.
- 6 The purpose in virtual teams is best described as a vague direction with certain milestones, which need to be reached.
- 7 With the entrance of new members of a virtual team, the roles, rights, privileges and accountability of the team as well as each individual team member are negotiated.
- 8 The language of the team in terms of terminology and standards is formally clarified at the entrance of a new team member.
- 9 Response levels (quality and time taken) to team questions and requests are negotiated.

- 10 Evidence that a virtual team has effectively fulfilled its purpose is found in the internal organisational performance measures as per contracted agreements being reached.
- 11 Evidence that a virtual team has effectively fulfilled its purpose is found in the successful handover of projects.
- 12 Evidence that a virtual team has effectively fulfilled its purpose is observed in functional products and services.
- 13 Other: Specify.
- 14 I choose not to answer this question.

Please select: _____

BPP2 In the absence of your selected top best practice for establishing a purpose for the team, how would a virtual team overcome this critical practice?

- 1 Specify: _____
- 2 I choose not to answer this question.

BPP 3 Rank the following conditions according to their importance for the creation of an innovative climate for virtual team members (1 being the most important).

- 1 Knowledge sharing between team members
- 2 Interpersonal communication channels
- 3 Reliance on personal contacts in decision making
- 4 Relying on published reports
- 5 I choose not to answer this question.

BPP4 In the perceived absence of an innovative team climate, the best practice that I have encountered to drive new ideas in a virtual team is:

- 1 Specify: _____
- 2 I choose not to answer this question.

Insert save button

BPPRO THEME 2: PROCESS

BPPRO1 Can a virtual team function effectively without a leader at any point in time during the duration of the team?

1. Yes, How? _____
2. No.
3. I choose not to answer the question.

Please select: _____

BPPRO 2 Consider the following practices and rank them in importance with regard to which enable processes in virtual team facilitation to function most effectively (1 being the top best practice):

- 1 Team leader must understand the personal circumstance of each team member.
- 2 Particular hierarchical and organisational responsibility is assigned to a dedicated individual in a team.
- 3 The hierarchically and organisationally assigned individual creates culture in the team.
- 4 The team leader is able to choose and use unique team-embedded processes, techniques and procedures to deal with discipline, trust and conflict in the team.
- 5 Other: Specify: _____
- 6 I choose not to answer this question.

BPPRO3 Members of my current virtual team were selected as follows:

1. Traditional recruitment procedures were followed where individuals apply for an advertised position and follow the interview process.
2. Members are recruited via a networking system of people that have worked together before.
3. Personality fit in the team.
4. Other: Specify _____
- 5 I choose not to answer this question.

Please select: _____

BPPRO4 Consider the following 22 aspects and choose the top five that have positively influenced your performance as a virtual team member:

- 1 Anticipation of a particular known reward
- 2 Anticipation of a reward of which the details are not clear
- 3 Awards do not influence my behaviour
- 4 Weekly *team* performance feedback meetings
- 5 Bi-weekly *team* performance feedback meetings
- 6 Monthly *team* performance feedback meetings
- 7 No *team* performance feedback meetings
- 8 Scheduled *team* performance feedback meetings
- 9 Ad hoc *team* performance feedback meetings
- 10 Individual and team work progress are electronically visible for all team members to see
- 11 Individual and team work progress are not electronically visible for all team members to see
- 12 Weekly *individual* feedback meetings
- 13 Bi-weekly *individual* performance feedback meetings
- 14 Monthly *individual* performance feedback meetings
- 15 No *individual* performance feedback meetings
- 16 Scheduled *individual* performance feedback meetings
- 17 Ad hoc *individual* performance feedback meetings
- 18 Bonus based on individual performance
- 19 Bonus based on individual and team performance
- 20 Bonus based on individual, team and organisational performance
- 21 Independence of team members to take ownership of decisions made
- 22 Team support
- 23 I choose not to answer this question.

Other: Specify:

BPPRO5 Cultural differences in virtual teams are bridged as follows:

1. Clarification of individuals' religious beliefs from the onset of the team
2. Clarification of individuals' world, work and people perspectives from the onset of the team
3. Cultural differences are not discussed as they increase the incidence of conflict
4. Other: Specify: _____
- 5 I choose not to answer this question.

Please select: _____

BPPRO6 The best practice that I have encountered to align, update and integrate processes in a virtual team is:

Comment: -----

Insert save button

BPPEO THEME 3: PEOPLE

BPPEO1 How do you socially bond with other virtual team members?

- 1 Specify:
- 2 I choose not to answer this question.

BPPEO2 The greatest area of conflict I have encountered in a virtual team is:

1. Specify: _____
- 2 I choose not to answer this question.

Please select: _____

BPPEO3 The best practice for solving the conflict identified in the previous question is by means of:

1. Specify: _____
- 2 I choose not to answer this question.

Please select: _____

BPPEO4 The best way to create a team that is meaningfully engaged in its work, is:

1. Specify: _____
- 2 I choose not to answer this question.

Please select: _____

Insert save button

BPTECH THEME 4: TECHNOLOGY

BPTECH1 Is there a way that a virtual team would still be able to function effectively in the absence of technology (i.e. extended server and electricity outage, viruses etc.)?

- 1 Yes, how?
- 2 No.
- 3 I choose not to answer this question.

Please select: _____

BPTECH2 The choice of collaboration tools in the virtual team fits the purpose for which they were intended.

- 1 To a great extent
- 2 To some extent
- 3 No influence
- 4 To a lesser extent
- 5 To the least extent
6. I choose not to answer this question.

Please select: _____

BPTECH3 Availability of a common platform for logistics, HR, finance, and other transactions in my organisation assist with the formation of a heritage database on previous teams' successes.

- 1 To a great extent
- 2 To some extent
- 3 No influence
- 4 To a lesser extent
- 5 To the least extent
- 6. I choose not to answer this question.

Please select: _____

BPTECH4 Contractual attention is given to the virtual space of where work of our team members is expected to be done for the purpose of inclusion into labour legislation protection and protection of organisational assets.

- 1 To a great extent
- 2 To some extent
- 3 No influence
- 4 To a lesser extent
- 5 To the least extent
- 6. I choose not to answer this question.

Please select: _____

BPTECH5 Risk behaviour of team members regarding cybercrime is carefully monitored and addressed.

- 1 To a great extent
- 2 To some extent
- 3 No influence
- 4 To a lesser extent
- 5 To the least extent
- 6. I choose not to answer this question.

Please select: _____

BPTECH6 The best practice that I have encountered across to keep team members abreast of the latest technology in a virtual team is:

Comment: -----

Insert save button

B. ORGANISATIONAL DATA

This section explores organisational relationship. It consists of two questions.

OT1 I currently work in a team associated with the following software company(ies):

- 1 Adaptit Holdings Limited
- 2 Business Connexion Group Limited
- 3 Compu-Clearing Outsourcing Limited
- 4 Convergenet Holdings Limited
- 5 Datacentrix Holdings Limited
- 6 Datatec Limited
- 7 EoH Holdings Limited
- 8 Faritec Holdings Limited

- 9 Gijima Group Limited
- 10 IBM
- 11 MicroSoft
- 12 Paracon Holdings Limited
- 13 PBT Group Limited
- 14 SAP
- 15 Securedata Holdings Limited
- 16 Square One Solutions Group Limited
- 17 I am contracted to more than one of the companies listed
namely:.....and.....
- 18 Other: (specify).....
- 19 I choose not to answer this question.

Please select: _____

OT2 Due to the nature of the contract with the organisation I spend most of my time:

- 1 As a permanent employee
- 2 On a fixed-period contract
- 3 As an independent worker (I work for myself, but am contracted to do certain tasks for
the company)
- 4 As a project-based worker
- 5 As my own boss, because the company is a client
- 6 Other: (specify).....
- 7 I choose not to answer this question.

Please select: _____

Insert save button

C. BIOGRAPHICAL DATA: PERSONAL

This section explores some general biographical data pertaining to participants. It consists of 14 questions.

- 1 Gender**
- 1 Male
- 2 Female
- 3 I choose not to answer this question.

Please select: _____

- 2 Nationality**
- 1 South African
- 2 Other: (specify).....
- 3 I choose not to answer this question.

Please select: _____

- 3 Population group**
- 1 Black African
- 2 Coloured
- 3 Indian or Asian
- 4 White
- 5 Other: (specify).....
- 6 I choose not to answer this question.

Please select: _____

4 Home language:

1. Afrikaans
2. English
3. IsiNdebele
4. IsiXhosa
5. IsiZulu
6. Sepedi
7. Sesotho
8. Setswana
9. Sign language
10. SiSwati
11. Tshivenda
12. Xitsonga
13. Other: (specify).....
14. I choose not to answer this question.

Please select: _____

5 Please indicate the year in which you were born.

1. Dropdown box of years
2. I choose not to answer this question.

Please select: _____

6 Highest qualification

- 1 Grade 8 or lower
- 2 NQF level 1: Grade 9 (General Education and Training Certificate)
- 3 NQF level 4: Grade 12 (National Senior Certificate)
- 4 NQF level 5: Higher Certificate
- 5 NQF level 6: Diploma or Advanced Certificate
- 6 NQF level 7: Bachelor's Degree or Advanced Certificate
- 7 NQF level 8: Postgraduate Diploma or Professional Qualification
- 8 NQF level 9: Master's Degree
- 9 NQF level 10: Doctoral Degree
- 10 Other: (specify).....
- 11 I choose not to answer this question.

Please select: _____

7 My job title in the organisation is:

- 1 Human resource manager: Please specify.....
- 2 Manager who has financial authorisation powers (i.e. approval of leave, buying of items): Please specify position.....
- 3 Team member: Please specify
- 4 I choose not to answer this question.

Please select: _____

8 The greater part of my job is best represented as follows:

1. I deal with policies and procedures to bring about business change to ensure the organisation's competitiveness

2. I deal with system continuity to ensure that the system's capacity is effectively used
3. I deal with the maintenance of systems
4. I manage people in a team
5. I provide a human resources support function to other sections: Please specify....
- 6 Other: (specify).....
- 7 I choose not to answer this question.

Please select: _____

9 Work experience in years:

- 1 Please provide number of completed years of work experience:
- 2 I choose not to answer this question.

Please select: _____

10 Describe how your income is determined (basic pay, commission, benefits, bonus, etc.)

- 1 Specify:
- 2 I choose not to answer this question.

Please select:

11 Are you currently a paid-up trade union member?

- 1 Yes
- 2 No
- 3 I choose not to answer this question.

Please select: _____

12 Are there any comments you would like to make on items you believe were overlooked or not questioned in sufficient detail, which could enhance the insight into best practices in effective virtual teams? Specify.

13 I would like to read the collective report on the findings of this study, in the following media (journal or newspaper): Specify.

14 Should the researcher need to clarify any comments, I give permission that I may be contacted at the following email address: Specify.

Thank you for your participation.

Insert save button

ANNEXURE "H": UNISA ETHICAL CLEARANCE CERTIFICATE



2012-11-02

Ref. Nr.: 2012/CEMS/HRM/

To the researcher:

Anita Juliana de Bruyn

Lecturer Dept Human Resource Management

0124294098

dbruyaj@unisa.ac.za

Cell 0726126840

Request for Ethical approval for the following research project:

MANAGING PEOPLE FOR SUCCESSFUL VIRTUAL TEAMS IN ORGANISATIONS

GUIDELINES FOR SOUTH AFRICAN ORGANISATIONS

Dear AJ de Bruyn

The application for ethical clearance in respect of the above mentioned research has been reviewed by the Human Resource Management Departmental Research Committee of the College of Economic and Management Sciences, Unisa. **At this point Ethics clearance is granted.**

Kindly be advised that the committee needs to be informed should any part of the research methodology as outlined in the Ethics application (Ref. Nr.: 2012/CAEMS/002), change in any way. The committee would then require a memo in which the amendments are explained. A new application is not required. We trust that sampling, data gathering and processing of the relevant data will be undertaken in a manner that is respectful of the rights and integrity of all parties, as stipulated in the UNISA Research Ethics Policy.

The Committee wishes you all the best with this research undertaking.

Kind regards,

A handwritten signature in black ink, appearing to read "MJ Bushney", is written over a printed name.

Prof. MJ Bushney....., Human Resource Management Departmental Research Committee Chair, CEMS

ANNEXURE "I": ACCREDITED COPYEDITOR AND PROOFREADER

This thesis was proofread and language edited by Elsabe van der Westhuizen, an accredited Copyeditor and Proofreader, and Associate Member of the Professional Editor Group (PEG).



Elsabe van der Westhuizen

ANNEXURE "J": PLAGIARISM REPORT

2/28/2014

Turnitin

Aj de Bruyn

User Info

Messages

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NOW VIEWING: HOME > STUDENT SUBMISSIONS: STUDENTS

Welcome to your new class homepage! From the class homepage you can see all your assignments for your class, view additional assignment information, submit your work, and access feedback for your papers. ✕

Hover on any item in the class homepage for more information.

Class Homepage

This is your class homepage. To submit to an assignment click on the "Submit" button to the right of the assignment name. If the Submit button is grayed out, no submissions can be made to the assignment. If resubmissions are allowed the submit button will read "Resubmit" after you make your first submission to the assignment. To view the paper you have submitted, click the "View" button. Once the assignment's post date has passed, you will also be able to view the feedback left on your paper by clicking the "View" button.

Assignment Inbox: Student submissions

	Info	Dates	Similarity	
Student documents	①	Start 20-Jan-2014 8:27AM Due 28-Dec-2014 11:59PM Post 29-Dec-2014 12:00AM		Submit View
Front pages	①	Start 27-Feb-2014 8:50PM Due 28-Dec-2014 11:59PM Post 29-Dec-2014 12:00AM	4%	Resubmit View
Annexure	①	Start 27-Feb-2014 8:50PM Due 28-Dec-2014 11:59PM Post 29-Dec-2014 12:00AM	23%	Resubmit View
Bibliography	①	Start 27-Feb-2014 8:50PM Due 28-Dec-2014 11:59PM Post 29-Dec-2014 12:00AM	76%	Resubmit View
Chapter 1	①	Start 27-Feb-2014 8:50PM Due 28-Dec-2014 11:59PM Post 29-Dec-2014 12:00AM	3%	Resubmit View
Chapter 2	①	Start 27-Feb-2014 8:50PM Due 28-Dec-2014 11:59PM Post 29-Dec-2014 12:00AM	5%	Resubmit View
Chapter 3	①	Start 27-Feb-2014 1:48PM Due 28-Dec-2014 11:59PM Post 29-Dec-2014 12:00AM	13%	Resubmit View
Chapter 4	①	Start 27-Feb-2014 3:59PM Due 28-Dec-2014 11:59PM Post 29-Dec-2014 12:00AM	8%	Resubmit View
Chapter 5	①	Start 27-Feb-2014 4:00PM Due 28-Dec-2014 11:59PM Post 29-Dec-2014 12:00AM	6%	Resubmit View
Chapter 6	①	Start 27-Feb-2014 4:00PM Due 28-Dec-2014 11:59PM Post 29-Dec-2014 12:00AM	1%	Resubmit View
Chapter 7	①	Start 27-Feb-2014 4:01PM Due 28-Dec-2014 11:59PM Post 29-Dec-2014 12:00AM	2%	Resubmit View
Conclusion	①	Start 27-Feb-2014 4:00PM Due 28-Dec-2014 11:59PM Post 29-Dec-2014 12:00AM	1%	Resubmit View
en Rubric				

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