

SKILLS DEVELOPMENT AMONG SOUTH AFRICAN BASED
INNOVATIVE ICT FIRMS

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ABSTRACT

FDI is a buzzword used in the discourses of many emerging market politicians over the last two decades and SA politicians make no exception. It is commonly accepted that many multinationals (MNEs) provide employment opportunities and contribute to the transfer of technological knowledge in support of the host country's catch up activities. This study aims to provide insight into how the South African subsidiaries of innovative ICT MNEs invest in skills development and why their local leaders chose to act in this way by comparing the case studies of IBM SA, Cisco SA and Dimension Data. It also seeks to find which of these three firms is more efficient at this investment and how South Africa, as a host country, influences their investment activities.

The theoretical foundation for this study contains the literature review under the topic framed by the research problem: *"How innovative ICT firms based in SA invest in skills."* The researcher gained knowledge about the habit of investment in skills in these branches of MNEs, in particular, their behaviour when they operate within South Africa, and produced a set of propositions that were investigated under the framework of the three case studies using qualitative research methodology.

On one hand, the outcome of the study is that these researched branches are not innovating in SA because of the special emerging market context of SA and consequently, at present, they do not invest in R&D and innovation activities. On the other hand, SA government business consultants consider the branches of MNEs as sources of strong innovative and R&D activities that may influence SA innovation successes, different from what these firms do. Moreover, the results of the analysis show that the studied firms intensively exploit their existing products for maximum short-term profit. Policy makers could be assisted by this study in developing adequate policies in support of R&D and innovation activities. The study could also provide guidance for those HQs and leaders of local branches who want to improve their performance in SA and to SA innovators who are seeking to understand the twofold effect of globalisation.

DECLARATION

I declare that this dissertation is my own, unaided work. It is submitted in partial fulfilment of the requirements of the degree of Master of Management of Innovation Studies at the Wits Business School in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in any other University.

Raruca Pauna

22 March 2015

DEDICATION

I dedicate my dissertation work to my husband *Gabriel* and a special feeling of gratitude to my loving mother *Constanta*, whose words of encouragement and push for tenacity ring in my ears. I also dedicate this dissertation to my children *Laura*, *Silviu* and *Gabriel jnr.*, who have supported me throughout the process.

I will always appreciate all they have done and for believing in me throughout the entire program.

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TABLE OF CONTENTS

ABSTRACT	I
DECLARATION	II
DEDICATION	III
ACKNOWLEDGEMENTS	IV
TABLE OF CONTENTS	V
LIST OF ABBREVIATIONS	IX
LIST OF TABLES	X
LIST OF FIGURES	X
CHAPTER 1 - INTRODUCTION	1
1.1 Background	1
1.2. Research Problem	3
1.3. Research Question	3
1.3. Research Scope	3
1.5. Socio-political framework: geographical and temporal limits of the research	4
1.6. Research Motivation	5
1.7. Research Key Issues, their background and their definitions	6
1.7.1. Innovation	7
1.7.2. Firms	10
1.7.3. ICT sector	12
1.7.4. Skills	13
1.7.5. Firms' investment in skills development	14
1.8. Structure of the research thesis	15
CHAPTER 2 – LITERATURE REVIEW	16
2.1. Literature Review Framework	16
2.2. A Historical Review of Investment in SD in Innovative Firms	17
2.3. Investment in Skills Development – Emergent topics from literature review	18
2.3.1. Topic 1: Investment in Skills Development as a strategic activity	18
2.3.2. Topic 2: Factors, processes and routines that shape the investment in SD	26
2.3.3. Topic 3: South African context influences investment in SD	32
2.4. Summary	34
CHAPTER 3 – RESEARCH METHODOLOGY	38

3.1.	Proposed Research method	38
3.1.1.	Quantitative vs. Qualitative Research	39
3.1.2.	Boundaries of the research	40
3.1.3.	Research Process	40
3.2.	Case Selection and the chosen composition of the multicase	41
3.3.	Data collection and data analysis	42
3.3.1.	Data collection phase	43
3.3.2.	Data analysis phase	44
3.3.3.	Cross case analysis	46
3.4	Data validity and reliability	47
3.4.1.	Internal/Construct validity	47
3.4.2.	External validity	48
3.4.3	Triangulation	48
3.4.4.	Reliability (Dependability)	48
3.5.	Challenges and limitations in using this multicase approach	49
3.6.	Ethical considerations	51
3.7.	Summary to chapter 3	51
CHAPTER 4:	PRESENTATION OF RESULTS AND DISCUSSIONS	52
4.1.	Introduction	52
4.2.	IBM - How “The Vanguard” invests in skills development	54
4.2.1.	Background	54
4.2.2.	IBM SA background	55
4.2.3.	Topic 1: Investment in SD is a strategic activity	56
4.2.4.	Topic 2: Factors, processes and routines that shape the efficiency of investment in SD	60
4.2.5.	Topic 3: SA context influences investment in SD	64
4.2.6.	IBM case study conclusions	65
4.3.	Cisco Systems - “The Great White Shark”	66
4.3.1.	Background	66
4.3.2.	Cisco Systems - SA branch	67
4.3.3.	Topic 1: Investment in SD is a strategic activity	67
4.3.4.	Topic 2: Factors, processes and routines that shape the efficiency of investment in SD	70

4.3.5.	Topic 3: SA context influences investment in SD	74
4.3.6.	CISCO SA case study conclusions	75
4.4.	Dimension Data –DiData “The System Integrator”	76
4.4.1.	Background	76
4.4.2.	DiData or Dimension Data South African branch	77
4.4.3.	Topic 1: Investment in SD is a strategic activity	77
4.4.4.	Topic 2: Factors, processes and routines that shape the efficiency of investment in SD	82
4.4.5.	Topic 3: SA context influences investment in SD	86
4.4.6.	DiData case study conclusions	87
4.5.	Conclusions of Chapter 4	87
CHAPTER 5 - CROSS ANALYSE OF CASE STUDIES RESULTS		89
5.1.	Introduction	89
5.2.	Discussions/Analysis of the nine propositions/statements	89
5.2.1.	Topic 1: Investment in Skills Development is a strategic activity	89
5.2.2.	Topic 2: Factors, processes and routines that shape the efficiency of investment in SD	103
5.2.3.	Topic 3: South African context influences investment in SD	118
5.3.	Chapter 5 Summary	127
CHAPTER 6 - CONCLUSIONS		128
6.1.	Introduction	128
6.2.	Synthesis of the empirical study findings as answers to the research question	129
6.3.	Implications of the research study	134
6.4.	Limitations of the research study	135
6.5.	Recommendations	136
6.6.	Conclusions	137
REFERENCES		A
APPENDIX 1 INFORMATION ABOUT THE INTERVIEW PROCESS		A
A.1.1.	Letter of request to interview participants	a
A.1.2.	Participants’ names, positions, and the schedule of interviews conducted at the head offices of the three firms or their place of work (experts).	b
A.1.3.	Interview Questions	c

APPENDIX 2 DISPLAY OF COLLECTION AND CODIFICATION OF DATA

A.2.1. IBM - Tables with themes, subthemes and codes

TABLE T1.S1 (Theme 1, Subtheme 1)	f
TABLE T1.S2 (Theme 1, Subtheme 2)	h
TABLE T1.S3 (Theme 1, Subtheme 3)	j
TABLE T1.S4 (Theme 1, Subtheme 4)	l
TABLE T2.S5 (Theme 2, Subtheme 5)	m
TABLE T2.S6 (Theme 2, Subtheme 6)	o

A.2.2. CISCO - Tables with themes, subthemes and codes

TABLE T1.S1 (Theme 1, Subtheme 1)	u
TABLE T1.S2 (Theme 1, Subtheme 2)	v
TABLE T1.S3 (Theme 1, Subtheme 3)	w
TABLE T1.S4 (Theme 1, Subtheme 4)	x
TABLE T2.S5 (Theme 2, Subtheme 5)	y
TABLE T2.S7 (Theme 2, Subtheme 7)	aa
TABLE T2.S8 (Theme 2, Subtheme 8)	cc
TABLE T3.S9 (Theme 3, Subtheme 9)	dd

A.2.3. DIMENSION DATA - Tables with themes, subthemes and codes

TABLE T1.S1 (Theme 1, Subtheme 1)	ff
TABLE T1.S2 (Theme 1, Subtheme 2)	hh
TABLE T1.S3 (Theme 1, Subtheme 3)	ii
TABLE T1.S4 (Theme 1, Subtheme 4)	kk
TABLE T2.S5 (Theme 2, Subtheme 5)	ll
TABLE T2.S6 (Theme 2, Subtheme 6)	nn
TABLE T2.S7 (Theme 2, Subtheme 7)	oo
TABLE T2.S8 (Theme 2, Subtheme 8)	qq
TABLE T3.S9 (Theme 3, Subtheme 9)	rr

APPENDIX 3

A.3.1. Expert opinion – Adrian Schofield	tt
A.3.2. Expert opinion – Mario Scerri	vv
A.3.2. Expert opinion – Anonymous	ww

LIST OF ABBREVIATIONS

DiData/DD	Dimension Data
DST	Department of Science and Technology
FDI	Foreign Direct Investor/Investment
HR	Human Resources
IBM	International Business Machines
IP	Intellectual property as copyrights and patents
IoT	Internet of Things
IT	Information technology
ITC	Information & Communication Technology
MICT	Media and Information and Communication Technology
MNE/MNC/TNC	Multinational Enterprise / Multinational Corporation / Transnational Corporation
NPC	National Development Plan
NTT	Nippon Telegraph Telephone
R&D	Research and Development
SA	South Africa
SD	Skills Development
SDP	Skills Development Plan
SETA	SA Education and Training Authority
TF	Technology foresight

LIST OF TABLES

Table 1: Table with literature grouped on themes/topics and themes/propositions.....	34
Table 2. Structure of data collection	43
Table 3. The steps taken during analysis of the data	45
Table 4. Topics, propositions/subthemes and codes	53
Table 5. Qualitative variable table for topic 1 with the evaluation of the four dimensions...	102
Table 6. Qualitative variable table for topic 2 with the evaluation of the four dimensions..	117
Table 7. Qualitative variable table for topic 3 with the evaluation of the four dimensions...	125

LIST OF FIGURES

Figure 1. HR roles in building a competitive organisation (Ulrich, 2013, p.24)	23
Figure 2. Subsidiary mandate life cycle (Mooney, 2013).....	25
Figure 3: Conceptual Framework - Investment in skills at ICT MNE's branch level.....	37
Figure 4. Cases comparison – Topic 1	103
Figure 5. Cases comparison – Topic 2.....	117
Figure 6. Cases comparison – Topic 3	125

CHAPTER 1 - INTRODUCTION

1.1 Background

South Africa aims to achieve a faster economic growth through skills development and relevant and sustainable innovations (NPC, 2012), like Google and iPhone. The picture of the state of innovation in South Africa is not rosy, but many organisations are able to visualize the right direction. The researcher aimed at obtaining valuable data on skills development for entrepreneurs and policy makers of developing countries, like South Africa, that will assist them in their endeavour to improve their country's competitive position and grow locally and internationally by achieving technological self-sufficiency and innovative capabilities of their own. The goal of this research was to find, under the theme of innovation studies, the answer to the research question of how the South African subsidiaries of MNEs, part of the South African National System of Innovation (NSI), invest in skills.

Innovation is a process fundamentally uncertain, contextual and path dependent (DST, 2012; Tidd, 2001). The research question includes all these attributes of innovation because the researched firms are, on one hand, innovative and part of the global top end of economy, and on the other hand, actors in the context of South African NSI. These firms are part of the ICT sector, classified as a high-tech sector (OECD, 2011) and characterised by a rapid change of technological paths. The research question sought answers in a South African context where, according to the Technology Ministerial Review Committee on the Science, Technology and Innovation Landscape (DST, 2012), the shortfalls of human capital are key weaknesses of South African NSI.

South Africa's big ambition, similar to many other developing countries, is to move from an efficient and resource driven economy to a knowledge driven one (DST, 2008; DST, 2012). However, the main source of innovation in firms is human capital, which needs high investment to gain new knowledge and to face changes. Therefore, the question regarding how these knowledge based firms invest in skills is relevant in this research context. Moreover, the research wishes to open a new perspective, different from the existing perceptions and assumptions of the policy makers and government regarding the role of Foreign Direct Investment (FDI) (represented by MNEs investment) in the economy, especially with regard to their contribution to innovation activities. After all, FDI does not necessarily result in economic growth and may even be undesirable in certain sectors, such as

retail (Samuel, 2013). However, FDIs' role is very important in technology transfers and skills development and for advancing South Africa to a knowledge-based economy.

In the search for answers to the South African competitiveness problem, politicians and economists have discussed various opinions regarding the role of FDIs/businesses in R&D and innovation. Referring to the role of business in innovation activities, the Technology Ministerial Review Committee (DST, 2012) concludes: *"The key performers of research, development and innovation are private sector businesses."* (p.15) and *"...a policy framework that recognises that business in South Africa must be a large scale founder and performer of R&D, and therefore a key strategic partner for government to engage with."* (p.22)

However, the private sector, including branches of MNEs, lacks the willingness to perform R&D activities in South Africa, primarily because of NSI weakness in skills development. *"The behaviour pattern of MNCs reveals that they do not engage in R & D activities in underdeveloped countries."*(GTRC, 2015; UNIDO, 2006) Arguably, their first goal is to maximise the profit that is their responsibility to their shareholders and to downsize the risk. Moreover, fundamental R&D is very expensive, highly specialised and time consuming and applied R&D is as difficult.

The research paper wishes to discover how MNEs invest in skills development (SD) in the South African R&D and innovation landscape. The research study wishes to paint a new perspective for innovation managers and entrepreneurs, who need to follow relevant models of innovation management, applied in investment in skills in innovative firms. In addition, policy makers need a more detailed picture of FDIs' involvement in innovation in order to write appropriate policies for South Africa's benefit. As Samuel (2013, p.16-17) states: Incentives can be offered to invest in R&D and human capital. Moreover, South African labour is not as competitive when compared to other middle-income countries, and even some low-income countries. Although tax incentives are offered to companies to train their staff, more could be done to attract TNCs [trans- national corporations] to spread their technical expertise. The speed with which these projects are implemented must be accelerated, as South Africa cannot afford to lose further momentum in this area.

The research study intends to find a new perspective on the role of FDIs in South African National System of Innovation and this will be a contribution to its better understanding.

1.2. Research Problem

Arguably, it is very important for business strategists and business leaders to understand how to invest in skills development for competitive advantage and innovation. The question is holistic and the answer is complex because effective investment requires resource management competence. Models for gaining competitive advantage through investment in skills do not answer the question of how strategic management connects to this type of investment. The researcher limited the research study to investments in intangible assets like human capital or human resources skills, expenditure in R&D skills and innovation skills.

The research paper discusses the creation of new knowledge in firms in the ICT sector, a knowledge intensive sector, and provides insights into the process of acquiring skills and competencies through inward investment under leadership decisions. Three ICT firms, South African branches of MNEs, became the cases studied because these MNCs are serial innovators abundantly resourced with thousands of innovations diffused to the global market as part of their global strategy.

1.3. Research Question

The main research question is:

‘How do ICT innovative firms, based in South Africa, invest in skills development (SD)?’

The question directs this research study towards investigations of how innovative firms in the ICT sector invest in skills. Innovation is a process fundamentally uncertain, contextual and path dependent (DST, 2012; Tidd 2001). Therefore, the firms where innovation takes place invest in skills under these pre-determined factors that create the framework of this investigation.

1.3. Research Scope

This research study is in the field of innovation studies and takes place at the beginning of 2012, and ends at the beginning of 2015, in South Africa, an emergent market and the location of the three firms researched: IBM SA, Cisco SA and Dimension Data (DiData).

However, Nippon Telegraph and Telephone, an international corporation, owns Dimension Data now. Before 2010, DiData was a South African owned firm.

These firms are active in the ICT sector and are subsidiaries of large global firms or MNEs that are innovative and resourceful. The focus of this research study is on investment in the skills development that takes place in these firms within the context of their business activities and influenced by South African and global change. As the above research question states, the main activity studied by this research is investment, limited here to the inward investment in skills development in innovative firms. The sum of activities in firms that embed resources in people's skills (education, training, knowledge or competencies) for future returns represents investment in skills development.

This research is important for guiding managers and leaders to invest in skills because often they do this incorrectly and waste resources. For example, Acemoglu and Autor (2010) empirically prove that numerous investment decisions in skills can be regarded as misplaced, where the investment in skills was done, but in inappropriate skills. They argue that the result is a phenomenon called '*deskilling*' where there is a lack of balance between the investment in low and high skills. Thus, the investment decisions will affect firms' resources and competitiveness. The study of effective or efficient investment in skills in a world with scarce resources is part of this research.

1.5. Socio-political framework: geographical and temporal limits of the research

The present research takes place in the middle of the second decade of the twenty first century between year 2012 and year 2015, in a world characterised by challenging global turmoil. The location of the research is Gauteng, the most technologically advanced province of South Africa, a middle-income developing country where a massive general productivity gap affects its economic growth (Fedderke & Bogetić, 2009).

This research paper studied the firms in the context of South Africa, a location for branches of MNEs. Fedderke and Bogetić (2009) describe South Africa as a challenging business location because it is a mixture of developing countries' characteristics merged with restructuring and reindustrialisation activities, pockets of technical excellence and a general low level of technical and general education.

1.6. Research Motivation

The relationship between innovation, skills and economic growth has been the subject of economic studies for a long time with many questions unanswered. The researcher used a broader view in studying a continually expanding literature on economic globalisation that generated a plethora of conflicting viewpoints and alternative discourses in trying to answer one of these questions related to innovative firms' investment in skills. The present state of the global economy is characterised by uncertainty, instability and turbulence, especially since the 2008 global economic downturn. The process of tightening of firms' financial conditions caused a global GDP decline and affected firms' ability to perform after 2008. Firms' innovation expenditure dropped dramatically as a direct result of the economic crisis (Jermann & Quadrini, 2009). Due to the fast rate of technological change, combined with a high level of competition and a turbulent macroeconomic environment, the path to economic growth is difficult to measure and predict.

In their 2009 book "The Upside of Turbulence", Sull and Lester say (p.5):

"In today's volatile world, doing business feels like competing in a heavyweight boxing ring. To prevail, should your company rely on agility (nimbleness) to quickly spot and exploit market changes?" One can say that agility should be a characteristic of the innovative firm.

Sull and Lester identify three factors that drive turbulence, namely, dynamism, complexity and competition. Increased turbulence amplifies these factors in the future and the expected result is an increase in global economic volatility. Furthermore, globalisation requires evolving strategies from both multinational enterprises and firms based in emerging markets like South Africa. Teece (2007) says that firms respond to turbulence by using their dynamic capabilities - the distinct skills, processes, procedures, organisational structures, decision rules, and disciplines - that are difficult to develop and deploy.

Furthermore, Teece (2007, p. 1321) says:

Dynamic capabilities have no doubt been relevant to achieving competitive advantage for some time. However, their importance is greater because the global economy has become more open and the sources of invention, innovation, and manufacturing are more diverse geographically and organisationally, and multiple inventions converge to achieve

marketplace success. Achieving evolutionary fitness is harder today than it was before the millennium.

The growth opportunities available to firms based in developing countries depends on many factors. Among them are the developing country's macroeconomic policy environment and its available technological infrastructure, their national innovation system and the mechanisms in place to support technological development through skills development at the firm level. Arguably, some of these opportunities also depend on multinational companies and the way they manage their global and local operations (Adams, 2009). Thus, one of the complex variables that are challenging the firms' leaders is the capacity to navigate through this state of rapid change. The successful leader/navigator has to foresee the nature of skills that will be necessary in future and make effective decisions by investing in the right skills at the right time. The right choice will enable the firm to retain its competitive and innovative edge. Sull calls this navigation skill the "agility" to foresee and timeously act on opportunities using the firm's dynamic capabilities.

It is becoming increasingly difficult to predict the skills requirements of the market, as markets are not sending enough intelligible guiding signals to the players regarding how to invest in skills development. Other important stakeholders are not sensing or sending intelligible signals during their education and training activities such as those available at government institutions and universities. Therefore, the current education and training system is insufficient (Jones & Grimshaw, 2012).

This present research is a qualitative investigation conducted under the global business landscape described above, hence, its title summarises the researcher's goal to analyse how firms, based in South Africa and effective at innovation, invest in skills. The firms are part of ICT global companies and the investigation looks at how these subsidiaries contribute to the South African innovation landscape.

1.7. Research Key Issues, their background and their definitions

Opening of new markets and the ongoing process of globalisation create a South African dynamic market with the main feature being human development and innovation. Furthermore, this is the base of business creation by South African highly entrepreneurial

innovators as White (2012) says in his article called “South Africa, the home of global champions”. The research takes place in South Africa, a middle- income country, in the context of an education in crises that makes the implementation of new technologies for both innovators and the workforce difficult as White (2012) says.

1.7.1 South African National System of Innovation, multinationals (MNEs), ICT sector, R&D and Innovation Background

South African National System of Innovation is coordinated from the Department of Science and Technology’s perspective of research and innovation-push with broken links between private and public institutions and weak links between innovators and the economic and political institutions that should support innovation. Human development is hard to achieve with low skills level and requires growth and diversified economies away from exploitation of natural resources (Mills, 2012).

South African strategic location and its resources make South Africa attractive for multinationals to invest in ICT sector that is a dynamic one, but has challenges to overcome like the lack of high tech skills.

South African economic and political institutions make possible the process of innovation in South Africa by encouraging technical education and acquiring know - how. Technical improvements are part of the sustainable economic growth and enable people, but South African political support is not present (White, 2012).

1.7.1. Innovation

Innovation is a concept that has evolved over time. In the beginning of their innovation research, the economists mainly dealt with the allocation of resources to innovation processes taking place in firms. In fact, the innovation processes in firms are more complex and need sociological, management, organisational science and business studies (Fagerberg, 2004).

There are differing views between business academics and practitioners as to what constitutes innovation including the following (Tidd & Bessant, 2008, p.16):

- *“Industrial Innovation includes the technical, design, manufacturing, management and commercial activities involved in the marketing of a new (or improved) process or equipment”* Chris Freeman (1982), *The Economics of Industrial Innovation*, 2nd edition, Pinter, London.
- *“Innovation is the specific tool of entrepreneurs, the means by which they exploit change as an opportunity for a different business or service. It is capable of being practised.”* Peter Drucker (1985), *Innovation and entrepreneurship*, Harper & Row, New York.
- *“Companies achieve competitive advantage through acts of innovation. They approach innovation in its broadest sense, including both technologies and new ways of doing things”* Michael Porter (1990), *The Competitive Advantage of Nations*, Macmillan, London
- *“An innovation business is one which lives and breathes “outside the box”. It is not just good ideas, it is a combination of good ideas, motivated staff, and instinctive understanding of what your customer wants”*- Richard Branson (1998) DTI Innovation Lecture
- *“Innovation is the successful exploitation of new ideas”* Innovation Unit (2004) UK Department of Trade and Industry

From the above views, this research paper adopted the comprehensive and straightforward definition of the UK Department of Trade and Industry (2004).

A definition linking knowledge and innovation from different disciplinary perspectives is that *“innovation is the creation of new knowledge and ideas to facilitate new business outcomes, aimed at improving internal business processes and structures and to create market driven products and services. Innovation encompasses both radical and incremental innovation.”* (Du Plessis, 2007, p.21).

Innovation as a human activity requires various competencies, abilities and resources. The firms are also innovating through their human capital contribution and innovation can be product, process, business or organisational innovation. Innovation is a process from the new idea to the market and performs better in an innovative social context. Human resources in firms should boost innovation activities and fuel the creation of wealth.

On the other hand, innovation is a multidisciplinary and complex process hence the term is ambiguous and lacks a single definition or measure (Adams et al., 2006). During the innovation processes, firms create what Schumpeter (1934) refers to as “*gales of creative destruction*” by replacing the old knowledge with a new one.

Technical innovation processes are clustered and interconnected systems of technical change (Freeman, 1998). Innovative firms will always outperform optimization firms, with “*innovation as the driving force behind economic, social and institutional change*” (Fagerberg & Verspagen, 2002, p.3). Fagerberg studies the way in which high tech innovative firms outperformed other firms where only imitation processes took place. However, the economic reward associated with successful innovation is often temporary and transitory, as imitation will quickly follow. The innovation and its resultant imitation, as Schumpeter says, will both contribute to economic growth.

The process of innovation and its subsequent diffusion has a systemic path that is dependent on the firms’ geographical position and is cumulative over time. The innovation processes are not linear and depend on social, political and institutional factors, both at regional and national level (Fagerberg & Verspagen, 2002). Fagerberg et al. (2002) say that the national system of innovation is the place where firms externally share knowledge, manage knowledge flow by networking and partnership and create organic ecosystems. In the context of this research study, the firms belonging to South African NSI have specific characteristics that influence the performance of the firms’ innovation processes.

The innovation winners are firms that construct appropriate capabilities at local, national and, arguably, international level, for learning and interacting with new technological trajectories (Cantwell & Piscitello, 2005). The pursuit of competitiveness through innovation is a national policy objective, for the knowledge based global economy, both in advanced countries and in those that want to catch up (Fagerberg & Godinho, 2005) as is the case of South Africa.

Innovation is a mind-set, a culture, a desire to do better and an acceptance of failure. Much of what happens in an innovative firm depends on the way this firm organises its learning process (Hargadon, 2008). Hargadon says that many innovative firms recombine old knowledge in new ways. Old knowledge is the material from which individuals in firms construct innovative solutions in the larger social context.

Finally, in this research context, innovations are products or processes with successfully launched IPs diffused in the global market from where they generate returns.

The firms called 'innovative' belong to serial innovative MNEs that have built into their structures innovation capacities. The research question is how the firms, branches of MNEs that are part of the IT sector and located in SA, invest in their employees', partners' and clients' skills, including innovation and creativity skills, if any.

1.7.2.Firms

Penrose (1959) defines firms as organisations with formal structures that people consciously created with the explicit purpose of creating optimum and sustainable economic wealth. The firms are dynamic, heterogenic and interact with each other. Arguably, the innovative firm belongs to a system of innovation that is part of the socio-economic environment at national, provincial and local level. Furthermore, she says that the intensity of micro and macroeconomic activities differs with the geographical location and depends on the technologies used by the firms. A firm is more than an administrative unit; administrative decisions dispose the collection of firm's productive resources between different uses and over time. In order to understand the firm, Penrose points out that the difference between firms and market is that the former are administrative organisations. Firms differ from institutions because they have higher order organisation principles involved with the coordination and recreation of social relations among employees. Penrose concludes that a resourceful firm wins better competitive advantage if it is using its resources effectively.

Due to their widespread use and large scope for product, process and organisational improvement, ICT firms are general-purpose technology firms with patterns of lifelong learning activities in their workforce. The ICT firms must measure and evaluate their current situation related to skills development on a continuous basis because of their need to engage with a large variety of sources of knowledge that coexist with innovations focused on a few emerging technologies (Corrocher, Malerba, & Montobbio, 2007). The ICT firms that are leaders in innovation are those that have better capabilities, competencies, and creative skills than their competitors. The ICT firms must invest in skills to address the skills deficiencies like the skills gap, skills mismatch, skills bias and deskilling phenomenon as mentioned by Acemoglu and Autor (2010).

1.7.2.1. FDI, MNEs and their branches

The OECD (2011) defines the FDI as cross-border investment by a resident entity in one economy with the objective of obtaining a lasting interest in an enterprise resident in another economy. The lasting interest implies the existence of a long-term relationship between the direct investor and the enterprise and a significant degree of influence by the direct investor on the management of the enterprise. Ownership of at least 10 per cent of the voting power, representing the influence by the investor, is the basic criterion used.

Furthermore, the OECD defines foreign direct investment (FDI) as a key element in international economic integration. FDI creates direct, stable and long-lasting links between economies. It encourages the transfer of technology and expertise between countries, and allows the host economy to promote its products more widely in international markets. FDI is also an additional source of funding for investment and an important vehicle for development.

The earlier optimism regarding FDI as “*an engine of development*” (UNCTAD, 1992) has virtually evaporated and been replaced with an arguably more realistic assessment. There is now a belief that if host countries want to benefit from FDIs, they must work hard to align to the FDIs’ challenging process.

1.7.2.2. MNE/MNC or TNC

A multinational corporation or multinational enterprise is an organisation that owns or controls productions of goods or services in one or more countries other than the home country. An international corporation, a “*transnational corporation*”, “*a multinational enterprise*” or as a stateless corporation, operates on a global scale through its branches/firms located in the host countries.

1.7.2.3. Culture and Climate in Firms

The total set of a firm’s social interrelations, ideologies and core values defines the firm or organisation culture. Leadership and management change the firm culture by giving new strategic directions and provide models of behaviour, but cannot directly change the culture. Beside culture, a firm also has a climate defined as “the recurring patterns of behaviour, attitudes and feelings that characterize life in the organisation” (Tidd & Bessant, 2008,

pp.131-137). Furthermore, they say, climate is a psychology of the organisation and the way the individual perceives his life within the organisation hence, more amenable to change than culture. Academics use these two notions interchangeably despite the fact that they are slightly different with culture a rather broad and inclusive concept and climate falling under the concept of culture as Tidd and Bessant say.

1.7.3. ICT sector

ICT is a high tech and general-purpose technology with a widespread use and a large scope for product, process and organisational improvement. The main research question connects the researcher to firms in the ICT sector. The ICT sector is characterised by a huge investment in R&D that may be conducive to breakthroughs of disruptive innovation. In addition, ICT firms support customer driven innovation at all levels, as Hyytinen and Pajarinen (2005) point out. They further add that ICT industries are similar to any other industry under market forces. However, there are some ICT sector characteristics that the researcher considered important for this research study. The researcher limited the list of ICT characteristics that Hyytinen and Pajarinen consider to three.

Firstly, network effects that lead to demand side economies of scale characterise some ICT industries resulting in the cash flow volatility from investment in R&D. Secondly, intermediate ICT goods industries, such as software and ICT equipment, produce many incremental innovations of high quality. Thirdly, the cost of entry of new firms is low, due to the nature of products called “*information goods*”.

Internet and mobile technologies are a global presence and part of ICT sector technologies that have created an increasingly borderless world. Today, ICT activities perform across various cultures, geographies and time zones. The ICT sector has applications divided in two groups, using the criteria of growth of patterns, structure of innovations, pervasiveness of innovation and variety of sources of knowledge. Corrocher, et al. (2007, p. 419) argue that “*high opportunity ICT applications are characterized by high growth of patenting activity, high rate of entry of new innovators and high concentration of technological activity across firms. These innovations will be capable to induce the Schumpeterian creative destruction in the ICT sector*”. Consequently, these high opportunity applications are different from the ICT intermediate goods incremental innovations, and are potential disruptive innovations.

The radical change brought about by the ICT advancement in massive storing, processing and transmitting of information has been mastered by leading firms as *"waves of creative destruction"* (Schumpeter, 1934). The characteristics of ICT trends are miniaturization, compression, convergence, virtualisation through the Internet and networking through increased connectivity and communication. The future trends are social networks, cloud technologies, big data analysis and cognitive computing with Internet of Things as the major forward step part of E2E technology (*"everything to everything"*) (Schofield, 2014).

"High technological sophistication and intellectual capital, quick time responses, short life term of the technologies, a rapidly changing global market, high export dependency and absence of true knowledge shearing are some of the hall marks of IT industries" (Thatchenkery & Stough, 2005, p. 42).

1.7.4. Skills

Skill is a goal-directed, well-organised behaviour that employees acquire through training and practice and perform with economy of effort (Procter & Dutta, 1995). Skills' measurements are speed and/or accuracy of performance. Proctor and Dutta distinguish between skills - perceptual skills, response and selection skills, motor skills and problem-solving skills. Typology of skills is vast however, two major types are important: soft skills or non-cognitive skills and cognitive skills. Procter and Dutta further say that skills most in demanded are problem-solving skills, part of cognitive skills that depend upon intellect and mental models and can be acquired and developed through practice.

Furthermore, the two types of skills - cognitive and non-cognitive - relate to each other because socio-emotional (non-cognitive) skills foster cognitive skills and are an important product for nurturing capable employees because human capital is the capability in firms to create, carry and exchange information and knowledge. Global leaders support the view that the knowledge possessed by human capital is among the most significant of competitive advantages (Deeds, 2003). In addition, skills acquired by investing in human capital in one period augment the skills attained at a later stage because they are path dependent (Cunha & Heckman, 2007).

Campbell (2001) says that ICT skills are the most sought after skills and advanced IT skills are part of the skills shortage group and attract high wages. Furthermore, the growth of the ICT sector itself reflects jobs growth of 39 percent between 2000 and 2008. After 2008's economic and financial crisis, IT skills in developed countries were in surplus because many firms retrenched their staff. In SA, the IT skills gap continued because high tech firms suffered fewer losses after 2008 as Western countries had suffered and the IT skills job market was in high demand. The 2013 ICT skills survey from JCSE (Schofield, 2013) estimates a demand of 70,000 IT network and cloud technology skilled professionals for the coming years. However, the outsourcing of skills became easier for South African HR departments after 2008 due to the global surplus of talent.

Skills development, human capital development or human resources development has the same interchangeable meaning in this research paper. They all refer to the knowledge and skills development of an entire firm's workforce. As Blundell et al. (1999) argue, human capital is the early ability (whether acquired or innate), together with qualifications and knowledge acquired through formal education, and skills, competencies and expertise acquired through training on the job. The concept of human capital arose from a recognition that an individual's or a firm's decision to invest in human capital (i.e. undertake or finance more education or training) is similar to decisions about other types of investments undertaken by individuals or firms.

1.7.5. Firms' investment in skills development

Blundell et al. (1999) say that human capital investments involve an initial cost from which the individual or firm hopes to gain a return in the future. The firms will undertake human capital investment if the individual or firm will maximise the return from the investment that will be greater than the market rate of interest.

Managers measure investment by size, direction, priorities, and the return it produces in a certain period. Investment is a function of the firms' strategic management of resources accomplished with the collaboration of the financial department. Efficient or effective investment at firm level is significant for productivity and business growth because it represents new capital accumulation in business (Blundell, Dearden, Meghir & Sianesi, 1999).

Firms invest in skills as a long-term commitment to sustainable competitiveness but in the South African context, the investment in skills is higher because of the poor education environment (Mills, 2012).

1.8. Structure of the research thesis

This thesis contains six chapters presented below:

Chapter 1 - Introduction

Chapter 2 - **Literature Review** regarding skills, innovation and their relation to economic growth that covers a number of academic papers and books belonging to the mainstream of innovation studies. The closing of the chapter concerns the interpretation of the literature and the chapter summary.

Chapter 3 - Research Methodology

The chapter contains the documentation of the qualitative analysis design, the description of the analysing instruments, the design of the case studies and the design of questionnaires/interviews. In addition, it contains discussions about the limitations of the study.

Chapter 4 – Presentation of Results and Discussions

This contains the full description of data collection, capturing and editing processes followed by the data analysis. A major source of data of exploratory value is the professional business and ICT media releases combined with independent sources. The chapter contains discussion and an overview of the findings resulted from the three case studies. The units of analysis are IBM SA, Cisco Systems SA and Dimension Data.

Chapter 5- Cross Analyse of Case Studies Results

In this chapter, the findings of the previous three chapters are analysed by applying deductive and inductive logic methodologies to primary and secondary content, under the thematic framework and cross case comparisons followed by multicase methods to extract patterns from similarities and differences found. The chapter ends with the summary of the findings resulted from the three cases studies.

Chapter 6- Conclusions

This chapter concludes by considering the findings of the analysis of the factors, conditions, processes and behaviours that shape the activity of inward investment in SD under the boundaries set by the research question.

CHAPTER 2 – LITERATURE REVIEW

2.1. Literature Review Framework

The literature on skills development and innovation in the ICT sector is comprehensive and has a number of topics. The present research paper is limited to the study of how innovative ICT firms are investing in skills development as one of their strategies for growth and competitiveness in a global climate characterised by accelerated technological change. The focus of the research is to find out how innovative MNE firms invest in dynamic capabilities, such as skills development and why they chose to do so.

Becker (1975) recommends that firms should focus their investment on skills and, more importantly, on specific skills for achieving performance. On the other hand, Edquist (2005) cited by Jones and Grimshaw (2012), argues that there is little systematic knowledge about the ways training and education are influencing the growth in firms and the steps of the innovation process, criticising Becker's mechanistic approach to investment in skills. Other critics like Jones and Grimshaw (2012) find it difficult to apply this theory to innovation performance. They conclude that training is specific and general at the same time and the impact of training always affects profitability or productivity.

Arguably, the present research fits at the border between the innovation and the resource management studies in firms belonging to the rapidly changing ICT sector. The researcher found a niche in the research field with no studies of how firms that are subsidiaries of global corporations based in South Africa invest in skills. The next step in this research was to find how these innovative firms invest in skills for innovation and creativity in support of South African innovators and their innovations. The study of literature on the topic of firms, skills, innovation and investment produced a large number of academic papers selected under three main topics.

Topic 1: Investment in Skills Development as a Strategic Activity

This topic includes literature review about strategy, human resources (HR) and leadership strategic collaboration, technology foresight and the exploitation vs. exploration modes of business opportunities.

Topic 2: Factors, processes and routines that shape the efficiency of investment in SD

This topic includes learning routines, soft skills, innovation skills, monitor and reward functions and talent management,

Topic 3: South African context influences investment in SD

Here the researcher discusses how South African economic and political context influences firms' investment in skills.

This literature review chapter starts with a brief look at the history of macroeconomic theory under the three topics mentioned above.

2.2. A Historical Review of Investment in SD in Innovative Firms

The history of economics highlights the sequence of great ideas generated by the dynamic discourses and controversies related to the evolution of emerging techno-economic paradigms. Classical economists, Karl Marx and Maynard Keynes, who made human relations central to the economic process, are followed by the neoclassical, Schumpeter (1934), who argues that business cycles fit the behaviour of the ICT sector or 'critical technology sector' characterised by rapid and critical changes. The period after World War II, called The Third Industrial Revolution, is characterised by a new set of skills focused on ICT and biochemical activities minimizing the role of the innovation processes structure and innovation concept system. Economic methodology significantly changed after World War II and after the 1970s, towards neoliberalism. The neoliberal era supports the globalized free market and a reduction in state intervention in economic affairs, with a strong accent on private property rights and individual freedom. Arguably, state intervention compromises the last two.

The history of the macroeconomic studies converges with the history of skills and innovation studies, forming a coherent and complex body of knowledge. From classical to neoclassical economy, further to evolutionary economy and growth economy, the importance of investment in skills and innovation is pivotal for development. Different to these beliefs, Malerba (1992) discusses technical change that happens in firms in small steps without any investment and following the learning by doing, using and interacting process called DUI. Furthermore, other innovations take place without using high technical skills or investment, but creativity. The transmission of individual creative products, ideas or discoveries into "*innovations*" that attain some level of adoption in a society is the subject of the ideas generated by Findlay and Lumsden (1988) who argue that successful innovation depends on an individual process and social environment but not on the level of investment in skills.

These two papers conclude that there are innovations that take place in firms without new investment in skills.

Contrary to these findings, the present study refers to ICT innovation seen as a product or process that is the result of a plan and needs investment in skills and other resources to go to the market. This planned innovation process integrates employees' creativity and new knowledge creation resulting from learning by doing, using and interacting. *"To turn really interesting ideas and fledging technologies into a company that can continue to innovate for years, it requires a lot of disciplines,"* says Steve Jobs in Jobs (2003, August 12).

2.3. Investment in Skills Development – Emergent topics from literature review

This section contains the discussion of the three topics that emerged from literature researched with their subthemes or propositions.

2.3.1. Topic 1: Investment in Skills Development as a strategic activity

The strategic management theory field researches activities in firms that develop sustainable competitive advantages with the aim of creating wealth. Management in firms makes decisions that are part of all firm activities, programs, budgets and operating plans for achieving the viable firm's goals. This process is more suitable for controlled firms with stable environments. Innovative firms have a visionary approach strategy, preceded by a visionary intuition and the innovation capabilities of the founder or the headquarters that play a critical role (Rialp-Criado, Galván-Sánchez & Suárez-Ortega, 2010). This theoretical approach to strategy is the guideline for the next section. Furthermore, the main research question of how these studied firms' investment in SD takes place has a strategic (why) and operational (how) connotation and the answer often depends on the firms' location characteristics. The aim of the researcher was to find theoretical arguments to confirm why the investment in SD should be successful under a set of strategic factors. These factors are strategic intent, human resources and leadership strategic collaboration, technology foresight process and exploitation vs. exploration modes of business.

2.3.1.1. Proposition 1: Investment in SD follows leadership strategic intent

Strategic planning and leadership strategic intent are the firms' backbone and the drivers of the decision to invest in skills for innovation performance (Hamel & Prahalad, 1989).

Leadership is about coping with change by motivating and inspiring, keeping people moving in the same direction and management is about coping with complexity by controlling and problem solving (Kotter, 1999).

The literature framework of this part includes agency theory, which studies the firms as branches of MNEs. The local leadership of these branches has its strategy directed from the parent HQs with some degrees of independence (Cantwell & Mudambi, 2005). The researcher limited the discussion about leadership strategic intent at this point considering only the influence of the local leadership of the firms without considering the mandate allocated by HQs. The researcher discusses this aspect in more details in the following sections.

Arguably, the firms' leadership make, at certain moments in time, irreversible commitments to certain domains of competence, skills, training or knowledge. Leadership decisions regarding the choice of paths / trajectories and the timing of changes in the paths are fundamental strategic problems. How firms develop their capability to adapt and even capitalize on rapidly changing environments by applying the dynamic capabilities framework approach is a subject developed by many academics like Penrose (1959), Barney (1986) and Teece (1988). They say that the leadership in firms gives directions and approves the resources to cope with change through existing learning operational routines or new learning routines. Therefore, investment in skills connects to leadership decisions on how to make choices towards a certain skill, competence or new learning routine following the technology foresight signals and market signals.

Consequently, the decision to invest in skills is also empowered by the outcome of the process of foresight in anticipation of future developments. Porter (1985) says that successful strategies depend on resources and capabilities, but also the firms must understand the competitive positions and structures of the industry. Strategic intent is the management's ability to consolidate corporate-wide technologies and production skills into competencies that empower individual businesses to adapt quickly to changing opportunities (Prahalad & Hamel, 1990).

Teece, Pisano and Shuen (1997, p. 524) write about “*the way firms achieve and sustain competitive advantage in a Schumpeterian world of innovation based competition, price/performance, rivalry, increasing returns, and the ‘creative destruction’ of existing competences.*” They conclude by saying that the growth in firms takes place by developing, deploying and protecting specific firm capabilities that are dynamic in order to address the pressure of change. As these authors debate, the firms are under pressure to change and the leaders must choose timeously in what type of technical skills they need to invest. The choice to invest in skills takes shape under the leadership strategic intent. Strategic intent needs financial resources and other assets in order to fit into the dynamic capabilities framework of the firms.

Finally, dynamic capabilities line up with strategy hence, one important dynamic capability is learning new routines and new processes for achieving growth. Consequently, the investment in SD is efficient if learning aligns to leadership strategic intent because learning is a human activity that requires effective learning routines, commitment achieved through shared vision and value and effort followed by appropriate rewards. Senge (1991) says that learning is the source of new knowledge in firms and for learning to be effective, firms must adapt to a learning organisation structure. The role of Senge’s academic work may be at the organisational theory level but because he describes the model of successful organisations knowing how to engage people at all levels and developing their shared vision as their capacity to continually learn, the link to strategy is evident. This organisational model, called the learning organisation, requires investment in individual and team level learning as a way to extend creativity and innovation (Senge, 1991). He further says that learning organisations have five pillars on which to focus their endeavour to succeed like system thinking, personal mastery, team learning, mental models and shared vision. The last pillar directly connects Senge’s theory to the firm’s leadership goals and further, the leadership strategic intent.

Senge’s theory took life two decades ago, but many managers and executives identify organisational learning as the key to competitiveness at present. The model, still highly regarded, gives room to some criticism about the way the firm’s performance takes place in a learning organisation, which is an ideal type of organisation but requires large investments to bring it to life.

Nevertheless, the leaders must behave like “*designers, stewards, and teachers*”, generate and manage a necessary creative tension not just in themselves, but also in an entire organisation (Senge, 1991). He also says that the leaders’ job is to energize the organisation. One may say that these leadership roles connect again to strategic intent. Furthermore, an efficient investment in SD is the result of the firm’s applied learning organisation culture.

Another empirically proven concept in a resource and knowledge based theory is the line of sight. Buller and McEvoy (2012) describe it as the alignment of organisational capabilities and culture, group competencies and norms as well as individual motivations and opportunities with the firm’s strategy. They define the overall firm performance as a function combining the vertical alignment of strategic priorities and actions among these three organisational levels with the horizontal alignment of the human resource management practices in recruitment/selection, performance appraisal, training/development, and compensation. Buller and McEvoy say that a clear line of sight combined with a correct alignment to firm strategic intent is a recipe for high performance and the further outcome is the efficiency of investment in SD.

Finally, the employees’ shared vision and shared values are the determinants of the efficiency of investment in skills development because it aligns them to the leadership strategic intent. Arguably, high skills in firms successfully boost innovation because of the high competence of their employees. When leadership senses change/opportunities, its strategic intent has the role to link technologies required and skills available in response, or invest in skills development to create the needed strategic resources. People must line up and move together in the same direction and their behaviour must be consistent with the leadership aiming at the same target (Kotter, 1999). Kaliprasad (2006) discusses the role of effective leadership in boosting firms’ performance by connecting firms’ strategic intent with the efficiency of investment in SD.

2.3.1.2. Proposition 2: Human Resource department and leadership design and implement SDP plan hand in hand

Strategy is about choosing your partners like the leadership intention to have the HR department “*sitting at the same table*”. The Human Resource (HR) function plays an

important role in developing a sustainable competitive advantage (Wright & Boswell, 2002) because it is managing and administering the firm's human capital.

" Human capital represents the knowledge and skills that individuals bring to an organisation. As it is developed through both education and personal experience, it contributes to both the explicit and tacit knowledge of the firm" (Dimov & Shepherd, 2005, p.9). Further, Maltz, Shenhar and Reilly (2003) define workforce planning as a process of analysing the demand for labour, evaluating the size, nature and sources of supply required to meet the demand. The skills development plan should contain descriptions of the employer brand, retention strategy, talent management strategy, recruitment strategy and selection strategy.

Notably, the HR function can be outsourced, but empirical studies show that part of the HR services are distinctive competencies and must be kept secret as core strategic keys. An example is IBM, which subcontracted WFS, a HR consulting firm. IBM's leadership later discovered that some of the outsourced HR services were some of IBM's distinctive competencies that are part of their uniqueness and business secrecy. The HR role is to balance efficiency and innovation when new ideas require risk capital, both financial and human (IBM website).

Further, a severe competitive disadvantage of the HR function in firms could be the failure of their system of selection to identify cognitive abilities, technical skills or/and interpersonal skills that create value. The HR manager must execute the HR function by investing in a system of continuous skills planning for the rest of the firm's life. The HR department must change into a strategic partner.

In the *"Human Resource Champion"* book, Dave Ulrich (2013) describes the role of the HR in building competitive organisations as shown in the figure below.



Figure 1. HR roles in building a competitive organisation (Ulrich, 2013, p.24)

Summarising the figure above, one may see how HR and leadership should be strategic partners for achieving the firms' objectives. Additionally, the studied firms are branches of MNEs and the role of the HR department is different from a local firm's HR department because it works under an allocated mandate and its human resource strategy may have an impact on host country development, including human resources and employment creation.

2.3.1.3. Proposition 3: Technology foresight drives SD for change

Martin (2000) defines technological foresight (TF) as a process aimed to identify future technologies likely to yield the greatest economic and social benefits. The global driving economic forces are competition, complexity, higher science and technology competencies all under increasing constraints on public expenditure.

Perez (1985) shows the connection between the TF process and the prediction of technological trajectories that display radical innovations. The outcome of the TF process will inform the firms' leaders of the way in which they should prioritise the allocation of resources and investment in SD. Perez considers this connection critical in defining technological trajectories as patterns of particular radical innovations evolution, developed, through successive incremental innovations, until the technology they created becomes optimised and standardised. Beyond this point, she says, the return on exploiting the technology diminishes.

The changes in prioritising the investment in SD, as Dierickx and Cool (1989) describe, are central to strategy in firms. Dierickx and Cool say that, at any given moment, firms must follow a trajectory of competence development that defines their future.

Consequently, firms must be strategically flexible, which is defined as a firm's intent and capability to identify major changes in the external environment, to create option bundles of product development resources, and to ensure the sustained competitive advantage of the firm (Johnson, Lee et al., 2003; Shimizu & Hitt, 2004). Foresight skills should help firms to see change in time and to build an effective response to change but the TF is an expensive process involving investment in resources; however, it helps firms enlarge their learning experience. Leadership needs visionary thinking and must regularly test its assumptions (Dess & Picken, 2001).

Firms are like “*ships floating in a sea of public knowledge*” (Cantwell, 2005) that can use, depending on their absorptive capacity and their networks, predictions and forecasting of skills needed for innovation and future scenarios. “*The Labour Market for 2020 Report*”, cited in OECD (2012), identifies skills and employment in the future issues through interviews with key experts belonging to important development areas with rapidly changing technologies.

Berends and Lammers (2010) describe the multilevel forecasting process in firms with discontinuities related to unfolding temporal and social dimensions. The authors discuss multilevel learning trajectories and their fragmented and transient behaviour created by processes and politics in firms and their dynamic characteristics. Summarising the ideas above, one can see how complex and dynamic the learning processes in firms should be, which require dynamic capabilities, effective TF and organisational learning processes for the correct prioritisation of future investment in SD. In addition, it is difficult to plan without proper foresight competence.

Arguably, the leaders must sense these critical moments and allocate resources for the needed skills because the firm may lose its competitive advantage by falling behind. Strategic foresight has many deficiencies like one-dimensionality, narrow sightedness and myopia, that are remedied by the access to a large knowledge base (Heger & Boman, 2014).

Consequently, knowing in what skills to invest and when, ahead of competition, is a big advantage and makes investment in skills efficient.

2.3.1.4. Proposition 4: Efficient exploitation of business opportunities requires investment in Skills Development (SD)

Notably, there are factors external to the studied firms that determine how leadership takes decisions beside strategic intent, technological forecasts and markets signals. One of these determinants is the mandate from headquarters (HQ) for researched firms that are subsidiaries of MNEs.

The agency theory is the field of study for subsidiaries or agencies of MNEs. The firm's agility to exploit opportunities within a focused business model depends on the firm's strategy (Sull & Lester, 2009). This is the case of IBM SA, Cisco SA and DiData, branches of MNEs, implementing the mandate allocated by their HQs. The mandates awarded by MNEs HQs to their subsidiaries determine the investment in the infrastructure and skills located there (Mooney, 2013).

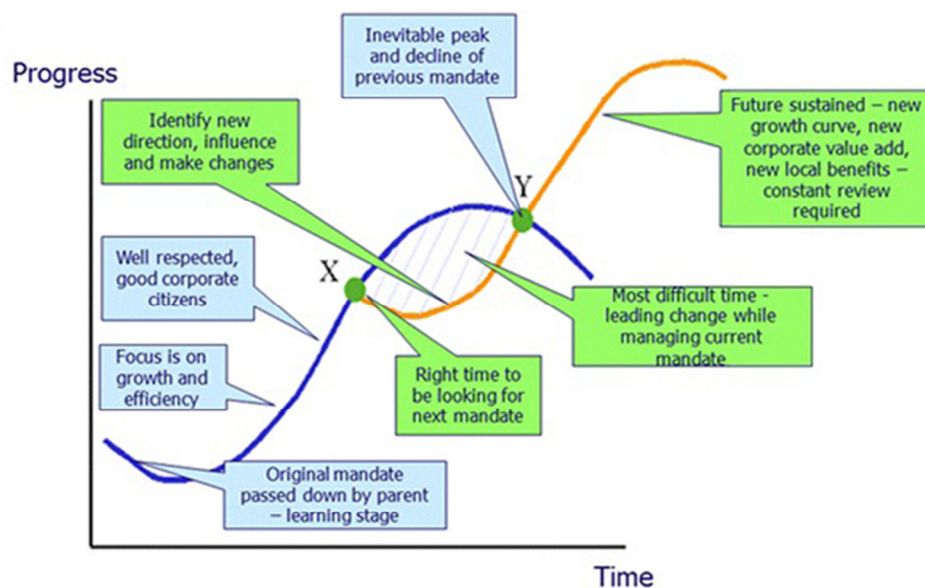


Figure 2. Subsidiary mandate life cycle (Mooney, 2013)

As seen above in fig. 2, the local MNEs leaders, with ambitious strategic intent, must carefully consider the allocated mandates because they are changing with the corporate needs. If they are stagnant year after year, without innovation, they guarantee a decline in the firm's competitiveness.

Mooney discusses the life cycle of a mandate that starts with strategic functions that alter over time and become operational. At this point, a strategic minded leader must migrate to a new mandate with further strategic goals and influence the corporation investment. Consequently, the agency theory (AT) perspective is important in understanding the role of ownership as a key factor in the behaviour of MNEs (Filatochev & Wright, 2010). The HQs - subsidiaries relationships add a new dimension to the understanding of the role of ownership.

IT firms access technology and knowledge by licensing software applications, selling OEM hardware, forming joint ventures and alliances and participating in value chains and global production networks. Surveys and papers show that licensing and certification are two means by which ICT professionals are encouraged to demonstrate the mastery of their body of knowledge (Gleason, 2002; Bruggink, 2003; Von Kinsky, 2008). Licensing is required by law whereas certification is voluntary (employers may use it as a job requirement). In addition, licensing does not require high levels of professionalism but the fulfilment of minimal standards. Certification, on the other hand, limits its use to individuals who have met certain requirements as well as high levels of job performance (McKillip & Owens, 2000). In both cases, the HQs' ambition is to make high returns and the investment in SD is higher than in other firms. Arnold and Thuriaux (1997) emphasize that firm must be knowledgeable in its exploitation skills and routine in order to gain competitive exploration competencies.

Mooney says that the subsidiaries of MNEs should intensively exploit their existing products for profit because they have the advantage to lead the market under high levels of technical core competencies. If the mandate changes direction, the subsidiaries should be prepared with the necessary set of skills for innovation.

2.3.2. Topic 2: Factors, processes and routines that shape the investment in SD

Berends and Lammers (2010) discuss how firms learn, saying that firms are using a learning multilevel process impacted by social and temporal factors. Further, they say that the firms under a rapid change environment are involved in an ongoing organisational learning trajectory that is not a straight line but a trajectory with feedback loops and discontinuities. It looks messy and fragmented until learning routines are conceptualised. The employees' commitment to ongoing learning depends on the firm's culture and on the employees'

individual personalities and their potential or talent. Arguably, the firms need resources to achieve learning performance.

2.3.2.1. Proposition 5: Efficient training / learning routines require investment

Teece et al. (1997) say that learning and training are among the resource based assets and dynamic capabilities of firms and belong to firms' innovation strategy.

In the dynamic capability framework defined by Teece et al. (1997), resources include engineering experience, tacit knowledge, core competencies and dynamic capabilities. The firms have difficulties in replicating or imitating competences that give advantage to their competitors. Teece et al. argue that there are three roles in the organisational processes, namely: static (coordination/integration), learning (dynamic concept) and reconfiguration (transformation). Furthermore, Teece et al. define learning as a process of repetition, experimentation and identifying opportunities. They argue that learning involves the participation of employees in firms at the individual level and requires a common code of communication as well as coordination mechanisms and routines/patterns of action. One of the mechanisms of efficient investment in SD is the one using an efficient learning capability through efficient mobile and e-learning technologies.

Training and patterns of learning occur in multiple forms at firm level. They give guidance to the innovation performance at all levels of the economy (Jones & Grimshaw, 2012). Training depends on the internal organisation of firms for informal/formal training and the external institutionalisation of schooling, higher education institutions and the role of government (Keep & Mayhew, 2010; Warhurst et al., 2004, cited in Jones & Grimshaw, 2012). Furthermore, efficient training depends on the firm's location. Many studies show that training can be an answer to changing demands for skills (Theter et al., 2005; Figueiredo, 2010; Jones & Grimshaw, 2012). All say that investment in skills is high risk because the incentives for employers to invest in the upgrade of their employees' skills may be insufficient and an optimal match should fit between workers' skills and job requirements. An employee trained by a firm can move to another firm, which will finally benefit. In conclusion, the serial ICT innovative firms invest highly in critical and professional skills development under strong uncertainty.

Mechanisms of investment in innovation skills are designed using rational decisions based on probabilistic estimates. The decision makers in charge of innovation investment choices are under an uncertainty that unfolds as the process evolves because, as Teece et al. (1997) say, learning for innovation skills is a transformational capability where knowledge unfolds to recombine, resulting in a non-routine high cost process. Employees learn, but they also make mistakes and decide in experiential and interpretative ways that are unpredictable and costly. Because of that, their rational analysis of resource allocations is limited (O'Sullivan, 2004).

In conclusion, mechanisms of investment in skills are efficient if the firm has learning organisational structures in place and a dynamic capabilities framework directed by a resource allocation program.

2.3.2.2. Proposition 6: Management and leadership monitor and reward employees' training and learning performance

The importance of monitoring performance in firms is an attribute of management and leadership who should decide how to allocate incentives "*where are the most fit, using agility*" as Sull and Lester (2009) say. Ulrich (2013) suggests monitoring performance of employees' learning/training by using online monitoring tools as part of the online training programs, following behaviour science models and a rigorous and scientific approach. The outcome of an accurate monitoring gives correct signals to HR management and training departments about the needs of future improvements. The HR department must nurture a culture of learning, aligned to the firm's needs and values. In addition, it must create incentives to reward employees' learning performance and mechanisms to measure the effectiveness of the investment in skills.

On one hand, Senge (1990)'s learning organisation is the optimum structure for efficient investment in skills because the leadership of such an organisation assumes the role of teaching, designing and coaching and continuous commitment to skills development, as Ellinger, Ellinger, Young and Howton (2002) point out.

On the other hand, it is difficult to measure and synchronise monitoring employees' learning performance with employees' rewards because it is a biased and subjective activity. The rewards depend on the managers' personality and behaviour. A biased attitude towards

rewarding employees can affect the organisational culture and climate and, furthermore, the efficiency of investment in skills (Kaliprasad, 2006).

2.3.2.3. Proposition 7: Soft skills, management and leadership, innovation and creativity influence the investment in SD

Firms must invest heavily in both core competencies and soft skills for high returns. In the OECD paper called “Innovation Strategy” (2011) the authors argue that “*incremental*” changes can lead to greater innovations in products and services, hence to growth and productivity in OECD economies as a whole. Further, they say that the optimum set of soft skills, if owned by employees, produces incremental change steps that can lead to a quantum jump at the end.

The location where skills for innovation are developed shapes the way the SD takes place in firms and the firms’ location shapes the way SD takes place at local or national level. Lorenz (2009) points out that there are large differences in the development of skills for innovation across EU nations and EU firms.

The Science and Technology (ST) based perspective is a determining factor in getting access to producing and utilizing the knowledge used in the innovation process. This ST perspective, along with the links between the science community and the science-based firms contributes to the “*high-tech*” fields as ICT, Bio and Nano-technology. These fields are most often the focus of current policy efforts at the national level in Europe, USA and South Africa, as Powell, Koput, Smith-Doerr and Owen-Smith (1999) say.

The innovative resourceful firms must consider the phenomenon of convergence of knowledge from various disciplines and its effect on increasing innovation capabilities when they design their training portfolios. Innovative capabilities are the sum of the skill-mix at the workplace (especially for the highly educated), embedded by the technical education of the firm’s owner and his prior work experience as Albaladejo and Romijn (2000) discuss the leader technical education is an advantage for business success in firms.

In high-tech industries, the rapid growth of knowledge requires the firms to share their R&D resources or to diffuse the innovative products using networks. Empirical studies to discover the relation between the technological sophistication; the intensity of R&D and the quality of

strategic alliances firms are developing (Freeman, 1991). The studies done by Eisenhardt and Schoonhoven (1996) for the semiconductor industries in USA show that successful firms in ICT industries, that are pioneering new technologies, need strong alliances to succeed. Powell, Koput, Smith-Doerr and Owen-Smith (1999) argue that external linkages facilitate innovation that attracts more collaborative ties. More alliances and collaborations result in less uncertainty perceived by firms' management. Firms with strong tied networks are capable of increasing their sources, gathering valuable information and reducing the uncertainty in their investment activities. Powell et al. (1999) show that the innovative firms have more patents if they belong to collaborative networks. An example of a collaborative project is the Linux operating system, created and distributed by the Linux Community.

Leadership mastery is scarce, as Senge (1992) says about managers in firms that are facing a lot of pressure during their daily activities and need to become system thinkers and better learners. They must develop new tools to accelerate learning and to simulate these tools in real life. They must "*act locally and think globally in the organisation of the future*" (Senge & Sterman, 1992).

In conclusion, converging what Powell et al. (1999) say with the results from Booz and Company's survey (Jaruselsky, Loehn & Holman, 2011) of 1000 companies all over the world, it was found that more investment in R&D for innovation would not drive results. The most crucial factors are strategic alignment and the culture that supports innovation. This survey found that only 50 percent of the companies interviewed said that they have a supportive culture for innovation. Furthermore, half of the companies said that their innovation strategy is not aligned with the business overall strategy of the firm. The firms that have their strategic goals supported by the firms' culture possess a huge advantage. The branches of MNEs also must integrate their activities into local culture for a better understanding of the needs of the local markets.

2.3.2.4. Proposition 8: Investing in talent management skills to win the war on talent

One knows that talent is an important key factor for the firm's business success and if it is well managed or nurtured will allow the firm to retain it and increase its productivity. MNEs are continually hunting for talent all over the world and this new function is very important for their business success.

Eric Lesser, under the label of IBM Institute of Business Value, argues about the role of the HR department in firms in *“How Human Resources keeps its seat at the table - Insights from 2006 IBM Human Resources Summit”*, the talent *“is the focus of the new generation of HR organisation”* (p.1). He says that beside the administrative role of the HR department, its strategic role is growing, especially when the firm to which it belongs is hunting talent and is facing many challenges in finding it. Furthermore, in international firms, the HR must understand the workforce demographic in the context of globalisation and find effective mechanisms for talent retention.

Furthermore, he argues that the HR department must be dynamic in sourcing and creating talent, as well as in using recognition and retention talent systems. MNCs manage their HR, aiming to build a sustainable competitive advantage by attracting and developing the best managerial talent through global HR leadership and local adaptation.

The method used by MNCs is to feed global human resources needs by exploiting talent at regional, national and local level and actively developing employees' careers in exchange for a maximum advantage of their firms' human assets.

Becker and Huselid (2006, p.9-10) argue: *“When employees are able to contribute to a firm's strategic objectives, they have (strategic) value. In other words, human capital (or talent) is strategically important if it directly implements firm's strategy. Presumably, not all strategic processes will be dependent on human capital. As that dependence increases, the employees' performance behaviours in that business process are increasingly a complement to effective strategy implementation”*.

If firms employ talent, they also have to manage it effectively. Several decades ago, talent management was the task of the personnel department, so the idea is not completely new (Wellins, Smith & Erker, 2009). They write in this white paper about talent management as an *“organisational function”* highlighting that *“The ability to effectively hire, retain, deploy, and engage talent at all levels is really the only true competitive advantage an organisation possesses”*.

Conclusively, the nature of talent is a twofold issue with many unanswered questions. For example, not all top positions require top talent however; the ways talented individuals perform in various contexts differ because individuals and firms behave differently in

different locations. How MNCs' investment in SD differs at global and South African level is a subject discussed in the following section.

2.3.3. Topic 3: South African context influences investment in SD

The researched innovative firms belong to South African system of innovation (NIS/NSI), a part of the South African socio- economic environment at national, provincial and local levels. Furthermore, the intensity of micro and macro-economic activities differs with the geographical location and depends on the technologies used by the firms. Today, trends such as the rise of the Internet and the globalization of knowledge have the potential for creating severe problems for academic institutions and systems in smaller or poorer nations and also problems in the transfer of technology from the parent HQ to the branch and further to the host country (Altbach, 2001). For example, the three firms have their head offices in Gauteng that is the most technically advanced South African province and they are intensively training their locally recruited employees and South Africa's previous disadvantaged communities to obtain better social cohesion.

2.3.3.1. Proposition 9: Investment in SD under IT SA context

Furman, Porter and Stern (2002) argue that government must stay at the periphery because their model sees the government role as a secondary factor that comes and goes with the democratic process. They further say that government must have the role of stimulating companies' performance, new products assimilation and focusing on specialised knowledge creation through funding research institutes, creating free markets and minimising inflation. They introduce the concept of the measurement of national innovative capacity by the number of patents produced by that country in a given time.

National innovative capacity is the ability of a country to produce and commercialize a flow of innovative technology over the long term. National innovative capacity depends on the strength of a nation's common innovation infrastructure (crosscutting factors, which contribute broadly to innovativeness throughout the economy), the environment for innovation in a nation's industrial clusters, and the strength of linkages between these two.

Furman, Porter and Stern say that the level of inputs given by state to innovations/R&D differentiates the output of R&D activities at country level. There are critics like Harney (2007) and Fairbrother (2007) who see the importance of the state in understanding the

economic performance of a sector in a region and its contribution to the increase of national competitiveness. They say that Porter et al.'s downplaying the role of the state is not realistic because the state accounts for more than 50 percent of GDP. For example, the USA government had a big contribution in all disruptive innovations developed after 1960s like GPS, Space program, cellular communications. These innovations received funds on a large scale from the USA government.

Furthermore, a government is an efficient government if it provides the quality of education, literacy, delivering health, and infrastructure as La Porta, Lopez-de-Silanes et al. (2014) point out.

South Africa has high levels of unemployment, high rate of failure among SMEs, poor education and infrastructure and high levels of crime and corruption, among others. South Africa suffers from high unemployment with an official estimate of approximately 24.5% of the economically active population unemployed (Statistic South Africa, 2014). The brain drain is also prevalent among university graduates as Schofield (2014) and Scerri (2014) discuss.

National System of Innovation (NSI) is a complex system consisting of all firms, institutions, stakeholders and innovators resident in a country. South Africa is falling behind its peers in Africa as countries like Kenya, Nigeria and Egypt place greater emphasis on the contribution that technology plays in economic growth and innovation (Scerri, 2014, p.2):

“There remains a significant lack of improvement in South Africa’s basic education as well as exposure to and familiarity with ICT. Learners need a better understanding of the ICT sector to equip them to adapt to the modern tools used in everyday lives.” For example, the South African presidency mentions in State of The Nation Address report from 2014 the poor achievements from 2009 to present in high education.

Furthermore, the goal of SA firms is to become innovative. *“Firms are looking to increase their competitiveness through innovation. The pursuit of competitiveness through innovation is a national policy objective for the knowledge based global economy both in advanced countries and in ones that want to catch up like South Africa”* (Fagerberg & Godinho, 2005).

The South African NSI is arguably at an incipient and weak stage of development mainly because of the weakness of its institutions, their links to firms (Lorentzen, 2009) and because of skills deficiencies. Scerri (2009) discusses the need of a new NSI control paradigm and Niosi (2010) says that the government must control the NSI development, because of the failure of ‘free market’ policies such as the Structural Adjustment Programmes imposed by IMF on Africa and Latin America. Niosi argues that South African government must adopt appropriate STI institutions like customs, organisations, routines and public policies that collectively foster learning and the build-up of technological capabilities.

Both government and the private sector highlight the importance of the ICT sector as a development priority and South Africa’s goal is to stay abreast of cutting-edge technologies (Akoojee, 2012). For example, empirical studies found that there is a demand of ICT skills in the financial sector and that the ICT sector cannot supply people with these skills. At the government level, the third National Skills Development Strategy document (2011) has a clear approach to the high skills scarcity phenomenon that is affecting high technology sectors like ICT. The solution to the problem will probably be agreements and partnership between universities, MICT SETA and other stakeholders. Appropriate interventions will give priority to students to increase their work experience in the ICT sector.

2.4. Summary

Below is a table with literature review grouped on topics and propositions.

Table 1: Table with literature grouped on themes/topics and themes/propositions

Themes /Topics	Subthemes/Propositions	Literature Review
T1. Investment in Skills Development as a strategic activity	S1. Investment in SD follows leadership strategic intent	Hamel and Prahalad (1989); Kotter (1999); Kaliprasad (2006); Cantwell and Mudambi (2005); Rialp-Criado et al. (2010); Penrose (1959); Barney (1986); Teece (1988); Teece, Pisano and Shuen (1997); Senge (1991); Buller and McEvoy (2012).

	S2. HR and Leadership design and implement SDP hand in hand	Wright and Boswell (2002);Dimov and Shepherd (2005); Maltz, Shenhar and Reilly (2003); IBM website; Ulrich (2013)
	S3. Technology foresight drives skills development for change	Perez (1985); Dierickx and Cool (1989); Johnson, Lee et al. (2003); Shimizu and Hitt (2004); Dess and Picken (2001); Cantwell (2005); OECD (2012); Berends and Lammers (2010); Heger and Boman (2014).
	S4. Efficient exploitation- requires investment in skills for efficient exploitation activities	Sull and Lester (2009); Mooney (2013); Filatochev and Wright (2010); Gleason (2002); Bruggink (2003); Von Konsky (2008); McKillip and Ows (2000); Arnold and Thuriaux (1997).
T2. Factors, processes and routines that shape the investment in SD	S5. investment in efficient training/learning routines	Berends and Lammers (2010); Teece et al. (1997); Jones and Grimshaw (2012); Keep and Mayhew (2010); Warhurst et al. (2004) cited in Jones and Grimshaw (2012); Theter et al. (2005); Figueiredo (2010); O'Sullivan (2004).
	S6. Monitoring and rewarding employees' learning performance	Sull and Lester (2009); Ulrich (2013); Senge (1990); Ellinger, Ellinger, Young and Howton (2002); Kaliprasad (2006).
	S7. Soft skills, management and leadership, innovation and creativity are influencing the efficiency of investment in SD	OECD (2011); Lorenz (2009); Albaladejo and Romijn (2000);Freeman (1991); Eisenhardt and Schoonhoven (1996); Power, Koput, Smith-Doerr and Owen- Smith (1999); Senge (1992); Senge and Serman (1992).

	S8. Investing in talent management skills to win the war on talent	Becker and Huselid (2006); Wellins, Smith and Erker (2009); Lesser (2014);
T3 SA context influences investment in SD	S91. Investment in skills development within IT SA context	Freeman (1982); David & Foray (1995); Edquist (2000); Etzkowitz and Leydesdorff (2000); Viotti (2001); Brown, Hesketh, et al. (2003); O' Sullivan (2005); Pouris and Pouris (2005); Vespagen (2005); Akooje (2008); Tylecote (2007); Jones & Grimshaw (2009); Lorentzen (2009); Scerri (2009) Mosia (2012); Samuel (2013); Mosia DST (2011); DST (2012); Niosi (2010); Niosi (2012); UNIDO (2012); OECD (2014); Scerri(2014); Schofield (2014); Fagerberg and Godinho (2005); NPC (2011).

The three themes emerged out of the extant literature as resource-based theory, organisational theory, strategic management, and finance in firms, behavioural and evolutionary economics, agency theory, international studies, organisational theory, and innovation studies. Together they form a complex theoretical framework represented in fig.3 inserted in the following page. The conceptual framework represents how a HQ in ICT sector, characterised by high investment in technical skills, invests in skills in a branch situated in an emerging market like SA.

Firstly, the HQ has its own strategic intent and its strategy for competing at global level. The HQ leadership has a top down approach of the subsidiary's leadership and management because of the high risk displayed by South Africa's external factors. There are internal firm's factors that will make the investment in skills efficient for exploitation of business activities. Because South Africa has high ICT skills gap and high general education skills gap, subsidiaries of MNEs in ICT sector are engaged in Corporate Social Investment directed to general ICT education and training programs.

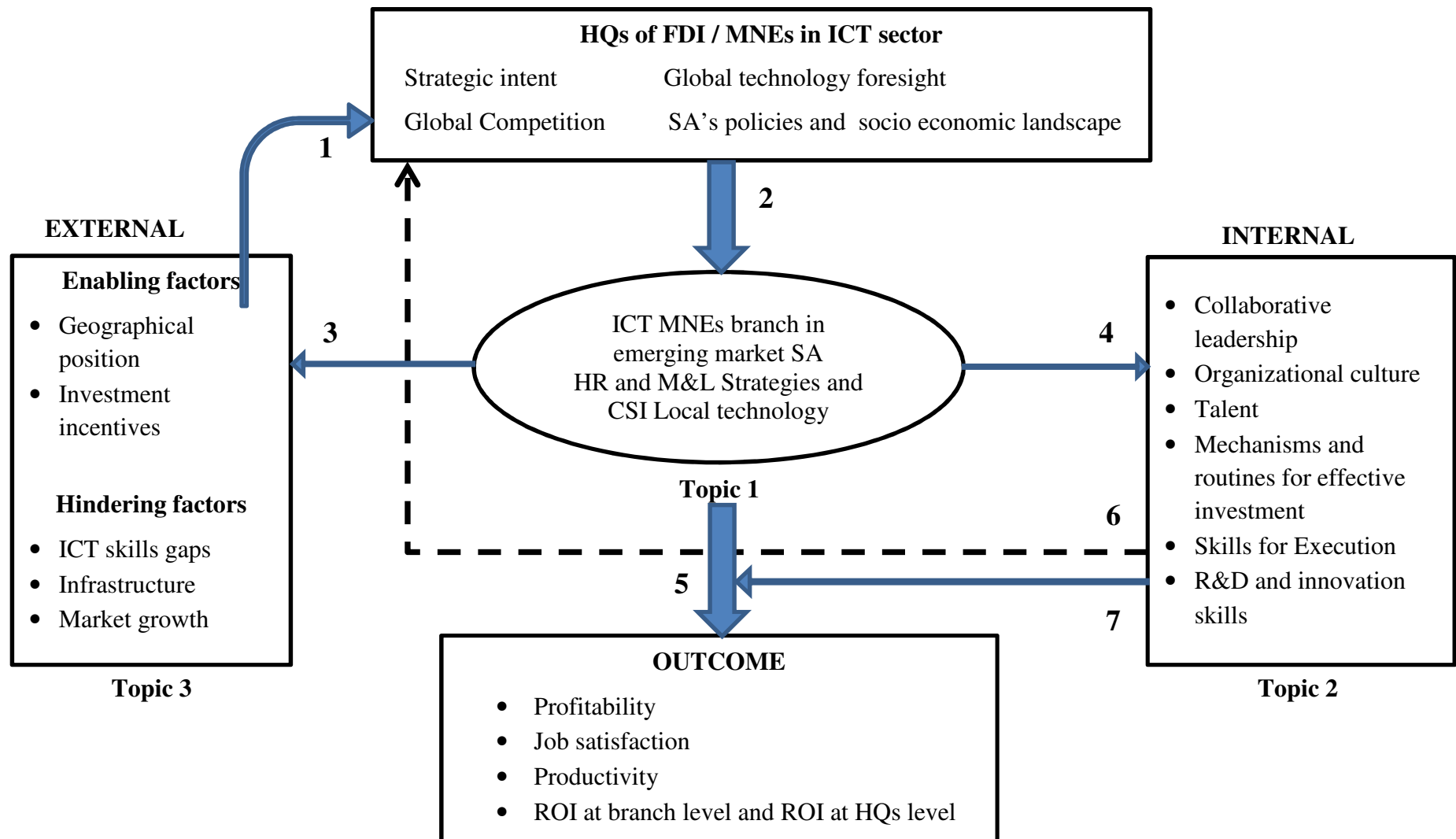


Figure 3: Conceptual Framework - Investment in skills at ICT MNE's branch level

CHAPTER 3 – RESEARCH METHODOLOGY

3.1. Proposed Research method

This research study is an empirical investigation interrogating how innovative firms in the ICT sector are investing in skills development. The analysis of the multicase study of MNE branches active in ICT sector and based in South Africa is the objective of this study. The three firms are IBM SA, Cisco Systems SA and Dimension Data.

To answer the main research question, a multicase study was utilised. The main research question is an exploratory question that required a holistic approach, as described in detail in Chapter 1 of this research. When asking a question that begins with “*why or how*”, using case studies is the preferred method of research, where a phenomenon takes place and the investigator has little or no control over events and the focus is on a contemporary phenomenon in a real-life context (Yin, 2006, p.2).

The case study approach is the best vehicle for qualitative research because involves organizing the data for in-depth study and comparison (Patton, 2002, p.448). During the data collection and analysis phase, the main research question guided the research in an open way. This methodology is exploratory in nature and serves the intention of the researcher to highlight the way investment in skills development takes place in innovative ICT firms. The case studies must have empirical data to support the theory, centrally constructed patterns of recognition, relationships and the logic of the focal phenomenon.

The first step taken by the researcher was to choose samples that displayed similarities and represented the population of innovative firms. The selection of the firms followed important attributes that were important for finding the answer to the main research question.

The next section presents a comparison between the qualitative and quantitative research methodologies and the reasons behind the researcher’s choice.

3.1.1. Quantitative vs. Qualitative Research

For this thesis the qualitative research methodology was utilised based on a number of assumptions made and because it was best suited for this type of research. Some of the main assumptions made include the objectivity and independence of the researcher. While the quantitative research methodology uses deductive forms of logic with theories and hypotheses tested in a cause-effect order, the qualitative research methodology is a process of understanding the phenomenon studied as a holistic picture in its natural setting. The researcher tried to find the holistic outcome of the phenomenon studied through its multiple facets and dimensions in an attempt to make sense of it in terms of understanding the social or human problem from multiple perspectives (Yin, 2006).

The study's main research question discussed in detail in Chapter 1 implied that in large firms, many of their realities depend on the way these firms manage their resources for profit and performance. The researcher interacted closely with the firms researched in order to understand them in their various contexts. The findings from the data collected were based on inductive forms of logic and categories/subthemes or propositions emerging from interviewees. The goal of the research was to unveil patterns that explained the phenomenon of interest. Narrative data, combined with various sources of information that were validated using triangulation, helped the researcher to gain insights on the three case studies. Finally, all observations and interpretations were examined in order to discover new meanings and rich in-depth data, which a quantitative approach might miss.

Using the multicase study, the researcher identified dependencies in relation to various functions associated with the firms' investment in skills that could not be identified through interviews only. Qualitative research allows the researcher to ask open-ended questions at the beginning of an investigation and it is an effective approach for a case study analysis. The researcher studied and learned the firms' environment extensively and prepared the interview within the context of the unit of analysis.

3.1.2. Boundaries of the research

It is essential to frame the multicase and to avoid any confusion between the depth and intensity of the research within the multicase context (Yin, 2006). The period of the research study was limited between beginning of 2013 to the end of 2014 and shortly beyond. The primary data collection took place at the headquarters of the three firms based in South Africa.

3.1.3. Research Process

There were two phases of data collection, which formed part of this qualitative study.

Phase 1: The collection of the secondary data contains the outcome of the desktop research, including the data from websites of the three firms, available annual reports, press articles, competitor reports, which provided information on the firm and the ICT industry including the social and political context of the researched periods. The researcher used this background to understand the evidence collected from other sources, in particular through interviews (Yin, 2008, p.103). The desktop research helped the researcher identify relevant participants within the firms for the interviews.

Phase 2: This phase took the form of individual interviews with previously identified key players. Twelve semi-structured open-ended interviews were undertaken to augment the data collected from formal documents that provided a richer and more in-depth analysis. These exploratory interviews were sources of uncensored information with questions used to guide the interviewers as Yin (2006) suggests, further underlining that the researcher must be guided by a desire to learn the facts and gain insights from the participants' opinions.

The researcher conducted semi-structured interviews with three experts in academic and applied research in ICT skills and systems of innovation. Their open views and opinions were used during the testing and validation of the data collected. Appendix 3 contains the list of participants, interview schedules and the interview setup.

3.2. Case Selection and the chosen composition of the multicase

Multicase study research is usually instrumental by nature, meaning that its focus is to go beyond each case and create a higher level of representation (Stake, 2006). He further states that these multiple cases are definitely bound and this is their common thread. The researcher chose these three cases as unique entities of a complex nature.

Considering the present research study, the proposed population, as mentioned in the introduction to this chapter, are innovative firms within the ICT sector and based in South Africa. The attribute “innovative” defines firms capable of having at least one innovation successfully commercialised and with a successfully launched local or international patent (OECD, 2005).

For example, the samples selected from the total population of ICT firms that are innovating gave the researcher the opportunity to investigate how branches of MNEs work in the South African context. At the same time, the focus on large corporations constrained the number of variations due to size differences among firms. This sample selection reduced extraneous variations and clarified the domain of the findings as large corporations, effective at innovation and currently operating in South Africa. . The three chosen case studies are all part of a complex dynamic environment defined by many processes. The use of multiple cases enables comparisons that clarify whether an emergent finding is idiosyncratic or similar in all cases (Eisenhardt & Brown, 1998). The multicase consists of three firms that are the samples of the research chosen for their innovative attributes, which are in alignment with the frame set by the research question.

Two of the three firms studied are the South African branches of IBM and Cisco Systems, known as serial innovators. The other firm is the South African branch of Dimension Data, which shares its location with its HQ. DiData belongs to NTT, ranked by Gartner as the most innovative corporation among 100 firms for three consecutive years. The three firms configure the multicase study and they present a very persuasive argument in terms of the context of the study.

Furthermore, they provide a lot of information that will assist other firms within the ICT sector and more broadly, to understand how to use their leadership and strategy and what their employees can successfully achieve through investment in the SD process.

The selection of these three firms has a key attribute and is not a result of a random selection. The key attribute of the selection process was the existence of intense innovative activities within these corporate entities that provide special insights into the way branches of large MNEs are investing in SD and how they are influencing other players within the sector to do the same. In the course of the empirical study, it emerged that these three firms have similar business activities and skills demands and are product/service providers of numerous ICT devices and software applications. A high proportion of their products and services are new to the market because of their high levels of innovation as well as their in-depth experience and expertise in conducting daily service activities for ICT systems integration. All three firms are subsidiaries of global serial innovators, and are part of three different national systems of innovation (USA, Japan and South African NSI) and active in the global ICT sector. The researcher chose these firms because she wishes to get particular information and insights that are unique to this field.

3.3. Data collection and data analysis

The researcher studied qualitative evidence collected from a small pool of participants who have the responsibility of carrying out complex tasks in their firms. The table with the interviewees' names and positions, the time of the interviews and, as well, the letter of request of the interview and the interview questions are part of Appendix 1. The findings of the literature reviewed, were extracted using three main themes/topics for the design of Likert scale interviews. Yin (2006) and Silverman (2013) state that data collection and data analysis are conjoined processes that are constantly mined for new insights and direct the researcher to new findings.

3.3.1. Data collection phase

The following table, based on Leedy and Ormrod (2001) shows the structure of data collection in these case studies.

Table 2. Structure of data collection

Design	Purpose	Focus	Methods of data collection
Three case studies part of the multicase study	Holistic research of a complex problem	Multiple case studies or multicase to fit the purpose and design using replication	Observations (desktop research) Interviews - 12 of firms' employees and three experts for data validation Firms' written documents

The case studies were structured using an open framework to highlight similarities or differences between the three firms studied, or to expose exceptional shifts from existing theory, academic papers and empirical studies (Eisenhardt, 1989). The researcher conducted interviews with leaders and human resource managers belonging to these three ICT firms based in South Africa. The tables with codes extracted from the participants' answers to interviews are part of Appendix 2

Interviews are a biased representation of how the image of the phenomena studied is reflected in the researcher's mind. In order to reduce this bias, the researcher used experts' opinions and numerous documents that are available in the public domain for triangulating the findings. The interviews contained questions, which were not ambiguous, and here the researcher applied Neuman and Neuman (2006)'s suggestions about how questions can be improved if they are unclear. It also contained double-barrelled questions, as discussed by Babbie (2013). The order of the questions did not affect the response accuracy and response rates. The researcher ensured that questions were not leading and did not influence the

participant in any way. Following directions from Babbie (2013) on this matter, the questions specifically aimed at helping the participant to focus on the main objective of the interview.

The fieldwork for primary data collection took place at the head offices of the three firms based in Gauteng, South Africa, where the researcher conducted interviews with leaders, CEOs, human resource managers, skills development officers and R&D heads of departments. The interviews were telephonically booked and the list of questions sent one week in advance. The researcher sent a formal request, shown in Appendix 1 to the participants in anticipation of the interview. Appendix 1 contains the sample interview. The design of the fourteen questions was similar across all three firms and Appendix 1 contains a sample. The participants from the three firms requested that their answers to the interviews to be anonymous, but they let the researcher to disclose their names as participants. Two of the three experts interviewed gave the researcher permission to use their names in the final research document. The third one asked to remain anonymous. Appendix 2 contains the participants' coded answers organised after the three topics and nine propositions and Appendix 3 contains the codes extracted from the experts' answers similar with Appendix 2. The interviews lasted 40 - 50 minutes and the researcher recorded all answers using a voice recorder. The interviewer did transcripts of all recordings at a later stage. The data collected, as part of the research paper database, was stored in computerised forms using the Excel and Word applications. The researcher archived the voice-recorded files and the transcripts of the interviews that may be available on request.

3.3.2. Data analysis phase

In order to analyse the collected data, the researcher used an inductive process to test data collected with theory. The researcher produced findings that covered all facets of the multicase study and produced accurate, interesting and testable patterns and insights.

The steps taken during analysis of the data based on a on Leedy and Ormrod, (2001) are shown in the table below.

Table 3. The steps taken during analysis of the data

Steps	Outcome
Organisation of details	The facts are arranged in logical and chronological order
Categorization of data	Categories are identified for clustering the data into meaningful groups
Interpretation of single Instances;	Rivalry explanations and outliers' answers together with specific documents analysed for the meaning they might have
Identification of patterns that characterise the cases more broadly	Data are scrutinised for underlying themes and other patterns
Synthesis and generalisation	An overall description as a narrative explanation building of the multicase is constructed and conclusions drawn with implications beyond the specific cases studied

Yin (2006) suggests that studying the theory preliminary to the data collection phase is the blue print for the study. The data analysis was structured around the three themes/topics identified in the scope of the study. Various analytic techniques were employed for different phases following the rationale for using them. During the first phase of content and thematic analysis, the researcher identified a number of subthemes emerging from grouping the codes found in the participants' answers. The coding process of the collected content was done in two cycles in order to refine the codes and to align them to why or how something happened. This is a complex and difficult process because causal links are difficult to measure in any precise manner (Yin, 2010).

The second phase was the building of the narrative explanation under the framework of thematic analysis which is common in case studies as well as in multicase studies analysis. The researcher used the two phases of analysis simultaneously and together with alternative or rival explanations that emerged

during the research process, regarding the complex nature of investment in SD in firms. The content analysis of the outliers' rival explanations and their out-of-the-box opinions allowed the researcher to scope for a more rigorous analysis that resulted in an unbiased and fair treatment of the evidence, producing enhanced analytical conclusions (Yin, 2011).

3.3.3. Cross case analysis

Case studies are holistic and context sensitive and they represent the units of analysis, the process and the product of the process of analysis. When the research requires the design of several cases for cross case comparison, every case gets full attention in order to understand its complexity (Patton, 2005).

The design of the cases assembled of the raw case data that consists of all the information collected about the studied firms and their settings, in a way that makes it easy to access and manage. The writing of a complex, but easy to understand narrative presented chronologically or thematically, offers a holistic portrayal of the process or issue researched (Patton, 2005).

Cross case analysis is a research method that facilitates the comparison of commonalities and differences in the events, processes, and activities of three units of analysis, allowing the researcher to learn from their differences and to gain critical evidence for the final research report.

Silverman (2013) says that researchers develop expertise from cases through learning from and comparing cases. The researcher gained valuable insights and knowledge from this cross case analysis because the three cases represent holistic examples of experiences; they display patterns of similarities and differences and could be used to produce analogies, inferences and generalisations.

The focus of the multicase method is on investment in SD within innovative firms. This focus defines the framework of the three case studies' commonalities and uniqueness (Stake, 2006).

The researcher compared all units of analysis at once, highlighting in detail the commonalities and differences, under the topics and subthemes/propositions previously discovered, and then finalised the findings by listing and interpreting the revealed patterns.

A final qualitative variables table took shape representing the similarities and differences found among all three cases. Further, a graph came together showing the way the four main dimensions/qualitative variables were interrelated under each topic. A narrative built from an overall description of the multicase crystallised for the drawn conclusion with implications beyond the specific cases studied.

3.4 Data validity and reliability

Case study and multicase study methodology are seen by many as possibly biased because of the researcher's mind and pre-conceived perceptions, as well as a lack of verifiable statistical data by scientific means and the lack of possible generalisation. Flyvbjerg (2011) says that all data are subject to the researcher's bias, therefore the rigor in the iterative nature of data collection and analysis helps to reduce the researcher's preconceived bias.

3.4.1. Internal/Construct validity

Credibility is an important construct for case research, according to Yin (1994). Firstly, the researcher conducted an extensive literature review to discover the theory and the social environment; next, she constructed the research questions as part of the design of the interview. The comparison of literature findings and participants' responses used crosschecking and triangulation to get a clearer picture (Perry, 2000).

Validity is a term used in quantitative research and credibility is the corresponding criterion in qualitative research and aims to build confidence in the credibility of the findings in relation to the research topic (Ulin, 2002). The interpretation of the

results relies on the plausibility of the logical reasoning applied during the research process and in the drawing of conclusions (Ulin, 2002).

3.4.2. External validity

Perry (2000) defines external validity as the generalizability of research findings beyond the scope of the case to the general population. This particular study has external validity as a limitation of the case research because the researcher cannot test it to see if it is applicable to a population of similar cases because the cases are unique. The only generalization exists in the way the researcher designed the content of the interview and the selection of the interviewees. The process of selection of interviewees took place through a target sample of forty per cent leaders and managers and sixty per cent HR and business consultants of the firm. The interview content was set up using the outcome of the literature research.

The research study outcome became credible because:

- 1) The researcher's supervisor checked the underlying reasoning
- 2) The researcher collected data from a diverse sample/group of participants
- 3) Two of the experts, participants in the primary data collection of this research study, received a draft version of the conclusions of the research for comments and the initial text was amended, based on their feedback.

3.4.3 Triangulation

The researcher used triangulation to demonstrate convergence or agreement, thereby increasing the credibility of the findings. In this case, guided by the key research question, three experts in the field responded during open-ended interviews and their opinions are part of Appendix 3. Two of the experts that received a copy of the conclusion of this research study sent comments included in Appendix 3.

3.4.4. Reliability (Dependability)

Qualitative researchers consider dependability during the research process to match the rules and conventions of qualitative study methodology. Researchers in many studies of a similar nature have used the multicase study. The researcher

collected the data personally and followed the qualitative research methodology using other comparable research studies.

The researcher used Yin's (2006) recommendations that added validity and reliability to the analysis by collecting data from many sources including experts' opinions and creating a multicase study data base (formal collection of evidence), following a chain of evidence from interviews, secondary data and conclusions drawn. All the steps above represent principles, which enhance the quality and reliability of the findings (Yin, 2006).

3.5. Challenges and limitations in using this multicase approach

The findings and conclusions of these case studies, assembled in a multicase, confirmed or informed the theoretical and model framework. The researcher interpreted these shifts from previous theories and empirical studies and tried to create a new conceptual framework. It is possible that the interviewer omitted an important variable during the interviews or data collection.

South Africa is the geographical location of the three firms, attracting international organisations and successfully hosting branches of global corporations.

These three South African based firms were studied, especially their path dependent strategies, providing valuable insights for painting a holistic picture of investment in SD. The study is vertical, concentrating on the research of the three cases over a limited period in time. The results derived from the research conclusions are limited by the period as well as by available resources, because the researcher was only able to utilise a snapshot of the data available in the public domain. One of the biggest limitations was access to firms' strategy documents. The research only used documents obtained through desktop research from the Internet and through activities undertaken by the researcher in supporting innovation competitions and marketing events that took place at the studied firms' locations.

Furthermore, during the research, various limitations, such as the absence of R&D departments, restricted the researcher from getting formal information regarding the connection between investment and innovation at firms' level.

The researcher was aware of the challenges faced in analysing this enormous amount of online data and managed to separate the relevant data using her own professional experience gained over a period of more than thirty years, internationally in the ICT sector. Based on this experience, the researcher is confident that important factors and interlinks were identified and all necessary variables were covered while still maintaining the integrity and ethics of the research methodology. Future fieldwork and research will identify the development path of complex processes like organisational learning or firms' resource management systems.

The research outcome may inspire and generate new ideas by building new concepts through an inductive process. Some concepts may also be oversimplified or some variables omitted, thus making the outcome of the research meaningless. The research in its documented form is interesting for the reader if the conceptual arguments used hold the readers' attention. The main aim of the researcher is to open up new ways of interpretation, rather than to contradict existing theories that are only simplifications of a much more complex reality (Siggelkow, 2007).

According to Patton (2005, p.420), *“the moment you begin analysis it will become perfectly clear to you that you're missing the most important pieces of information and that without those pieces of information there is absolutely no hope of making any sense out of what you have”*. To avoid this kind of occurrence, the researcher returned to the field to collect what was missing or used inferences to complete the missing data.

3.6. Ethical considerations¹

The participants in this research case were informants and the researcher did not conduct the interviews using invasive techniques nor did she invade their privacy at any point during the interview process. All study participants were provided with information relating to the aim and methodology of the research prior to the data collection, and participation was voluntary.

All primary data collected in the form of narratives was deemed confidential and was only utilised by the researcher. In the final aggregated text, the names of participants did not appear. The researcher inserted generic descriptions to reference the verbatim quotes.

Participants in this research study did so voluntarily without any form of coercion. All participants were free to withdraw from the process at any time. This research forms part of a social sciences study and there are ethical issues attached to this kind of research process that researchers should be aware of and abide by. Due to the nature of this research, it is necessary to mention that the researcher followed a list of precepts based on the Code of Ethics of the American Anthropological Association².

3.7. Summary to chapter 3

In this chapter the researcher presents the research methodology used – the multicase - including data collection, analysis and presentation. The next chapter contains the data collected and the presentation of the findings.

¹ www.wits.ac.za/academic/research/ethics.htm

² <http://www.aaanet.org/issues/policy-advocacy/upload/AAA-Ethics-Code-2009.pdf>

CHAPTER 4: PRESENTATION OF RESULTS AND DISCUSSIONS

4.1. Introduction

The results chapter identifies key factors and themes stemming from a semi-structured interview process that followed the three main literature review topics:

The first topic is about firms' strategy and investment in SD; the second topic deals with organisational routines, monitoring and rewarding functions, soft skills and interpersonal skills and talent; the third topic is about investment in SD influenced by the SA context as a host country. These topics are the result of the interpretation of the literature review converged with the collected data.

The first topic contains four propositions about strategic intent, forecasting decisions for efficient investment in skills development (SD), aligned strategic goals and balancing exploitation and exploration activities in resource based innovative firms. The second topic is about mechanisms and routines of effective investment in SD with four propositions for analysing the factors contributing to the efficient investment in SD and various ways firms monitor employees' performance in learning and training, organisation culture and soft skills and talent management. The last topic collects papers containing discussions around the South African socio-economic landscape and its influence on ICT innovative firms' investment in skills.

Appendix 2 contains the codes refined from primary data collected from the interviewees (including experts) and inserted in tables as shown in Table 3 below:

Table 4. Topics, propositions/subthemes and codes

TOPIC	Propositions	CODES		
		IBM	CISCO	DiData
T1. Investment in Skills Development as a strategic activity	S1. Investment in SD follows leadership strategic intent	for codes see Table IBM T1.S1	for codes see Table CISCO T1.S1	for codes see Table DD T1.S1
	S2. HR and Leadership design and implement SDP hand in hand	for codes see Table IBM T1.S2	for codes see Table CISCO T1.S2	for codes see Table DD T1.S2
	S3 Technology foresight drives skills development for change	for codes see Table IBM T1.S3	for codes see Table CISCO T1.S3	for codes see Table DD T1.S3
	S4. Efficient exploitation- requires investment in skills for efficient exploitation activities	for codes see Table IBMT1.S4	for codes see Table CISCO T1.S4	for codes see Table DD T1.S4
T2. Factors, processes and routines that shape the investment in SD	S5. investment in efficient training/learning routines	for codes see Table IBM T2.S1	for codes see Table CISCO T2.S1	for codes see Table DD T2.S1
	S6. Monitoring and rewarding employees' learning performance	for codes see Table IBM T2.S2	for codes see Table CISCO T2.S2	for codes see Table DD T2.S2
	S7. Soft skills, Management and leadership , innovation and creativity are influencing the efficiency of investment in SD	for codes see Table IBM T2.S3	for codes see Table CISCO T2.S3	for codes see Table DD T2.S3
	S8. Investing in talent management skills to win the war on talent	for codes see Table IBM T2.S4	for codes see Table CISCO T2.S4	for codes see Table DD T2.S4
T3 SA context influences investment in SD	S91. Investment in skills development within IT SA context	for codes see Table IBM T3.S1	for codes see Table CISCO T3.S1	for codes see Table DD T3.S1

4.2. IBM - How “The Vanguard” invests in skills development

IBM is a global “vanguard” enterprise with sustainable long performance and thousands of innovations per year.

4.2.1. Background

IBM is a globally integrated technology and consulting company headquartered in Armonk, New York. With operations in more than 170 countries, IBM attracts and retains some of the world's most talented people providing solutions to problems and an edge for businesses, governments and non-profit making organisations. IBM claims to be not only a firm for profit but also a complex open ecosystem working “*without borders*” with communities, suppliers, clients, business partners through a large number of consultants and staff members (from IBM website part of the research database in Appendix). Despite difficulties, IBM reinvented itself many times by selecting its partnerships and applying perceptive leadership. Furthermore, the turn-around strategy transformed IBM in “*a vanguard enterprise*” by using its unique strength to provide innovative solutions to social challenges through business leadership.

At present, IBM focuses on growth, using not only ICT skills and initiatives but by employing a large number of skilled people from sectors other than the traditional ICT sector skills, like civil engineers, designers or chemical engineers

IBMers says, “*IBM always achieved its targets by attracting and retaining high skilled professionals and, in addition, by acquiring talent.*” (IBM participant)

Consequently, many business analysts say that IBM is a structured firm with little agility. “*Despite talk of delayering and collaboration across silos, IBM still has a steep hierarchy, with thirteen layers of management. When combined with the relentless cost-cutting and offshoring and the fear that these practices generate, the agility of the organisation tends to be compromise.*” (Summers, 2014).

At present IBM faces business turmoil because it lost the value of shares and downsized its revenue by 10% or more. The general leadership decides to retrench

more than 100,000 employees worldwide representing 25% of the total number of employees and this action is part of a project called Project Chrome that hit many of the worldwide services operations. “The USA will be hit hard, but so will other locations. IBM’s contractors can expect regular furloughs in 2015. One in four IBMers reading this column will probably start looking for a new job next week. Those employees will all be gone by the end of February” (Cringley, 2015, January, p.1/2).

4.2.2. IBM SA background

One of the case studies in the present research, IBM SA, started business in 1941 and is part of IBM Middle East & Africa that includes fifty-four active IBM branches. It is important to notice that, for South Africans, IBM is a metaphor for business success (www.ibm.com/za/en/).

Abraham Thomas, General Manager of IBM SA, nominated among the TOP IT Executives of 2001 by IT Nation Business Review Magazine, is an example of the way IBM is cultivating its rising stars beyond the headquarters and in line with the firm’s culture of “*working without borders*”. The main vision of IBM’s various branch’s management is to provide services, software and systems in the most convenient and rapid way and to efficiently sell IBM’s services and products for maximising ROI, “*Smart planet*” and “*Global Entrepreneurs Ecosystem*” help IBM to better integrate into the local communities. In 2013, IBM SA became a “*Globally Integrated Enterprise*” (<http://cfo.co.za/profiles/blogs/ibm-lesley-anne-wilkinson>).

Recently IBM SA experienced the same pressure in downsizing more than forty percent of its staff (around 1 500 employees) under the Project Chrome directions. In January 2015 Ginni Rometty, the Chairman, President and Chief Executive Officer of IBM, approved an investment of R700 million for covering SA requirements to transfer equity for BEE (black economic empowerment)³.

³ <http://www.ujuh.co.za/ibms-special-r700m-bee-deal-gets-approved/>

Furthermore, the branch displayed a small 2014 ROI and the cloud technology department, where IBM invested large amount of money, had little achievements.

4.2.3. Topic 1: Investment in SD is a strategic activity

Strategy at IBM is a core leadership competency together with strategic alignment of staff and strategic partnership and collaboration as presented below.

4.2.3.1. Investment in SD follows leadership strategic intent

The first theme is about how investment decisions develop under IBM SA leadership. *“Investment in employees’ core skills and basic skills through HR function is a top [IBM SA leadership] priority, a continuing activity, a joint decision of several departments and not a once-off decision.”* (IBM participant)

Many corporate education and training initiatives that are taking place at IBM SA branch are synchronised with other global branches using Internet and online learning. One example is Gene Romety’s *“Think Friday”*, a learning project, and *“an opportunity for more than four hundred thousand employees to learn about important aspects of IBM businesses or new products and services. The event covers an estimate five percent of the total IBM corporation overall annual working time”* (IBM participant).

And IBM SA does not leave it to chance: *“Leadership must develop skills to deliver business growth and IBM Smarter Workforce is a project used by IBM HR leadership to study the new empowered employees using behaviour science, collaboration and analytics”* (IBM participant).

The participants underlined IBM SA leadership *“capability to look ahead and identify the skills they will need in the future, and then rapidly develop a critical mass of individuals with those skills in a cost-effective manner. This is a core competency for IBM SA because they are looking to compete in a globally integrated world”*. This cohesion between employees and leadership is of high

importance for investment in SD and can be obtained if the employees share vision and share value with their leaders.

However, IBM SA is short-term profit focused and pays a lot of attention to its shareholders' value and less to its middle management or to the last echelon's incentives.

4.2.3.2. HR and leadership design and implement SDP hand in hand

At IBM SA, the HR executives and the leadership design skills development plan working hand in hand. This following part from an online article written by GSB (Gordon Institute of Business) consultants contains the ideas developed by Pretty Charles, the IBM SA HR director, who talks about HRIS (human resource information system, <http://www.leader.co.za/article.aspx?s=2&f=1&a=5627>).

"We are joining the dots using technology," said Charles. "And by putting these tools [technical] in the hands of employees and their managers, HR's function becomes less to manage day-to-day admin, and more to facilitate the processes and look at the bigger trends. This is in line with global trends for HR to move away from a transactional role to a more strategic role within the organisation."

Another way at IBM SA to link HR department with management and leadership is *"by using a tool called HRLDP (HR and Leadership Development Program)"* (IBM participant).

"HRLDP is a complex software application for HR as a strategic partner to the business, advancing the company's goals and objectives. HRLDP contains methods for specialist, generalist and global rotations across HR over three-year period, including a required international opportunity. It allows broad exposure to potential career paths through targeted learning opportunities, executive mentorship and shadowing. The scope is to gain insights into leadership styles, strategic decision-making, business acumen and career development" (<http://www.ibm.com/employment/hrldp>).

IBM SA leadership expects that IBM's corporate reputation will allow IBM SA to more easily attract and retain employees *"but the final decision is taken in*

partnership with HR department. In the case of IBM, HR is its strategic partner” (IBM participant) and IBMers, part of the HR department, call themselves “*business managers*”.

Some participants contradict the view of the existence of a strategic partnership of HR and management saying, “*HR was not always at the same table with leadership and the final decisions of how much to invest in training are the decisions of BU leaders and CFOs.*”(IBM participants)

The outlier expresses the dissatisfaction of a broken link between theory and practice at IBM SA during the implementation of IBM best business models. It means that some assertions have the value of an advertising campaign for promoting IBM to shareholders and do not represent the reality in the field. In the end, IBM SA will get less efficiency in general ROI and particularly in investment in skills if there are fractures between HR and leadership.

4.2.3.3. Technology foresight drives SD for change

This proposition explores IBM SA’s capability to foresee what skills will be required to differentiate its business success from failure. The tracking and optimisation of technological change is one of the tasks of IBM SA CFOs. The role of CFOs is now twofold because of the downturn of the economy after 2008. CFOs need to be informed, agile and have business insights in order to answer to pressure and take better decisions resulting in an overall higher ROI. (IIBV, 2006) Globally, IBM leadership has many tracking and sensor systems to foresee change like Accelerating Critical Expertise and MANAGEMENT AND LEADERSHIP , using dynamic learning strategies for learning new skills like cloud computing. Furthermore, the effective investment in SD depends on the firm’s capability to plan the development of a workforce that is adaptable to change.

IBM has developed an Academy of Technology for IBM leaders, another program for educating and piloting solutions for early adopters, used globally, together with GTO (Global Technology Outlook), and TMAG (technology market analyse group), “*Value Jam*” online brainstorming discussions and Global Innovation

Outlook, a multidisciplinary group for sensing innovation trajectories. IBM SA sent its most talented employees to these highly technical courses and is using, on a regular basis, all the projects listed above (IBM online documents).

IBM's study of CHROs [Chief HR Officer] called "*Working without borders*" is a result of inputs from seven hundred CHROs worldwide regarding globalisation of talent. The main findings of the study written by the IBM Institute for Business Value under the direction of J. Randall McDonald, IBM Vice president of Human Resources, are around how the leadership is dealing with technological change from the workforce point of view. "*IBM has a borderless and diverse structure that implies the workforce deployment to be flexible and well trained to embrace change. The creative leadership checks and assessing the skills required for change. Investment in new learning tools is high and various mechanisms for retaining talent, compensations and benefits are available.*"

"*IBM SA sent two of its employees to TOP GUN and continually looks for talent inside and outside the firm.*" (IBM participant) An expert, one of the three experts consulted for this study, says that IBM SA started to tap the South African technical talent more than "*Cisco who works for themselves or DiData which is very conservative.*"

4.2.3.4. Efficient exploitation requires investment in SD for exploitation activities

"*We invest in skills that support the routine operations and not in innovation activities that are risky.*" (IBM participant)

Despite the fact that IBM SA shows an intention to invest in local innovation and recently, in January 2014, IBM SA announced the opening of an IBM Client Centre in Johannesburg, South Africa where innovations should take place but the new facility is an investment in education infrastructure, not in the innovation process.

Abraham Thomas, IBM SA General Manager, describing one of the many ways the IBM center is used, said: "*Our investment in this center is in line with our*

strategy to underpin growth in South Africa's IT sector and to support the use of advanced technology in public sector service delivery and commercial business growth, particularly African expansion." One of the participants (expert) says that *MNEs must look to all Africa as a region not only to SA to integrate skills and transformation.* The exploitation of products and process are the main modus operandi of IBM SA because the parent HQ mandate is directing the branch towards short-term high profits. *"We are a structured firm and we follow the profit path, but we do not innovate."* (IBM participant)

4.2.4. Topic 2: Factors, processes and routines that shape the efficiency of investment in SD

Operational routines and management mechanisms work the best under a climate of collaboration and shared knowledge.

4.2.4.1. Investment in efficient training/learning routines

A large number of articles, reports, surveys and case studies reflect that IBM uses new and up to date learning routines on a continuous basis. IBM's on-line library contains thousands of courses and the management monitors employees during the entire course. The mechanism of online learning, called "*e-learning*" works all over IBM SA. A huge database of online courses links employees and their learning activities to monitoring their performance at an optimum investment in SD. The continuous learning process at IBM SA requires effort and commitment, directions and priorities. The leadership should create a learning organisation as Senge (1991) suggested with a climate of collaboration and communication.

However, Internet employees' reviews shows criticism of the formal training received and the pragmatic way IBM behaves with employees based in India or South Africa in comparison to the USA based ones⁴: *"... Even IBM's fans concede that staff morale is low. Despite many talented and committed staff, the*

⁴ www.businessinsider.com/ibm-early-retirement-ripoff-2012-5

relentless cost-cutting, the steep hierarchy and lack of agility have taken their toll, particularly in key areas like innovation and generating customer delight”.

At IBM SA innovation education manifests by using e-learning routines *“IBM, after rolling out an eLearning program for managers, found that participants learned nearly five times more material without increasing time spent training.”* (Evans, 2013) Furthermore, he says, eLearning can help companies boost productivity. *“Every \$1 spent in eLearning results in \$30 of productivity.”*⁵ One of the areas of major improvement where IBM SA obtained high return of investment is the assessment of teams’ skills. The HR consultants need to find out not only at individual level but also at team level how IBMers perform using a grid of skills. Arguably, the e-learning routines, training on the job and committed employees determine the efficiency of investment in skills.

4.2.4.2. Monitoring and rewarding employees’ learning performance

The workforce must be well assessed and supported: *“The new empowered employees are the agile and more informed ones, beyond their job descriptions”.* The employees’ main role is *“to be a bridge between the customers and the firm”* (IBM participants).

Participants mentioned that HR at IBM SA monitors the training/learning performance of IBM SA employees annually: *“The training reports are the basis for evaluating the learning performance and, together with [MICT] SETA performance indicators and SETA reports; they are used to create the skills development projection plan.”*

For example, a participant says, *“a monthly program called ACE, for Africa and Middle East, is measured in the final quarter by the number of jobs it has created”.* Furthermore, another participant describes the way HR department uses performance based rating scale called PBC with four scale rates as a basis for recommendations and rewards.

⁵ IBM Training building skills for a smarter planet. (n.d.). The value of training. Retrieved from <https://www-304.ibm.com/services/learning/pdfs/>

Other programs deal quarterly with individual career guidance. *“Every quarter in Human Resource department are taking place sessions and discussions regarding the development of individual careers. The tool used is called Career Smart with the goal to train employees for a better job performance and employees are engaged in discussions with HR on monthly basis”*(participant). *“Career Smart”* has the role to identify individuals by their roles in the organisation, assess them and provide guidance. The Global Learning team takes care of performance tracking tools and rating scales of employees. Special arranged meeting with employees help to monitor them under programs like ACE, and Advance Education with reports that follow up the meetings (participant).

Leadership and management give rewards and incentives in verbal or written form, flexible hours or monetary form. Although the message seems clear and simple *“People need to understand,”* says Palmisano, *“that if they execute the model, they will be rewarded.”* The result is not always the expected one: *“The problem is that when incentives are purely financial, motivation suffers. And when the financial incentives are as skewed towards the top as they are at IBM, the costs in terms of motivation are considerable”* (Denning, 2014, October).

The employees’ motivations are important for the efficiency of investment in skills because create a higher purpose for their efforts.

4.2.4.3. Soft skills, management and leadership, innovation and creativity influence the efficiency of investment in SD

IBM SA invests in soft skills and management and leadership skills that are in need among their employees. IBM SA does not invest in R&D and innovation processes and no R&D or innovation department formally exists in its organisation structure. *“Our innovations take place in USA branches equipped with R&D capabilities, especially in Texas where three quarters of IBM innovation projects are produced. The future approach of IBM SA strategy of innovation will be changed and more support for innovation will be given to branches”* said IBM SA master innovator, Indran Naick.

IBM SA develops collaborative networks and ecosystems with all major South African IT vendors in the partnership sphere. Business ecosystems are built with networking and collaboration skills (IBM, 2014, May) and the project loops and links part of the Global Entrepreneurship Ecosystem or Global Partner Ecosystem built with organic networks. In contrast with IBM's global approach, at IBM SA, the firm's structure is rigid, with few opportunities to express creative solutions. "We work to sell and implement our products that are highly technical but we do not innovate" (participants). IBM SA leadership focuses on obtaining the best business returns and selling its turnkey solutions.

4.2.4.4. Investing in talent management skills to win the war on talent

One may say that IBM Smart Workforce is a technical tool in the hands of HR, a complex software system to help analyse and process firms' information for engaging and employing "*the best fit*", building the culture of collaboration and free connection. It is an important tool for talent management, designed by IBM for other firms, but used internally as well.

Globally, the Talent Management Program is one of the tools used to align IBM's pool of talents with its corporate identity and goals (IBM, 2014).

IBM SA is constantly looking to attract and retain talent from different backgrounds by taking into consideration the SA socio-geographical differences.

If the development of talent is about leadership performance, another way to develop is to rotate the managers across divisions and geographies. Yet, according to the IBM study, thirty six percent of HR executives confirmed "*rotating leadership talent is a significant challenge in developing future leaders*" followed by the challenge of filling the generation gap. The challenge is to pass the knowledge from the older to the younger generation overcoming various levels of resistance from the groups involved.

An underlying cause according to "*Working without Borders*" is that, at IBM, HR executives believe that, despite the on-going war for talent, they are more capable of attracting and retaining talent than their competitors. Almost 60% of HR

executives surveyed feel that they attract and retain talent better than their peers, while only 10% state they are less effective, the rest are neutral.

Due to various internal and external pressures, IBM is responsive to the shifting market needs; very flexible in how it operates; more focused on its core competencies; and more resilient to external threats. For all these characteristics, function and processes to work, IBM needs to rely on talent (http://www.ibm.com/1/VRM_02369_1RESH_1IN/MVanEeden146132081).

4.2.5. Topic 3: SA context influences investment in SD

IBM SA is a firm with deep understanding of SA environment and committed to contribute to its social cohesion. The mandate from shareholders and the internal policies stopped until now IBM SA to give equity ownership but with the seven hundreds millions rands investment IBM SA changes the landscape of SA ICT MNEs contribution.

4.2.5.1. Investment in SD within IT SA context

The third topic considers the connection between IBM SA, South African socio-economic context and South African social needs. Innovation is a process strongly dependent on the environment where it takes place because many actors, resources and many stakeholders, part of a system called NSI, interact during the innovation process. IBM is a vanguard, and through CSI, the firm confirms its status as an enabler of technology transfer and a socio-economic development catalyst in SA, *“outperforming its competitors under the present economic conditions”* (IBM participant).

IBM SA invests in CSI: since 2010, IBM SA Global Entrepreneur program has helped the launch of more than 500 new local businesses in key areas such as green energy, health care and transportation. IBM SA's work with start-up companies is helping South Africa to build and strengthen new markets such as cloud, mobile and big data/analytics extending the geographic reach of many South African companies. An annual project called *“IBM Smart Camp”* that

includes a competition for start-up entrepreneurs with innovative solutions takes place in Johannesburg and Cape Town each year.

South Africa displays skills deficiencies and IBM SA tries to address these problems with high investment in general education and general training education. Mark Harris, managing director of IBM South and Central Africa, said that it is known that IBM is a big investor in skills development in South Africa, currently boasting a handful of programmes focusing on special technical skills such as Mainframe, SAP, Intel, Web Sphere, IT operations and language (IBM SA website). Those recruited into these programmes include recent or unemployed graduates. Furthermore, IBM SA has joint learnerships and internship programmes, initially with the Tshwane and Vaal Universities of Technology, to produce ready-made graduates and to introduce a Service Oriented architecture programme at the University of KwaZulu Natal's School of Information Systems and Technology. *"We have an on-going plan for Africa, so this by no means a one-off investment"* (IBM participant).

4.2.6. IBM case study conclusions

IBM is a supreme collective intelligence with its output in the mobilization of skills and having as a goal, the mutual recognition and enrichment of its employees and maximising its shareholders value.

The reader must imagine IBM as a well-equipped kind of ship, travelling for a long time on an ocean called Global Business Environment and encountering huge and dangerous waves called volatility, uncertainty, complexity and ambiguity. All participants and experts interviewed about IBM SA's skills development programme were of the opinion that IBM's plan covers immediate operational needs.

"IBM [SA] is very pragmatic in doing business", or "IBM started to tip SA for talent but its focus is business performance" and finally "IBM [SA] does not produces big number of jobs".

4.3. Cisco Systems - “The Great White Shark”

Established almost at the same time as Dimension Data, Cisco Systems is a global contributor to technological transfer.

4.3.1. Background

Cisco Systems Incorporated is pioneering the way companies use connecting technologies and its primary activities are to design, develop, manufacture and provide technical support for networking products and services in the ICT industry all over the world. Cisco is embracing change and its motto is “*Changing the way we work, play, live and learn*”. Its main customers include corporations, government agencies, utilities, educational institutions and other consumers (Cisco Systems website).

The firm has its headquartered in San Jose, CA, with major operations in Research Triangle Park, NC and Chelmsford, MA. The firm has 73,640 employees, including 23,000 engineers. They also have 475 offices in 165 countries. San Francisco, affectionately called “*Frisko*” or “*Cisco*”, was the inspiration for the name. Universities were its first clients. Shortly after Cisco went public, the two founders left. John Chambers, then Cisco’s second-in-line executive, took charge and began the now “*characteristic technique of obtaining R&D expertise via acquisition*” (WSJ Interactive Editions Company Profiles; available at www.wsj.com).

In 2014, John Chambers, on top of Cisco for almost twenty years, took the third place in the top 100 CEOs (USA). Furthermore, Cisco vision defines its organisational structure, procedures, and policies as Paulson researches and discover about how Cisco does mergers and acquisitions (2002, p. 60). However, Cisco has its own weaknesses: poor supply chain management, high pricing, constant reengineering of networks at a high risk for the companies relying only on them. The firm’s leadership must prepare strategies for the economic slowdown as well as for standing against strong competition from Dell and IBM.

“Fortune Magazine” dubbed Cisco *“The Great White Shark”* of the high tech world due to its strategy to innovate through acquisitions. Cisco calls these acquisitions *“market adjacencies”*. With 52,000 partners in 2011 and \$46 billion, fiscal revenue in 2013 Cisco is on course to transforming itself into the *“Next Cisco”* (Cisco participants).

4.3.2. Cisco Systems - SA branch

The present research paper studies the SA subsidiary of Cisco Systems called Cisco SA. Cisco SA, part of the Cisco East, Middle East and Africa subsidiary, started SA activities in 1995, and has branches in Pretoria, Cape Town and Johannesburg. There are many initiatives aiming to increase the penetration of high technology in Africa and Cisco SA is investing significant funds to improve the technical skills of South African citizens. Some executives' quotes cited below are examples of the leadership's approach to the African and South African technical skills shortage aligned with one of the experts says regarding Africa and South Africa development of skills (Cisco SA website).

Stefano Mattiello, director of Channels at Cisco SA, says that South Africa offers many unique advantages for customer services support. Cisco's focus to partner with emerging countries in order to create innovative and inclusive business models enabled by technology....”We lead in the way of adopting Web 2.0 tools that allow us to work virtually and do business anytime, anywhere, with high levels of operational efficiency” (Brainstorm, 2013, September 1, p.30).

4.3.3. Topic 1: Investment in SD is a strategic activity

Many business analysts recognize Cisco Systems as a firm with a successful strategy over a long period and investment in SD follows its success.

4.3.3.1. Investment in SD follows leadership strategic intent

Investment in employees' skills is a top priority and the leadership of Cisco SA invests hundreds of millions of Rand to train and develop employees with 82% of the workforce participating in the training programme at least once a year.

All Cisco SA participants agreed that the level of investment in technical skills is close to 90% of the firm's investment. Their leaders, managers and technical professionals are organized in teams that *"share vision and more important value"* when they do their jobs. The firm's vision of the next *"Internet of Things"* or *"Internet of Everything"* comes in support of its leadership strategic decision to invest in skills that will enable this shift and differentiate it from competitors.

The firm gives access to *"full acquiring of knowledge repertoire and training with individual coaches and mentors for discovering any new change in technology"*. Furthermore, the same participant says that *"Our engineers are the best and they continue to learn new technologies or to find solutions for existing ones on daily bases"*.

A Cisco participant says that it is a high need for niche technical skills. *"HR provides the planning, decision-making, strategic analysis and support that drive organisational effectiveness and productivity throughout our company. ...HR department is organizing recruiter events, on campus virtual information sessions, internship and apprenticeships. HR department is capable to recruit the top 10% to 15% of engineers. The ideal candidate is the one that holds Cisco goals and helps Cisco grow,"* says another participant.

The above quote paints the efforts of Cisco SA HR to play a strategic role, above the administrative one. In addition, the achievements in recruitment of skills and talent are high because the HR function is effective.

4.3.3.2. HR and leadership design and implement SDP hand in hand

Nasseema Sookaria, Cisco SA HR manager, says *"Our team is broad... networks of individuals collaborating to change the way we work, live, play and learn. From many events and engagements with entrepreneurs or students and from many backgrounds, we choose talent that not only mirrors our customers, but also brings new ideas to the table."*

She further points out that HR professionals are valued as dynamic business leaders and drivers of shareholder value. *"We collaborate with the business to*

define the human capital strategy and management strategy to meet Cisco's financial and technology goals and objectives. HR provides the planning, decision-making, strategic analysis and support that drive organisational effectiveness and productivity throughout our company. At Cisco SA, the HR management is strategic and follows the corporate strategy regarding recruitment, performance appraisal, training and development of skills and compensations and benefits. HR department uses automated tools and standard processes and is capable to act faster, simpler and consistent. One of the important functions of HR department is streamline and monitors the internal hiring process. HR department is organizing recruiter events, on campus virtual information sessions, internship and apprenticeships. HR department is capable to recruit the top 10% to 15% of engineers. The ideal candidate is the one that holds Cisco goals and helps Cisco grow" (Brainstorm, 2013, p.28-29). This quote paints the efforts of SA HR department at Cisco play a strategic role, above the administrative one. In addition, the achievements in recruitment of skills and talent are high because the HR function is effective.

4.3.3.3. Technology foresight drives SD for change

Cisco has many strategies designed with a correct technology foresight process. One of the technology foresight specialists is Ned Hooper, Chief Strategy Officer of Cisco Systems, called the architect of countless acquisitions. Several trajectories followed by Cisco belong to Hooper's technical clairvoyance. It means that investment in new technologies and new skills should be optimal and efficient. One of them is a move that helped Cisco's transition from the so-called "fat AP Wi-Fi era" to the controller-based, enterprise wireless LAN market.

Today, Cisco dominates this market, which happens to be growing faster than any other market in which Cisco participates. The acquisitions come after high investment in upgrading the needed technical skills. Chambers, Cisco's legendary CEO, has often said that Cisco's three-fold approach to handling market transitions and growing market share consists of three elements: *"build, buy and partner"*.

A participant says that *“Cisco SA must be the driver of the technology because it has the means and knowledge to design relevant solutions by understanding the clients’ challenges thoroughly.”*

The decision to invest in the development of new sets of skills for the technical stuff together with the investment in client or user product training is the implication of the new acquired technologies. *“The future technology will connect 99% of all the things and will form the Borderless Network. It enables improved collaboration, seamlessly connecting people and enabling new business model,”* said Den Sullivan, head of Architectures and Enterprises in Emerging Markets (Brainstorm, 2013, p.28-29). *“We are at the forefront of the technology, we have employees that are at the forefront of everything is happening”* says a Cisco participant.

4.3.3.4. Efficient exploitation requires investment in SD for exploitation activities *“Cisco engineers are doing their daily routine tasks with an innovative approach because they have high skills and know how to adapt the new technologies to SA conditions.”* said a participant. He continues saying that Cisco engineer are excellent in *“execution and always are looking for solutions beyond their working hours or job description tasks. Cisco SA invested in in-house training complemented by special e-learning courses using its own local technical resources and the overall online training available in all Cisco branches”*.

The investment in the development of *“correct skills”* must be relevant for Cisco’s sustained growth. Technology forecast at Cisco reveals that by 2020, 37 billion objects will use IoT every day. To facilitate this, the ICT industry is going to need an unprecedented number of skills. The Cisco HQ mandate is an exploitation mode of business because the firm decided to exploit its leadership position in the market.

4.3.4. Topic 2: Factors, processes and routines that shape the efficiency of investment in SD

Learning operational routines are dynamic capabilities in firms because transform human resources using organisational processes as Ciborra (1996) says. The efficient performance of these routines depends of employees' potential, their soft skills and their motivation.

4.3.4.1. Investment in efficient training/learning routines

All learning programs in Cisco involves an efficient use of the firm's strategic resources and *"Cisco is doing this for long time."* A participant showed that a team of Cisco SA Learning and Development Department, based across the EMEA region is implementing a skill development program (SDP) aligned with Cisco's business strategy and closely monitored by Cisco Performance Connect (CPC) where *"the manager and the employee have robust discussions related to work performance and career planning at every quarter"*.

In a constantly changing industry, the need for frequent employee training is high and Cisco SA, under its headquarters directions, was among the first in the mid-1990s to provide training to its staff via the web. Cisco SA has a variety of programs that are part of their e-learning site. Previously Cisco SA did formal training all over South Africa for its field technical staff and its business partners. After 2001, Cisco used IP/TV broadcast servers and all its employees viewed the online training daily. As a result, Cisco SA saved millions allowing its employees to get training online (www.Cisco.com/go/e-learning).

Cisco started as the leader in the e-learning race and due to its new strategy towards *"smart"* personalization for every employee it seems that they are still leading the pack using e-learning innovations (Cisco Systems, 2001 case study www.Cisco.com). In all Cisco subsidiaries, including Cisco SA, learning and training activities are using the same global infrastructure obtaining high results (Cisco online documents).

4.3.4.2. Monitoring and rewarding employees' learning performance

In addition to online streaming, Cisco developed Field e-Learning project. Cisco SA had the connection that allows its sales and technical staff to plan, track,

develop and measure their skills and knowledge worldwide. The site has links to tens of thousands of searchable web-based learning aids that are job specific and correspond to an individual's history, based on past online assessment results and certification exams. Learners have access to video on demand and online virtual labs where they can conduct hands-on experiments, access e-mentors who can walk them through an exercise, an online bookstore and a new employee's orientation kit. In addition, the sales managers can monitor an employee's development and progress. The site is used to its maximum capacity every month as is presented in Cisco online documents.

At Cisco SA, the retention of employees uses a best-in-class corporate experience and ESOP (Employees Stock Offer Plan) to motivate their efforts and retain them for a longer period. Training, mentoring and coaching achievements come with the appropriate recognition and rewards. For example, there are employees who have been working for twenty-five years or longer at Cisco SA.

Other tools for Cisco employees' performance appraisal are the Performance Connection Program started in 2012 and the traditional Mid-Year Career Discussion program for enabling dialogue between employees and managers.

The level of retention of new employees is around 80%. A program, called the High-Touch HR model, created for new employees to make them feel part of the family, contributes to the successful retention of the employees.

Another participant underlines that *"Monitoring the return on investment in skills continues to be our driving force behind each dollar spent on training initiatives. Our employees and our partners are our strength. Cisco University offers excellent 4,000 courses and has registered 70,000 students each quarter"*.

4.3.4.3. Soft skills, management and leadership, innovation and creativity influence the efficiency of investment in SD

The corporation CEO, John Chambers, started some key changes by shifting management from a command-and-control approach to one focused on collaboration and teamwork. Cisco is a global company and, *"if we feel there are*

certain skills to be made redundant in South Africa we will explore what happening in the rest of the world, and ...the opportunity to move people into the market where they are needed.”(Cisco website)

“The firm has the lowest turnover rate compared to all other companies. Last year Cisco SA has 13% attrition rate but recently Cisco went through restructuring. We had also only five resignations with a workforce of 200.”(Cisco online documents)

Further, Cisco SA has no formal R&D department and its technical staff is using existing Cisco products and existing routines. Cisco spent \$5 billion per year on R&D but no allocation for South African R&D activities. Out of the 700 new innovative products and processes patented every year not a single one is coming from South Africa. Consequently, there is no investment in skills development for innovation activities, creativity or design thinking. Instead, they invest in networking, project team building and communications training. Cisco is client centric *“and created a harmonious ecosystem of partners and clients”*. The Cisco participants recognize the need of soft skills and business skills where Cisco investment is high. Management and leadership skills are in high demand and outsourced training contributes to fill the gap.

4.3.4.4. Investing in talent management skills to win the war on talent

Cisco SA is a talent developer and the major task of its leadership is to create diversity and integration and furthermore to address inequalities.

“To achieve these goals, it needs more than just financial investment or box ticking exercise, commitment to transformation is vital and education is key to enabling us to continually build upon our existing BEE initiative” says one participant. *“Cisco wants to be known as South Africa’s first fully transformed multinational IT Company,”* emphasizes the same participant in charge with transformation at Cisco SA.

Cisco attracts young school learners and women into its talent development programs, such as GTAP. Cisco SA offers high-level certified courses that give the students a competitive advantage in the job market.

“Globalization of the corporate brain” at Cisco is the process of decentralization of the main Cisco activities to all its branches using the opportunities offered, especially in providing sources of much needed talent. “By investing and setting up more substantial operations in these countries-by moving closer to these areas--we feel we will be in a better position to recruit the best networking talent in the world” says a participant. Further, the networking talent gap is huge in South Africa and other emerging markets. Cisco SA is planning to hire thousands of workers over the next few years, so there is fierce competition for the best of these employees and the investment in their skills will be high. “Piloted Talent Connection is an internal tool used by the HR department recruitment team, managers and employees to work together in matching skills sets to internal job openings.”

4.3.5. Topic 3: SA context influences investment in SD

SA is an emerging market with many skills deficiencies and slow economic growth. Cisco SA integrates its activities in the South African context.

4.3.5.1. Investment in SD within IT SA context

Julie Ferreira, Cisco SA CTO, points out that the emerging IoT sensed by Cisco as a new technical opportunity, is going *“to radically change business processes in SA where customers are facing not only technology challenges, but economic ones as well”*.

The growing role assumed by Cisco in SA is part of the CEO’s strategy: *“IT SA market is not a pretty place at the moment; it must become part of a successful society that must be able to provide health, education and safety”*.

Moreover, *“Cisco wants to be known as South Africa’s first fully transformed multinational IT Company,”* emphasizes one participant. He further says

“Cisco SA also invests in employee skills and CSI as a top priority because “the biggest hurdle that ICT faces in SA is to overcome the skills gap. Our strategy of investment in skills is to be relevant to our clients and the country in every possible way”. “South Africa has problems with its education system that needs to be re-engineered.”

There is a climate of collaboration among Cisco SA employees and open exchange of ideas is part of the firm's culture: *"At lunch time people are chatting in the canteen, we get food at R10 a meal, but Microsoft offers free food which is even better. Cisco is founded on a family type of value structure."*

Discussing Cisco's efforts for enabling knowledge and technology transformation, Wim Elfrink, Chief Globalisation officer says:

"Cisco bolsters its Global Strategy, Investments" – and this is called *"Globalizing the corporate brain"*, (Cisco website, October 29, 2007).

Cisco SA obtained in 2013 the level 4 BB-BEE compliance because of Cisco SA leadership commitment to transformation.

4.3.6. CISCO SA case study conclusions

Cisco SA, a subsidiary of the top performer and IT enabler Cisco Systems, based in USA, is a relatively new IT firm. The participants agree that Cisco SA is a special place to work and develop personal mastery because the leadership is open to discussions and has a deep understanding of the South African socio-economic climate.

Cisco Systems' headquarters strategy of investment in innovation means acquisitions of innovative smaller firms and Cisco SA follows the path. Cisco invested \$5 billion in R&D, three times more than IBM HQs investment in R&D in 2014, but not in SA.

The Great White Shark has a huge appetite for acquisitions. Cisco SA is swimming in the same ocean with the big white shark and believes in the power of networks, as the saying *"many hands make light work"*. In South Africa, the number of Cisco volunteers is over 1,000. Cisco SA wants to be known as a social integrator (integrating all social network platforms) and skills builder (its simulation labs for networks is called Skills Builder).

Relationship of Cisco SA to Cisco Systems globally in respect of skills development for innovation follows the HQ mandate.

4.4. Dimension Data –DiData “The System Integrator”

Dimension Data started in South Africa as a successful firm covering South African network technology needs. Its leadership achievement is the golden partnership with Cisco Systems and consequently, Cisco SA.

4.4.1. Background

Dimension Data or DiData founded in 1983 has been active for three decades in the ICT sector. Headquartered in Johannesburg, South Africa, the firm has a presence in 50 countries with 15,000 employees and 6,000 key customers.

Since 2010, DiData has been a member of NTT (Nippon Telegraph and Telephone) Group ranked twenty-nine in “*Fortune 500*” and the largest telecommunications company in the world in terms of revenue. Its headquarters are in Tokyo, Japan.

The main acquisition strategy of Dimension Data is to acquire valuable firms like Plessey South Africa, in 1998 and OpSource Inc., in 2011. In 2013, the firm took the first place in the “*Leaders Quadrant*” of the Gartner Communications Outsourcing, in the “*Professional Services Magic Quadrant*” (COPS) as well as in the Gartner Cloud Infrastructure called “*Service Magic Quadrant*”.

DiData is in the business of IT services and the participants generally agree that the network integrator competencies are key drivers of the firm’s growth. Innovation of an incremental nature has taken place in pockets and has come from

Further, employees try to provide their clients with the best-fit technology adoption scenario. However, the business performance in Dimension Data comes from exploiting existing technical solutions and by giving clients services that fit them the most. At DiData, the innovation is not a product innovation with lodged IPs but is core business and sales in nature. DiData employees’ reviews revealed that the firm’s workplace has a pleasant and progressive climate and good team building with work over life balance rated 3.5 out of 5 and job security or advancements also rated 3.5 out of 5.

4.4.2. DiData or Dimension Data South African branch

DiData, the South African subsidiary of Dimension Data, is the object of the present research. The firm is located in Johannesburg close to other large IT vendors and has two other branches in Cape Town and Durban. DiData started business during the apartheid era when *“imposed sanctions essentially created a protective environment in many industries, including the information technology (IT) industry”* (J. Ord, personal communication, August 27, 2012 cited in Meny-Gibert, 2012).

Francois Sievers, Dimension Data project administrator, explains that *“At the time (1983), DiData wasn’t a core technology company; it was a very good, very capable, and very smart systems integration house that took technologies from...all over the world...and integrated these systems to meet the requirements of local customers, among them government departments, banks and industrial enterprises. That was great...but I wanted to get into core technology; I wanted to be part of developing something from scratch.”* (Barker, 2011, paragraph 9) On the day in 2010 when NTT bought Dimension Data, Jeremy Ord, executive chair of Dimension Data, says: *“...They recognize very clearly that the people are what it's all about with Dimension Data and the entrepreneurial spirit is what it's all about....”* (Meny-Gibert, 2012).

4.4.3. Topic 1: Investment in SD is a strategic activity

Leadership coordinates investment in the skills development activities because *“they must account for every penny spent.”*

4.4.3.1. Investment in SD follows leadership strategic intent

The investment in employee’s skills is the first priority of ICT firms and DiData followed this strategic activity, fully supported by its leadership.

Although, DiData invests in soft and hard skills, leadership must do more to allocate more resources. *“The SD and training receives a chunk from the resources needed but a higher and higher interest can be seen among big corporate and Government owned organisations (Eskom, SASOL) and who are requesting not only service and quality when they launch tenders but also*

technological transfer done through training their staff by the tender winners. So, investment in skills development is more and more a key priority among other investments.”

One of DiData leadership statements is *“Ongoing training and skills development forms the bedrock of transformation, and is an imperative for any company aiming to develop a competitive edge. Dimension Data recognizes the long-term benefits of keeping employees motivated and more adept. During the year ended 30 September 2013, around twenty seven million rand were spent to provide opportunities for further education, learning and development activities.* (<http://www.is.co.za/AboutUs/Pages/Empowerment.aspx>)

The participants agreed that in DiData *“investment is biased towards skills”* and the leadership has *“a strong drive to invest in skills over mergers and acquisitions”* in order to build *“a network of transformation following an hierarchic setup”*, strategizing SDP by including it into the (firm’s) picture and *tested through value...and the right behaviour (of employees)”*.

Furthermore, DiData has *“key strategic investment in training the clients and pre sales engineers...by assessing the clients’ needs and knowing their intimacy (business)”*. Strong investment in skills enables them *“to be competitive within the industry”*. The skills plan *“is strategic”* and *“a key priority”* for addressing or *“focusing on incremental change without a huge investment (for disruptive change) but more organic investment than investment in acquisitions”*. DiData is constantly *“studying the environment (political, economic and social) we put on the clients’ table and improve its (their) businesses”* (participants).

Moreover, DiData investment in SD follows the leadership strategic intent with the collaboration of HR department that enables the upgrade and transfer of needed skills.

4.4.3.2. HR and leadership design and implement SDP hand in hand

“We expect you to work hard, but also enjoy yourself; work hard, play hard, achieve.”(J. Ord, DiData CEO, about personal communication, August 27, 2012 cited in Meny-Gibert, 2012).The leadership style of Ord and the entrepreneurial skills of the executive board members were not restructured and the trend is continuing. The participant described the kind of relations between the HR department and leadership had when they wrote the skills development plan.

“I always participated to skills development plan and I designed proposals for higher hierarchy managers and top HR of customised high technical solutions. I can tell you that we use technological forecasting and future trends together with external benchmarking of competitors in terms of skills and strategies for achieving the performance we look for in Dimension Data.” (participant).

Arguably, the management and HR department are following DiData’s growth patterns by aligning their skills development plan to DiData’s core competencies. An operational manager says *“DiData is a firm behaving as enthusiastic as a start-up but with the stability of a blue chip company. The firm is adapting to new technologies using up to date information from high-qualified employees and after it sending the rest of the employees to training. The new needs will be added to the skills development plan.”*(Meny-Gibert, 2012, p.50)

All participants were of the opinion that investment in skills contribute to the firm’s growth and transformation. Furthermore, one DiData HR manager says, *“the investment in SD takes place in the framework of a transformation team where I have an independent role in planning it. The further decision is taken by a HR executive... and further approved by an executive situated at a level up...management and leadership training (MANAGEMENT AND LEADERSHIP) follows a complex development plan following the managerial need of DiData...”* (Meny-Gibert, 2012, p.50).

Different views were expressed by participants who saw DiData leadership and HR relations as having a top down approach, *“traditional and conservative”* with

the desire “to preserve the status quo of the past successes”. Another participant, contradicting the opinion of the HR specialist, said: *“DiData learning culture is not aligned with personal interest of employees and top down leadership decides who will fill the management position”*. HR and leadership are not always in tune: *“OPQ (OPQ32, is one of the most widely used and respected measures of workplace behavioural style in the world) scientific fact is minimal done during recruitment, as well not always matching the short list of candidates with the DiData needs and the learning path is done in pockets.”*

However, DiData must focus on technological change because *“IT sector attributes imply rapid change of SDP”*. More insights regarding how DiData have adapted to the new technical trajectories will follow.

4.4.3.3. Technology foresight drives SD for change

During the interview, one of DiData participants emphasised that *“formal skills development and keeping pace with technology first of all...access to the information we have forums to make sure we keep the pace. Overseas training...and for example Centres of Excellence and the global head will follow any incremental change incentive of excellence with global head of this technology area that will follow with strategy and outside the normal area Software as a Service (or SaaS) for example. Certain people will investigate and come back through broadcast and staffs participate all over the world in exchanging information.”*

On new technological trajectories, which are followed, the participant mentioned that: *“External training is expensive when new technological trajectories are sensed “..The need for new technological skills transfer starts small and continue with training on job and...to avoid risk is using a pilot...”* said another participant. DiData’s core competencies of *“anticipating future market trends and understanding the next technology wave, has tended to rest on the shoulders of a few key individuals who were either with the organisation from its inception or have remained with the organisation for lengthy periods”* (D. Wilcox, personal communication, September 17, 2012 cited in Meny-Gibert,

2012, p.54).

Furthermore, participants say, *“rapid change is reflected in skills development plan”* because *“DiData is part of a dynamic landscape changed from the traditional one.”* *“HR is highly involved to keep the pace with technological change on the leading edge for developing internal strategic plan for new technical areas”*.

At firm’s level *“there are organised investigative teams connected online to report to leadership and called connect sessions... by (using) global broadcasting. Furthermore,”* *The drive for technological change is done by technical high skilled gurus mostly internal”* followed by *“changing the SDP using competitors’ benchmarking, forecasting technological trajectories and sensing future trends”*.

4.4.3.4. Efficient exploitation requires investment in SD for exploitation activities
Data is a service-orientated firm with its major growth strategy focused on mergers and acquisitions of new and innovative firms. The project called Technology Lifecycle Management offers DiData’s clients business agility because *“at Dimension Data we are IT infrastructure specialists. ...Knowing your network will give you the high level visibility to ensure your infrastructure is business-ready and has the capability to run the applications that can deliver agility and competitive advantage by supporting new technology investments”* (participant).

DiData chose to focus on systems integration of the best technologies chosen from around the world to meet their client’s specific requirements for a business solution. So, the participants’ interviews emphasize that the product managers are regarded as *“stars and leaders in their fields”* and DiData specialists are aligned to manufacturers for *“massive skills transfer”* and getting training, licensing and certificates *“with heavy investment in product specialization”*. The revenue of this heavy investment *“is achieved through obtaining golden discount from vendors”* creating *“new revenue streams and return from investment in training and certification.”*

Finally, this display of data collected through interviews paints a vivid picture of the way DiData has invested in skills following the leadership strategic intent and a proper balance between exploitation but with no innovation activities.

4.4.4. Topic 2: Factors, processes and routines that shape the efficiency of investment in SD

The efficient learning routines, rewards and monitoring functions are all working under the learning culture in firm that is continually encouraged by the leadership.

4.4.4.1. Investment in efficient training/learning routines

DiData is a “*start up with the behaviour of a blue chip*“. Nevertheless, DiData’s growth requires from employees the speedy adoption of new technologies, making unmanageable old recruitment practices. The DiData learning and training routines are efficient because use e-learning routines.

In DiData, the participant mentioned, “*Internal training is more effective and achieved with less investment but trainers left DiData recently for other opportunities*”. The same is applicable to internal coaching and mentoring. The employees “*are brand aware with individual approach*” following cross skills training and managers are “*executing different roles not to stagnate in their current role*”. All staff has “*an average of two to three weeks of training per year*”.

This represents a huge investment for DiData “*that commands staff retention*”. DiData HR department “*mitigates risk by designing the best packages (for employees) and optimised contracts for high retention*”. Another participant says, “*it is a never ending story in skills development with mechanisms in the way we reach people and they advertise their skills but we innovate to keep links with communications and tracking courses*”. There are “*DiData University (DDU) and dynamic e-learning capabilities that make investment in skills efficient*” but instances when “*rapid technological change is taking place the outsourced training is preferred*” says a DiData participant.

4.4.4.2. Monitoring and rewarding employees' learning performance

DiData knows how to keep its working force committed for years. They have a DiData Hall of Fame where top achievers are recognised and rewarded. The main measurement of their performance is “*in numbers*” or using how many of the KPI were achieved during Q4 or annual assessments. Line managers and HR consultants using the same standards for everybody do these recognitions.

At the core of the firm's activities are its employees. Their skills are “*in connecting businesses, their customers and suppliers over local and wide area networks....building on this knowledge base enables us to move into several other technology competencies....that speak the same language, that of the IP[internet provider]*” (Dimension Data, 2013, Annual Report, p.10).

“*DiData has an incredibly competitive environment sustained by the nature of remuneration, particularly in the share options, the penalty for missing target. There were relatively middle management guys who lost 3m bucks in a year just because they missed their budget by a couple of percent...because everyone else was in the same boat....they sort of tolerate any sort of divergences within a limit, go out and screw up few things as long as you make the bottom number at the end of the year.*” (R Came, personal communication, September 6, 2012 cited in Meny-Gibert, 2012). Employees get: “*recognition for the creativity and at each quarter DD leadership applies the recognition systems followed by the annual recognition. It is not for ideas but for work and performance. If employees launch new service or special product development they get recognised.*”(participants).

However, some participants have a different opinion “*Alignment of the firm's learning culture with the people personal interest is not formalised and it is a need for DD to show to employees what is the pay-off for learning when training is not followed by getting the management position. For, example, people good at their jobs are advanced in the organisation hierarchies but they have no management skills. It will be required a formalised function for managing people and incentives must be awarded for effective management.*”

4.4.4.3. Soft skills, management and leadership, innovation and creativity influence the efficiency of investment in SD

DiData invested in “*educating clients, marketing, seminars and coordinated campaigns because of its client centric unique and innovative approach... The sales department targeted the top fifty clients for educating them in new technologies*”. It is “*the culture of clients’ satisfaction with heavy investment in relations building and entertainment*” (participant).

An example of networking and strategic partnership is the way DiData collaborated with Cisco (DiData website). DiData’s ascendancy in the networking space took place because their early identification of Cisco as the vendor of choice and Ord’s success in convincing Cisco to allow DiData to be their exclusive partner in South Africa. He correctly identified that the next technology wave would be around the convergence of communication – voice, video and data – and the standardisation onto one protocol, that of the IP. This was pivotal in the future success of the organisation.

Relationships among employees became very important because of “*the personality of technology people that feel they are a little bit different*”, but some participants have criticism to add to the culture of internal collaboration and networking saying that the external networks of clients and partners are better developed. The firm progresses in employees’ networking by using an innovative social network application called Yamma that helps them to share information.

All DiData participants and all secondary data collected showed that DD has no formal training for innovation and that creativity is not rewarded and supported in DiData because of “*the conservative and top down leadership attitude*”.

Despite this training gap, the firm is innovative in the way it operates. There are other processes regarded as innovative, as one of the participants says “*We are innovative... in many ways and every client is approached by a unique solution and by getting the business and creative way that you put the solution together by*

approaching clients. It is a way that leads us to lead the market. The innovative way of, for example, the table cost as a business innovation and shared all over the world. Climate intimacy, understand the needs, at that level we are creative, the way we improve their (clients') businesses."

DiData needs highly technically skilled employees and talent in order to reach their business goal and to be competitive worldwide. Participants describes the strategy DiData uses to win the war on talent as a continue activity.

4.4.4.4. Investing in talent management skills to win the war on talent

The HR department uses special strategies for funding and developing talent. One participant said: *"A big need of talent with management and leadership skills requires training and more assessment must be done to discover talent for management because recruitment is not always efficient with learning following in pockets"*.

Another participant added more insight about how the *"firm employs smart, inspiring and supportive colleagues. It is a culture of developing top talent internally but when it is needed to respond to challenges the firm employs the top technical talent."* The firm prefers an organic breed of talent that from an investment point of view is a better solution. All employees are involved in *"identifying the needed technical talent using box grids or methods of key talent discovery"*.

The talent is around 88% locally sourced but they also have a number of technically skilled employees sourced from overseas. When South Africa has *"unfertile hunting grounds"*, they use other mechanisms to win the war on talent by hiring from clients or competitors. One participant describes the strategy: *"breeding talent ...rather to procure it. We have people we invest heavily to manage the work force costs. We buy talent when we need talent and shadow our vendors."* They win the battle but the criticism is still there: *"We grow the oak trees than buy the oak tree"*, says another participant.

4.4.5. Topic 3: SA context influences investment in SD

DiData is the SA branch and at the same address is the HQ of the global corporation. DiData place of birth is South Africa and the takeover by NTT did not change its culture.

4.4.5.1. Investment in SD within IT SA context

DiData is constantly evolving to enhance South Africa's skillset capabilities as the firm's value composition and has contributed to South African skills transfer, despite having to deal with an *"anxious learning environment"* for skills transfer. The firm is embracing the country's challenges created by skills gaps and skills deficiencies especially *"the shortage of skills in new technical fields like Cloud"*. The participants unanimously agreed that South African needs out-of-the box thinkers to sort the education problem out and solve the skills gap. *"The links among innovative institutions and our services must be strengthened,"* said another participant who called the whole South African skills challenge *"a continuous journey"*.

Furthermore, DiData needs *"to short the adoption rate and create a revenue path by educating the market"*. Another DiData participant says, *"I encounter a lot of shortage in technical skills especially in cloud computing skills and business skills that are not part of SA pool of skills. It is specific to SA because I can source people from other countries who have these needed skills. However we give back to the SA communities we serve through our corporate social responsibility programme called Heads, Hearts and Hands."*

In addition, the participants expressed their opinions regarding tertiary education in South Africa. *"The SA universities and technical colleges have poor quality of graduates that need longer period of training at the working place. It is also a problem to recruit EE."* It is also known that *"is harder in SA to fill the skills gaps and for finding candidates we use LinkedIn. Dimension Data is a high-performance company with an open-door policy – where someone as 'junior' as a new graduate is able to walk into any executive's or manager's office to discuss*

just about anything. This is the kind of work that environment brings out the best in people", says Eva Mothapo, Project Administrator of DiData SA (Dimension Data website). Another participant says that *"it is needed a significant sales force, a sales team, to promote and to educate the SA market"*. DiData believes in South African model of social transformation and works towards a higher level of BB BEE compliance. At present DiData obtained BB BEE 3 compliance.

4.4.6. DiData case study conclusions

DiData is not an innovative firm but its CEO, Andile Ngcaba, wants to change this. The firm is constantly engaged in the South African entrepreneurial development challenges.

The participant's opinions are generally positive: *"Great company to work for, culture is amazing! However, I am underpaid and over-worked. Somebody needs to look at management; some managers do not have management skills. Nepotism... *mmmh let me keep quiet*."* Despite their appreciation for the firm's culture, some of DD employees are not happy and the firm is gets a low 3.8 rate for the work/life balance in the statistics collected from seventy employees who posted their comments to the online survey. One of the reasons for unhappiness is the management style. Furthermore, the issue of job alignment to training is a matter of concern. It is about *"receiving training in (technical skills) VB6 and not assigned to a project ...resulting in no working experience, being retrenched."*

4.5. Conclusions of Chapter 4

In this chapter, the researcher presented the primary and secondary data collection part of the three case studies grouped in main topics and propositions. The South African context was also analysed and a major South African variable called attractiveness for FDI displayed in 2013 a slight increase with 4.7 percent with no increase in number of jobs. In terms of destinations, South Africa maintained its position as the top FDI destination⁶ in Africa with a slight increase of 4.7 percent.

⁶ <http://www.ey.com/ZA/en/Issues/Business-environment/EY-africa-attractiveness-survey-2014>

It is evident from the way these chosen firms display their business behaviour, leadership strategies and allocation of resources that they have many similarities in the way they interpret South African environment. In the following chapter, the analyse of similarities and differences in the way they execute their business activities should help the researcher to answer to the research question of how these firms invest in SD.

CHAPTER 5 - CROSS ANALYSE OF CASE STUDIES RESULTS

5.1. Introduction

This chapter provides the opportunity to develop the story found in the data that makes connections to the existing theory and research. The researcher was looking for a holistic answer to the research question “*How do innovative ICT firms based in SA invest in skills development?*” by using a multicase study research. This chapter includes the analysis of commonalities and differences between three case studies: IBM SA, Cisco SA and DiData and the discussions developed under each statement / proposition by using the results from chapter 4 and chapter 2.

The findings of the content analysis and the literature framework constitute the basis of the arguments. The chapter finishes with the conclusions of this analysis.

5.2. Discussions/Analysis of the nine propositions/statements

The three case studies represent firms in complex collaboration-competition relations. The researcher analysed the findings from the previous chapter in conjunction with the outcome of the literature researched under three topics:

5.2.1. **Topic 1:** Investment in Skills Development is a strategic activity

The propositions under topic 1 are about firms’ strategic intent, strategic models of business activities, HR and leadership collaboration and the influence of the technology foresight process over the efficiency of investment in SD.

5.2.1.1. Proposition 1: Investment in SD follows leadership strategic intent

“Strategic intent provides employees with the only goal worthy of personal effort and commitment: to unseat the best or remain the best worldwide.”(Hamel & Prahalad, 1989, p.66)

Commonalities

IBM SA is a firm supporting “*innovations that matter*”, Cisco SA prepares to embrace change and DiData’s goal is to be the best system integrator. These are the strategic intents of the three firms. At IBM, investment in skills as a

continuous activity and a leadership priority is confirmed by the big financial efforts made for global training events dealing with new technologies.” *Think Friday*” driven by the IBM General CEO is an example of top leadership commitment to upgrading skills. IBM SA connects all its employees to this initiative following its HQ’s strategic intent under the direct supervision of the IBM general CEO.

“Leadership wants a workforce more informed, agile and capable to work beyond their job description; leadership sees the workforce as a bridge between the firm and its customers” (IBM participant).

Cisco Systems SA follows its top leadership strategic intent to build competencies in the firm by adapting to change through learning and training and giving employees clear guidance on the way forward. The culture of creating and maintaining Cisco SA as a learning organisation, in an environment that is hostile and lacks resources, needs large investments in skills for individual and team learning. *“We are a family at Cisco SA and investment in skills represents more than ninety percent or more from the available budget. At Cisco we apply system thinking when decisions are made, and team learning for all projects”* (Cisco participant)

DiData’s goal is to be a systems integrator and they achieved the top position in this field in South Africa. The firm wants to conquer the South African IT space by implementing and servicing its computer networks. DiData’s strategic intent is to cover knowledge gaps through expert training for client service and support. Similar to IBM SA, DiData overinvested in the new cloud technology skills and infrastructure for a superior and long-term competitive advantage. *“In DD investment is bias against skills; investment in skills is a key priority; the firm has a strong drive to invest in skills over mergers and acquisitions.”* (DiData participant)

Differences

IBM SA investment in SD follows the strategic intent to embrace change by learning new technologies. Cisco and DiData are only mastering niches in the IT sector specific skills, being less diversified than IBM.

Cisco SA is the supplier of equipment for cloud technology for both firms and is the leader in this niche. Cisco SA works with its clients through its network of partners and subcontractors giving expert support on request only and acting as a knowledge node for its subcontractors and partners' networks.

After the NTT acquisition, DiData SA often changed its leaders and consequently, has often changed its strategic intent. Arguably, the leaders have different personalities and their leadership style may affect their strategic intent. According to Finkelstein (2003), the reasons for leaders' failure can be summarised by arrogance, managerial hubris and a lack of strong ethical values. For example, the DiData leadership decided two years ago to shut down the hardware sales department without consulting their sales workers. The result was a less motivated DiData sales force because they lost their commission for selling networking devices and the leadership acted top down. (Meny-Gibert, 2012)

Discussion

Strategy in firms addresses skills issues because skills are the most valuable competitive advantage resources (Zack, 2002) which tend to be unique and difficult to imitate or purchase in an applicable form. Senge (1991) says that, in learning organisations, leaders are teachers, coaches and mentors. Strategic intent is motivating the employees and is internally focused (Hamel & Prahalad, 1989).

Employees' alignment to firm's strategic goals depends on the intensity of shared vision and value, also called line of sight (Buller & McEvoy, 2012). The strategic intent is part of the general strategy framework and the strategic decisions are part of the dynamic capabilities framework as Penrose (1959), Barney (1986) and Teece (1988) say. This dynamic capabilities framework copes with rapid change through leadership decisions following the strategic intent or business motivation.

Kotter (1999) argues that leadership addresses change in firms by motivating and inspiring people and coordinating activities in the same direction. As Rialp-Criado et al. (2010) debate, the difference between the decisions in firms with controlled and stable environments and the decisions in innovative firms is that the last one is the result of a visionary approach preceded by the innovation capabilities and intuition of the founder.

Conclusively, this study finds leadership in the three knowledge base ICT firms committed to overinvest in SD, as a way to increase knowledge and competencies in their firms and to challenge change through the allocation of resources biased towards skills. The high allocation of resources in SD could have many reasons, such as to pre-empt wrong or weak foresight functions and market signals or to cover for the skills deficiencies encountered at host country's level that forced these firms to overinvest more than in other branches of developing countries as all participants confirm. Furthermore, firms have reasons to apply strategic flexibility and prepare for disruptive change by creating organisational slack, in this case by overinvestment in skills to cover risk and uncertainty as Tan and Peng (2003) discuss. These findings correspond with other academics' opinion, like Cantwell and Mudambi (2005) who debate about competence creating versus competence exploiting mandates in subsidiaries and with the data collected. However, the literature about investment in SD taking place in branches of ICT MNEs is limited and future research should investigate more this field.

On one hand, IBM SA, Cisco SA and DiData are part of globally innovative corporations that are at the edge of technical knowledge implying learning efforts to stay abreast. On the other hand, the firms are seen as pivotal in transfer of technology despite the branch leadership lacking a visionary approach to innovation.

5.2.1.2. Proposition 2: HR and Leadership design and implement SDP hand in hand

“The capacity to manage human intellect (human resources, skills, human capital or knowledge) and to convert it into useful products and services is fast becoming the critical executive skill of the age.” (Quinn, Anderson & Finkelstein, 1996)

Commonalities

IBM SA has a strategic HR department that secured its *“place at the table”* by supporting the management and leadership initiatives in driving the firm’s business success. HR managers propose and leadership finalises the decisions regarding booking employees in training. *“FALL project links [HR] managers who plan to invest for staff training and BU leaders approve the investment together with CFOs; IBMers working in HR department are calling themselves business partners; HR might be focused on change and not on administration”* (IBM participant).

Cisco HR professionals are business partners and valued as dynamic business leaders and drivers of shared vision because this was *“always the way Cisco worked”* (Cisco participant). The HR department has tools to monitor the internal hiring process and plans the human capital development in an organic collaboration with other departments *“under management and leadership following technical diversification by skills diversification”* (Cisco participant).

At DiData, the top leadership was involved in recruiting and vetting every single member of the new staff and this trend continues today. SDP was also designed with the participation of *“both leaders and HR managers six months in advance following MICT SETA planning requirements”* (DiData participant).

All three companies follow the MICT SETA documentation framework because they want to align to the SETA requirements and to qualify for SA government incentives each year. This alignment corresponds to the firms’ strategic intent of continue overinvestment in SD.

Differences

IBM SA has more layers of hierarchy and a top down approach when engaging the HR department as the participants to the interviews indicated. IBM SA often loses its recruitment targets, especially to Microsoft SA.

Cisco HR recruitment function manages to attract 10% to 15% of top global engineers to be employed and some are part of Cisco SA. *“At Cisco, HR management was always seating on the leadership table”* (Cisco participant).

At DiData, HR and leadership relations are traditional and conservative following the managerial need of DiData. *“Leadership follows the culture of conserving the past success.”* (Expert)

Among participants from DiData, there are outliers who said that management is not considering the HR and Skills Development management recommendations for candidates enrolled to available management positions because the leadership approach in making decisions is top down. The consequences of this lack of synchronisation between departments result in an inefficient investment in management and leadership skills and a disappointed workforce.

Discussion

The HR departments of the three firms not only display administrative functions but strategic functions as well. This type of collaboration is a catalyst for efficient investment in SD. The strategic collaboration between HR management and management and leadership results in the design of a SDP based on firms' strategic goals. The plan should be rigorous, with tools designed for rigorous evaluation of its effectiveness, and include resolution of responsibility for training (Horwitz, 1999).

In knowledge-based firms like IBM, Cisco and DiData, resources should have a special role for their HR department that designs and creates methods to generate, transfer, integrate and protect general and specialised job related knowledge. This is due to an HR proposed strategy that deals with individual knowledge creation while the climate and the culture of organisational knowledge are the subject of

strategic management as Zack (2002) argues. Dimov and Shepherd (2005) as well as Wright and Boswell (2002) say that HR executives manage a set of resources like human capital skills, employee commitment, culture, teamwork that are the sources of firm's sustained competitive advantage. In her book "*Strategic Human Resource Management*", Agarwala (2007) considers human resources as investment and advocates the strategic fit between business strategy and human resource strategy. Maltz, Shenhar and Reilly (2003) describe workforce planning as a process of fitting the requirements of human resources to future demand. Ulrich (1999) designs the role of HR department as administrator of human resources and strategic manager of talent for change.

Data collected shows that the intensity of this collaboration varies from firm to firm and depends on the openness culture of the firms. This study finds that the collaboration between HR and leadership is strong at Cisco SA, weaker at IBM SA and even weaker in DiData, because only Cisco SA's leadership cultivates an open culture and an ambidextrous behaviour. As Tushman and O'Reilly (2006) say, an open culture firm is the place where knowledge is the optimum productivity factor. The norm in these firms is to stimulate and exploit employees' creativity by openness, flexibility and an inclination for taking risk and making mistakes is seen as part of the learning process (Tushman & O'Reilly, 2006).

The leadership of the three firms together with HR managers designs a SDP that follows the firms' strategic goals and aligns with MICT SETA requirements. The HR must also integrate in the host country's culture and follow the labour laws by locally sourcing HR recruitment consultants and HR managers and this is what all firms did. (Minbaeva et al., 2003)

5.2.1.3. Proposition 3: Technology Foresight (TF) drives SD for change

The IT sector produces waves of innovations that are highly important for the industry incumbents that, some of them, are able to pre-empt and adapt based on their superior resources and on-going internal research, part of technology foresight process (Nixon & Woo, 2003).

Commonalities

The firms studied have in common the way they use the link between technology foresight (TF) and SDP as part of their long-term strategy. Currently, all firms recognise the coming of new technologies and invest in overtraining employees in social networks, big data, cloud technologies, cognitive computing and Internet of Things or connecting E2E (Everything to Everything) as Schofield (2014) describes the main ICT future trends. IBM and Cisco TF are remarkably good at predicting the future and DiData follows Cisco. DiData, IT systems integrator focused on investment in training cloud technologies, is staying close to Cisco SA TF signals.

Differences

IBM SA has strong links with its best technology foresight programs designed at HQ level to sense any change in technological trajectories and offers the best training for adapting to the change like “*Top Gun*” program. IBM has powerful tools to optimise the technological change, tracking this with projects like ACE, Academy of Technology, TMAG, Value Jam brainstorming and On Demand Consulting and IBM SA follows and uses all these programs and has a large spectrum of investment choices in the new IT trajectories. IBM SA does not link their South African skills development program with the TF process; this is done at HQs level because it is a strategic decision and a business secret in the same time. The training following TF signals takes place at their HQs or in other special overseas venues.

At Cisco, TF was the base of many correct predicted strategies for all of its corporate existence. Cisco SA behaves in the same way as Cisco HQ and internally trains its high tech employees at the branch level but for high disruptive technical change trains them at its HQ’s level.

Grassman (2006) says, “*Cisco is regarded as one of the world’s most innovative companies. It does very little research and acquires most of its technology from external sources*”. Moreover, “*It’s all about the network ... an ICT platform that*

connects everybody” and Cisco is “*at the forefront of everything is happening*” (Cisco participant)

DiData invests in expert training for existing products and services and projects a conservative strategy applied to change. It has a non-flexible approach to change because its learning organisational structure is not formally present at firm’s level. As mentioned before in this thesis, the lack of [learning] structure determines the absence of strategic allocation of resources for this structure, including TF. When it comes to TF, they follow Cisco and their HQs. DiData has, at HQ level and further at NTT level, networks of high tech gurus who write reports and give technical advice in case technical change appears. These networks exist in all DiData branches. Furthermore, DiData has a database of clients from where it collects sales and marketing foresight signals with good results within South African context.

Discussion

One of the benefits of accurately predicting new technological trajectories, as Peres (1985) says, is the alignment of skills development plans with the future and prioritising investment in skills for high returns. Some foresight exercises are more successful due to their link to innovation models (Martin, 1995).

Anderson (1997) describes TF as a complex activity in firms belonging to rapid changing technical industrial sectors that uses many methods to look into the future. Leadership belonging to successful corporations are visionaries with rapid and accurate TF tools to test their assumptions (Dess & Picken, 2000).

In firms with temporal flexibility, as defined by Eisenhardt and Martin (2000), the competence of leadership to move their vision in time through technology foresight is an effective process. Networks of technical experts are important in obtaining good predictions (Rohrbeck, 2010) because they enlarge the technical expertise of the leaders who must have corporate imagination to make good choices (Danneels, 2008).

These three firms use strategic flexibility with bundles of resources and absorptive capacity when signals of disruption appear. (Johnson, Lee, Saini & Grohmann, 2003; Shimizu & Hitt, 2004). The researcher found that all three firms are using their global HQs TF processes, which allocate resources under business secrecy at all their overseas locations.

These firms know to execute TF in a very professional manner because their correct predictions influence their future investment in skills. The researcher found through literature that many governments contribute to this expensive TF activity, but did not find evidence of this kind of collaboration between these firms and local firms, South African government structures or South African NSI stakeholders. Hence, the researcher found that leadership should be in charge of interpreting the TF signals that predict technical change under the creation of adaptive knowledge resources. If this adaptation is not timely and accurately done, the competitive advantage can be lost. Cloud technology is an example of following new trends by all three firms. A correct TF prediction can also save money by cutting some existing investment in SD that will become obsolete in the near future. Under these circumstances, the investment in SD backed by TF process is efficient.

MICT SETA bureaucratic requirements often could delay the decisions of investment in skills that follow the TF signals. For this reason is difficult to optimise the investment in skills using MICT SETA framework as participants say. These priorities are effective at IBM SA and Cisco SA because the firms have a flexible strategy and a bigger organisational slack and can afford to invest in training without MICT SETA incentives. Furthermore, at Cisco SA, DiData and IBM SA, TF is prediction driven not invention driven and following their HQs' TF processes from their HQs.

5.2.1.4. Proposition 4: Efficient exploitation of business opportunities requires investment in SD

The potential to earn above-average returns shapes a business level strategy in firms that become effective when focus on the exploitation of core competencies and develop core competencies that will be needed in the future (Shankar & Bayus, 2003).

Commonalities

Because all three firms are not innovating, but intensively exploiting their existing products, the certification and licensing are important for obtaining maximum profit during their daily business activities. Similar to IBM, Cisco SA and DiData often retrench large numbers of their employees because their subsidiaries have less strategic importance. The decision follows the HQs intent because of the diminished role of the subsidiaries. Cisco SA and DiData mandates do not contain the execution of strategic functions but of routine functions to exploit existing products and processes. Cisco SA' exploitation of its competitive position in South African market determines the focus on selling exiting products (Mooney, 2013).

Differences

IBM SA is working at projects that are not risky and involve routine knowledge. The investment in skills follows the same route. *"IBM SA is a structured organisation with little agility, static hierarchies and top down approach for change and no investment in explorations. Necessity to do things is higher than to innovate because we develop things already known."* (IBM participant)

The three core businesses are software development, hardware and services. *"When times are good they work in concert,"* a participant says. In bad times IBM is flexible enough to close the business, even a core one, that is not successful or in demand. For example, in 2013, IBM SA disassembled ST (service technical department) which underperformed.

Cisco SA has a privileged leading position in South African market and its strategy is the exploitation of their existing products by using a pool of subcontractors and partners to run its daily activities and “*always worked like this*”. “*Cisco [SA] focuses on daily activities with maximum return.*” (Cisco participant)

DiData is an integrator and closer to clients’ needs, hence, focuses on obtaining maximum profit from services on a daily basis. They are highly involved in daily routines and the exploitation of existing products because, in South Africa, the firms are not innovating but contributing to South African innovation climate. They all organize entrepreneurs’ networks online and IBM SA organizes IBM Smart Camp annual innovation competition (IBM online documentation).

Discussion

The findings are aligned with the ideas generated by McKillip and Owens (2000), Gleason (2002), Bruggink (2003 and Von Konsky (2008). Further, Arnold (1997) says that in order to explore or to innovate, the firms must firstly be knowledgeable in their exploitation skills and routines. The three firms studied invest in certification and licencing to maximise their daily businesses and to exploit their core competencies as Zack (2002) debates. On the other hand, MNEs’ HQs allocate mandates and coordinate the activity in branches. The study found that there is no budget allocated by the HQs for R & D skills in their South African studied branches. Mooney (2013), Filatochev and Wright (2011) discuss the relations among branches and HQs and why the HQs have a specific approach within the South African NSI context. The study found the link between the decision to invest in SD for exploitation activities, the business mode of the branches and the mandate allocated by HQs that follows the projection of the host country perceived as a risky investment destination.

The outcome of literature research shows that the host country must do more to change the negative perception of HQs and influence them to invest in R&D and innovation skills. In addition, the exploitation mode affects the branches forced to

downsize and retrench their employees and this affect all branches studied. Notably, the retrenchment in IBM SA affects a larger percentage of employees because IBM has lost share values.

5.2.1.5. Topic 1 Summary

The study found that Cisco SA and IBM SA are extremely efficient in exploiting others' knowledge by acquisitions and should enjoy some long-term success as an exploiter. They have TF processes to detected destructive technical change that could affect their strategic planning. Data collected at IBM SA and Cisco SA shows that exploration and exploitation typically occur in different branches designated through HQ mandates, part of the global strategy of the corporation.

IBM SA is cautious in investing in skills and monitors the outcome of this activity using the value of return over time. Zack discusses exploitation activities in firms in line with Cisco SA's case, as the firm has the opportunity to exploit its existing technology platform because of its leadership position in the South African market. The researcher found alignment of data collected with literature reviewed about the danger of long-term exploitation. "*Exploitation without exploration will ultimately result in trying to pump from a dry well*" (Zack, 2002).

The study found that DiData does not produce innovations, as defined in chapter 1 of this study, but offers clients innovative solutions, based on business innovation in finance and ownership. It has intensive exploitation activities, competing and winning big deals in South African market, as literature confirmed that branches of MNEs from emerging markets perform better in other development markets or their own than MNEs from developed countries.

Below is a qualitative variable table with the four qualitative measurements of the variables allocated by the researcher to Cisco SA, IBM SA and DiData.

Table 5. Qualitative variable table for topic 1 with the evaluation of the four dimensions

Level of measurement	Share vision and value	HR & Leadership	Technology foresight	Exploitation
High (5 and 6)	Cisco SA (6)	Cisco SA(6)	Cisco SA (6) IBM SA (5)	DiData (6) IBM (5)
Medium (3 and 4)	IBM SA (4)	IBM (4) DiData (3)		
Low (1 and 2)	DiData (2)		DiData (2)	Cisco SA (2)

The table shows qualitative measurements of the four dimensions studied as part of the first topic. The researcher allocated two units for each of the three possible values of the dimensions studied: high, medium and low intensity.

Cisco SA scores high on all but the exploitation part because Cisco SA works through its SA business partners and intervenes only to fix difficult technical problems as a high-tech node of knowledge. IBM SA has many values marked close to Cisco SA's values but focuses less on sharing values and vision with their employees. However, these small differences count. DiData is service focused, with a conservative culture but successfully client centric.

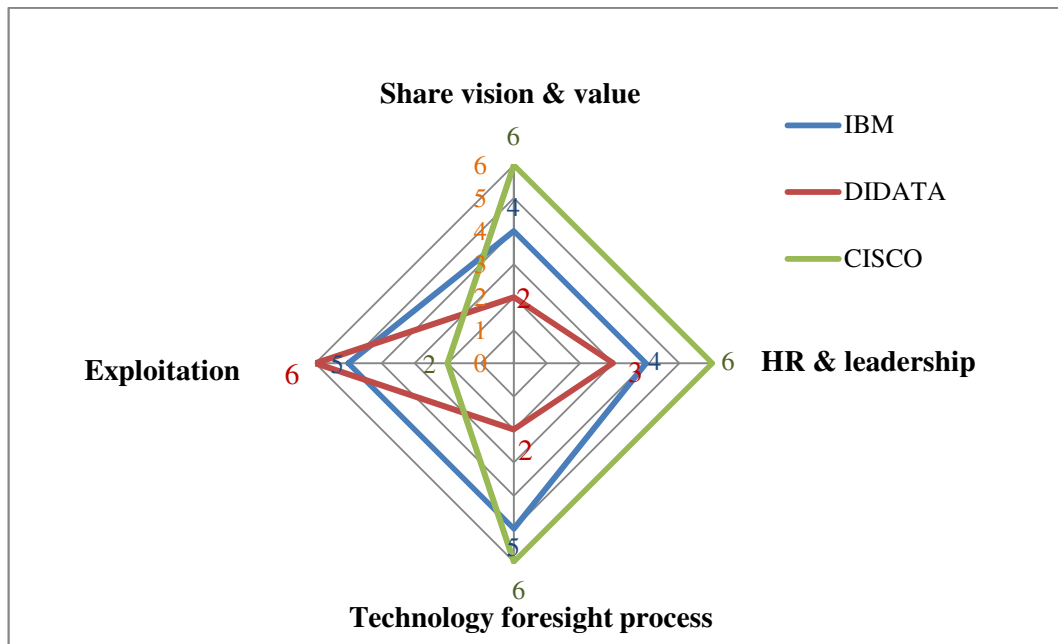


Figure 4. Cases comparison – Topic 1

The above graph visualises the outcome of the cases comparison process. As all dimensions are interrelated and affect the efficiency of investment in SD, a larger area displayed reflects a more efficient investment in skills in that firm. In Cisco SA case, the investment priorities are towards technological transfer, but internally focused. Cisco SA connects its clients through networks of partners and subcontractors only giving expertise on request. High employee commitment and strategic HR collaboration are present at Cisco SA. IBM SA shows less employee cohesion, lacks business foresight and has no service department in place. The branch turnover shows about seven percent decrease from 2013 to 2014. Dimension Data focuses on exploitation in a conservative climate with lower internal collaboration. The outcome of the TF process comes from its owners, NTT, and has an informative role because DiData has no R&D or innovative structure at local or global level and uses TF signals for acquisitions and mergers.

5.2.2. **Topic 2:** Factors, processes and routines that shape the efficiency of investment in SD

Mechanisms of learning and monitoring learning performance are management tools and represent the operational part of transformational capabilities. They

depend on how employees stick to the learning culture of the firms using their soft skills and their high potential or talent. The following propositions deal with these dimensions.

5.2.2.1. Proposition 5: Efficient training / learning routines require investment

The application of strategy in practice requires running events by using routines and applying rules to make the strategy closer to reality.

Commonalities

Knowledge based firms' investment in skills is bias towards employees' specific skills and this is a characteristic of firms in the ICT sector as the literature researched shows, but the case is also SA contextual. Cisco SA, IBM SA and DiData invest in e-learning routines, and recently in mobile learning, because these are efficient learning mechanisms. Nevertheless, the three firms use internal training for a better way to monitor performance.

IBM SA deeply uses e-learning and online workshops, seminars and global video conferencing and has "*unlimited resources*" for learning on individual basis using online technologies and e-learning courses. IBM SA also started to use mobile applications for training.

Cisco SA trains its employees through the Learning and Development Department across the EMEA region. Cisco is the initiator of "global e-learning" that optimises investment in skills development and from an early stage implemented and invested in E-learning and online courses because it was and remains an appropriate way of learning by using global connectivity.

DiData is also using e-learning methodology to train its staff all over the globe using the same high quality of content but with fewer resources.

All three firms studied prefer to use their own infrastructure and trainers for SD because "*it is optimised and easy to monitor the trainees' learning performance.*"

as a participant says. Additionally, HR managers and employees have regular one-on-one discussions regarding career advancements outside the net.

Differences

IBM SA invests in a very diverse training content with a lot of attention on soft skills. At IBM SA, business requirements connect to investment in SD with advanced mobility to reinvent business as Danneels (2008) says regarding the second order competencies, meaning to learn new tasks fast and to cannibalise old knowledge. Both IBM SA and DiData use MICT SETA incentives.

Cisco SA relies less on MICT SETA incentives but applies internal training and certification to its technical staff because it makes better use of its resources.

There are cases when Cisco needed training from IBM to learn special platforms at global level, like “*Worksphere*” and the benefits were high. The training was special, involving a big Cisco team set up on the IBM site for a long period for learning a special platform and this can be similar with DUI (doing using and interacting) learning. Hence, the special training on core competencies and TF signals does not take place using e-learning, but standard classes with high tech coaches and a non-routine curriculum based on DUI.

DiData uses e-learning at all levels of training and answers to TF signals or technological change by using pilot training in small classes to avoid unnecessary expenses.

Discussion

Teece et al. (1997) say learning is a dynamic capability that is sector and context specific, so its efficiency is dependent on the firm’s location, as Keep and Mayhew (2010) and Warhurst et al. (2004), cited in Jones and Grimshaw (2012) say. E- Learning, an innovation in education, is a training mechanism called new learning ecology (Hall & Brown, 2009) and it is intensive and interconnecting. All types of training must address changing demands for skills (Tether et al., 2005; Figueiredo, 2010; Jones & Grimshaw, 2012) if training is to fit the job

requirements. Beside e-learning, a new learning technology called mobile learning, related to e-learning, augments the context of formal and e-learning education and is for individual use (Pachler, Bachmair, Cook & Kress, 2009; Brown, 2005).

The researcher's argument here is that effective e-learning operational routines positively influence the efficient investment in SD and that the firms' management uses the up-to-date technologies and online forms of IT learning routines with high efficiency. This is in line with the e-learning literature that says that global corporations use learning mechanisms in the global context of their structures, sharing resources and opening an internal knowledge flow among all global branches. The researcher found from the data collected, and the evidence from literature review, that the issue of online training content globally available is seen as a standard curriculum for all. In addition, the HR consultants use the standard online training and learning resources for all staff but they have open individual discussions with the employees during the training or at the end of the course (Kranz, 2008).

For special disruptive technical change, training takes place in overseas HQs or in routine classes, located in special branches, using intensive live coaching and mentoring under business secrecy.

5.2.2.2. Proposition 6: Management and leadership monitor and reward employees' training and learning performance

Organisational control uses effective tools to compare actual results with expected results and suggest corrective actions for this alignment to take place (Venkataram & Sarasvathy, 2001).

Commonalities

IBM *“Executives measure the outcome of investment [in skills] at regular basis; Management and leadership leverage mobility to reinvent business. Management*

and leadership prioritise investment and allocate resources for SD” (IBM participant in line with Sull and Lester (2009)).

IBM SA regularly monitors employees’ learning performance through online courses, which have a final mark allocated for each trainee and are further used under IT SETA framework for skills development plan projections. There are schemes to monitor performance with rates from one to four but the method is criticised by many that say the monitoring “*is making you to work like a dog*”. Quarterly HR consultants discuss with employees ways to develop their careers and Career Smart as a project proved to be very successful, as participants say. This program guides the employees for their individual careers.

Cisco Performance Connect project tracks all employees’ learning performance and informs managers who initiate robust discussions with employees in line with Ellinger et al. (2002). Furthermore, Cisco is the initiator of “*global e-learning*” that optimises investment in skills development as well as other online streaming applications like “*Field e-learning*” that allows the managers and employees to train, collaborate and track their performance. Cisco SA monitors, trains and coaches its employees on a regular basis, using a large technical arsenal. The firm uses High Touch Human Resources to make employees integrate faster and “*feel like home*”. The “*Mid-Year Career Discussion*” is an event for all employees on individual basis and the “*Performance Connection Program*” is used for individual performance appraisal. All these programs have a strong monitoring component, obtained using one-on-one communication. A participant says, “*Cisco rewards non routine achievements.*”

At DiData, HR consultants have frequent discussions with employees to monitor their careers. Likewise, HR and management reward their gurus in Dimension Data Hall of Fame where at present “*are rewarded 34 gurus*” who brought exceptional success to the firm, as participants disclosed. DiData is a learning organisation and firms that apply this model achieve financial performance as Ellinger et al. (2002) say. If the learning organisation model produces

performance, the consequence of this performance produces an efficient investment in SD.

Differences

IBM SA monitors its employees by performance appraisals and rating grids with written reports to management and feedback from the ROI in skills. Regular set up of robust one-on-one discussions between employees and managers for career guidance or using Career Smart and Career Framework are successful monitoring tools. “*At IBM SA, reward is for executing the model*” so IBM rewards routine work done perfectly, but the reality is that the rewards are skewed towards the top leadership as data collected showed.

Cisco knows to motivate its employees because they own Cisco shares, given as incentives. The rewards are many but ESOP (Employees stock offer plan) motivates their training and learning. Cisco leadership addresses any extant treatment of behaviour within or external through implications of self-interest and the resolution of conflicts through ownership.

Primary and secondary data show that DiData does not have a formal learning organisational structure and monitors the employees’ learning performance using software performance appraisal embedded in the e-learning courses part of the DiData database. This is generally considered an objective way to monitor the employees’ learning achievements but there are subjective rewards attached to Management and leadership training skills activities aligned with what outliers state.

Discussion

The researcher found alignment between data and the literature as Sull and Lester (2009), Ulrich (1999), Venkataram and Sarasvathy (2001), Ellinger et al. (2002), Senge (1991), Jones and Grimshaw (2012) and Armstrong and Taylor (2014) say. People who are well motivated, take action towards achieving their clearly defined goals and their effort is a consequence of their motivation. The following

findings confirm the statement above. Motivation theory talks about human needs that direct human behaviour in line with Kashdan, Rose and Fincham (2004), Sull and Lester (2009) who argue that measuring learning performance activities and rewarding employees' achievements help managers to internally allocate and shift cash resources and talent distribution. This is part of the firms' agility. They and Ellinger et al. (2002) further discuss that the model of learning organisation in firms implies accurate monitoring of learning performance and, furthermore, efficient investment in skills. Ulrich (1999) suggests monitoring performance using online technologies. Locke and Latham (2002) say that the employees need feedback from their managers to adjust their efforts towards their goals and Kontoghiorghes, Awbre and Feurig (2005) confirm, their findings that learning organisations monitor learning performance in the best way compared with other firms by inducing efficient investment in skills and performance.

Clark (2006) argues that monetary incentives are better at boosting performance than non-monetary ones and this argument is in line with less motivated DiData employees recognised in DiData's Hall of Fame. Cisco obtains more overall motivation because of the equity distribution of value through ownership of shares. The rewards are in many forms and if are subjectively distributed could create less commitment among the employees and finally less efficient investment in SD, and that is aligned with equity theory which says that humans like equal treatment. IBM SA and DiData often treat unequally their employees by skewing rewards toward top management and this creates dissatisfaction and lower performance.

5.2.2.3. Proposition 7: Soft skills, management and leadership, innovation and creativity influence the investment in SD

Organisational culture refers to the complex set of symbols, ideologies and core values shared by the employees during their business activities. The culture is the glue that links – or fails to link - all employees and drives the success in firms. Employees need to be good at collaboration, networking, team learning, management and leadership skills, innovation and creativity skills in order to

create an openness, trust, autonomy and competitive climate in their firms (Hitt, Ireland & Hoskisson, 2005)

Commonalities

The data collected from the participants of the three firms pay attention to their internal networks of employees and the knowledge flux among departments and business units using online technologies and mobile applications to keep in touch and communicate new tasks, rules and successes and failures. Internal networks of communication among employees support the knowledge flux for an efficient investment in SD. The literature researched is in line with all the data collected from the participants regarding actions taken in the firms studied to build a large number of virtual networks and ecosystems for engaging their clients, partners, suppliers and subcontractors in a robust exchange of information and further knowledge. This directly influences an efficient investment in SD.

Although the firms studied are resourceful and sustainable, they have decided not to innovate in South Africa. Consequently, they do not invest in innovation or creativity skills or R&D skills for innovation despite their high potential innovation capabilities. They screen the SA environment for opportunities and clients' needs using their SA virtual networks and all their global networks.

All firms have no formal R&D department but they invest in training courses in team building and team learning skills and management and leadership skills, where there is a high need that is significantly higher than at global level. Leaders support collaboration and teamwork through councils and boards linked to the firms' existing structures.

Differences

IBM SA creates networks of South African suppliers, partners and emerging entrepreneurs because this is what globally the firm has done as a strategy for retaining its competitiveness. Ecosystems like Watson, Big Data Insights and Global Entrepreneur helps hundreds of SA start-ups to strengthen their business

models at global level and these activities align with Zack (2002)'s view. IBM is *"like ships floating in a sea of public knowledge"* with its high business performance dependent on its networks' strength (Cantwell, 2005).

Cisco CEO decides to direct his activities towards socioeconomic changes in Cisco SA's approach to creativity and innovation *"for SA benefits"* (participant). Cisco has a culture of shared vision and team learning and rewards teamwork and projects.

DiData is active in a kind of *"applied research based on clients' needs"* with soft and management and leadership skills in high need. Relations among DiData people are open but not always functioning well because of personality differences between technical gurus and the rest of the staff. Notably, DiData has a weak internal network and weak collaboration among departments, compared with Cisco' culture of shared vision and team learning. A participant says, *"DiData concentrates externally better because it is client centric."*

Discussion

Soft skills like collaboration, networking, communication, team learning, management and leadership skills together with innovation and creativity skills are the backbone of a firm's culture and in line with Jaruselsky, Loehn and Holman (2011) who state that the firms that have their culture aligned with their general business strategic goals possess a huge advantage. Zack (2002), Criscuolo (2010) and Haskel, et al. (2010) argue about the importance of networks and ecosystems for the transfer of knowledge that will make the leadership decision to invest in innovation skills less risky. Teece, et al. (1997) say learning for innovation skills is a transformational capability where knowledge unfolds to recombine, resulting in a non-routine high cost process.

Furthermore, innovation is taking place in firms with strategic alliances, part of a strong NSI (Freeman 1991) and capable of diversifying their knowledge by following their strategic goals. Powell (1999) relates the number of IPs with the

type of collaborative networks and Eisenhardt and Schoonhoven (1996) say that the semiconductor industry in the USA shows that successful firms in ICT industries, that are pioneering new technologies, need strong alliances to succeed. Further, Criscuolo et al.(2010) argue that global enterprises are more innovative than local firms because they contact a larger pool of knowledge and understand local clients' needs better.

Management and leadership skills are globally deficient and all participants of the studied firms claim the same gap exists among their employees or among the pool of local candidates because effective managers need to be “*system thinkers and better learners*” (Senge & Sterman, 1992) and have a global perspective. MNCs [like Cisco IBM and DiData] “*must act locally but think globally for the future*” says Senge and Sterman (1992). These findings are in line with Kotter (2008) who says that collaborations and networks are facilitating internal and external knowledge flow that should result in higher efficiency in investment in SD. Further, the corporate culture can influence the firm's performance in the long term.

IBM SA, DiData and Cisco SA invest in soft skills for more than half of the total investment in SD and they are all client centric hence, investing significantly in client education for new products. However, the lack of innovation focus could downsize the importance of the subsidiaries, among others. Hence, the local leader can change the situation towards building a permissible climate for innovation (Dörrenbächer & Geppert, 2011).

5.2.2.4. Proposition 8: Investing in talent management skills to win the war on talent

The current challenge in managing talent in today's global environment is one of the most difficult tasks facing managers who should strategically manage high potential employees (Stahl et al., 2012).

Commonalities

“At the same time, IBM seems to have this ridiculous expectation that employees should be loyal. They are disgruntled when critical talent [like myself] leaves for a better opportunity” (IBM article).

All firms studied failed talented [high tech] staff in many cases because of lack of talent management skills. This is in line with literature that reveals barriers to corporate advancement of talent located in subsidiaries and the barriers to promotion of employed talent to the level of the upper echelon management teams. Arguably and following the participants’ answers, all three firms are using their global pool to distribute talent in branches where the needs are bigger. The event of *“local employees becoming global”* or *“glocal”* is an effect of globalisation. Despite this mechanism, talent is scarce and continually poached by all three firms.

All firms have talent management training outside South Africa and only Cisco trained a larger number of high performers compared to IBM SA and DiData. The relation between technical talent and learning performance is obvious and if a firm has a large pool of talent, their investment in SD should be efficient. These studied firms do not optimally perform talent management as a strategic function and they should invest more in talent management skills. The need of talent management skills is an issue that exists at the global level in all firms. *“Companies around the world have made talent management a top priority, and therefore, such activities are marked by a relatively high degree of sophistication. Yet, few HR professionals, senior executives, and line managers appear to believe that their organisations have fully solved the talent management puzzle.”* (Stahl et al., 2012) The researcher’s findings show that the firms do not effectively align talent with their strategy and culture. For example, IBM SA retrenches entire departments without looking to save its talents and send very few to high tech core training. Cisco SA rewards non-routine work only if *“all could benefit”* and DiData HR has problems to recruit and retain talent on a daily basis.

Differences

IBM recently bought an innovation software application in talent management systems called Kenexa that “*makes redundant all talent management consultants*” (IBM online).

It is common practice at IBM SA to find talent to train for the new tasks and for possible redeployment to another internal or external branch. In case of leadership and management talent, IBM SA uses rotation of employees across divisions to familiarise them with the firm’s organisational aspects. When IBM SA decided to cut the activity of the Service Department, it retrenched all Service Department employees with no regard to whether they were high potential employees or not (IBM SA online).

At Cisco, a new project called “*Globalisation of the corporate brain*” has the goal to decentralise main Cisco activities to all its branches in the world and to provide opportunities for sourcing talent. “Piloted Talent Connection” is a project used by all HR departments to search and create internal teams of talent for new innovative / job opportunities.

DiData hunts and recruit talent in many ways but they intensively use LinkedIn for a faster search. The talent for management and leadership positions is scarce and DiData is filling the gap by training. DiData management prefers an internal organic growth of talent because “*DiData preferred to breed talent or to grow the oak tree than to buy the oak tree but in cloud technologies SA has few technical skilled available. Therefore, DiData must recruit from overseas and it is difficult under protective SA laws. DiData is often recruiting talent from its clients and loses the war for talent to bigger one like Cisco or Microsoft*” (DiData participant).

Discussion

Snell (2011) argues that talent is under globalisation pressure, depends on demographics and it is scarce for jobs where problem solving tasks and innovation skills are needed. HR employees or talent managers should nurture talent because

it is a strategic scarce resource and part of strategic human resource management that manages high potential human resources to fulfil the firm's strategies. The issue here is that employees and employers have different views regarding their conditions stipulated by their contracts. Leaders want talent on demand and employees want job security and this is in line with Collings and Mellahi (2010) that debate the role of the top management teams at HQ level that used to make decisions about talent management that resulted in overlooking talents at subsidiary level. Furthermore, they say that subsidiaries get rewards (or punishment) for their own performance, so it may be in their interest to keep their best talent hidden. Therefore, leadership can make talent hindered and redundant.

The literature and the primary data have some contradictory views regarding the role of talent globalisation and subsidiaries' interest. An example is IBM SA that is screening talent in many fields of knowledge and expertise with a less effective talent management function at HR level. For example, during 2012 and 2013 only a small number of top IBM SA technical employees went to TOP GUN intensive training *"for re-charging their skills"*.

Talent search is a continuous process as Chambers et al. (1998) acknowledge and moreover, Quelch and Bloom (1999) say that the scarcity of technical talent is now *"biting into companies' bottom lines through high staff turnover and high training costs"* and these are following firms' bad talent management. Lesser (2006) says that HR must have a strategic role in finding talent, not only an administrative role considering the workforce demographics and the effect of employees' retirement. Becker and Huselid (2006) argue that if employees contribute to a firm's strategic objectives they have strategic value similar with what Wellins, Smith and Erker (2009) say. Meyers et al. (2013) discuss how to maximise profit by using talent and whether it is better to nurture versus to acquire talent. Ferrier and Hilgart (2014) link innovation performance to talent management and HR function because talent management has become a standalone organisational function.

Consequently, investment in SD is efficient if talent exists and the firm properly manages it. Local branch leaders' behaviour regarding sharing talent with their global HQs is a subject for further research because the research data is not yet available in order to develop a sustained argument.

5.2.2.5. Topic 2 Summary

Aligned with literature and findings, this study found that IBM SA and Cisco SA are using a larger pool of global databases containing technical documentation and training material in many fields (IBM) or niche fields (Cisco) and they develop their certification programs for firms like DiData.

Firstly, their learning mechanisms are diverse and better developed than DiData, a follower. Secondly, the monitoring and rewarding functions, part of management of human resources are deficient in IBM SA and DiData. The participants' answers aligned with findings from secondary data and literature show that the bias towards top management retributions and the non-monetary rewards are not effective for staff motivation. Thirdly, the soft skills contribution is high for boosting firms' learning culture in IBM and Cisco but less in DiData, which projects weak internal networks and skewed and biased rewards for management and leadership skills training that result in less efficient investment in soft skills. Fourthly, talent management performs better at Cisco SA that has certified a large number of high potential engineers through their top courses while IBM SA and DiData are cautious and prefer to outsource talent, despite their management discourses.

The qualitative variable table uses the four dimensions part of topic 2 with their qualitative measurements that influence the ROI in SD.

Table 6. Qualitative variable table for topic 2 with the evaluation of the four dimensions

Level of measurement	Mechanism and routines	Monitor and reward	Soft skills	Talent management
High	IBM SA (6) Cisco SA (6)	Cisco SA (6)	Cisco SA (5)	Cisco SA (5)
Medium	DiData (4)	IBM SA(4); DiData(3)	DiData (3) IBM SA (4)	IBM SA (4)
Low				DiData (2)

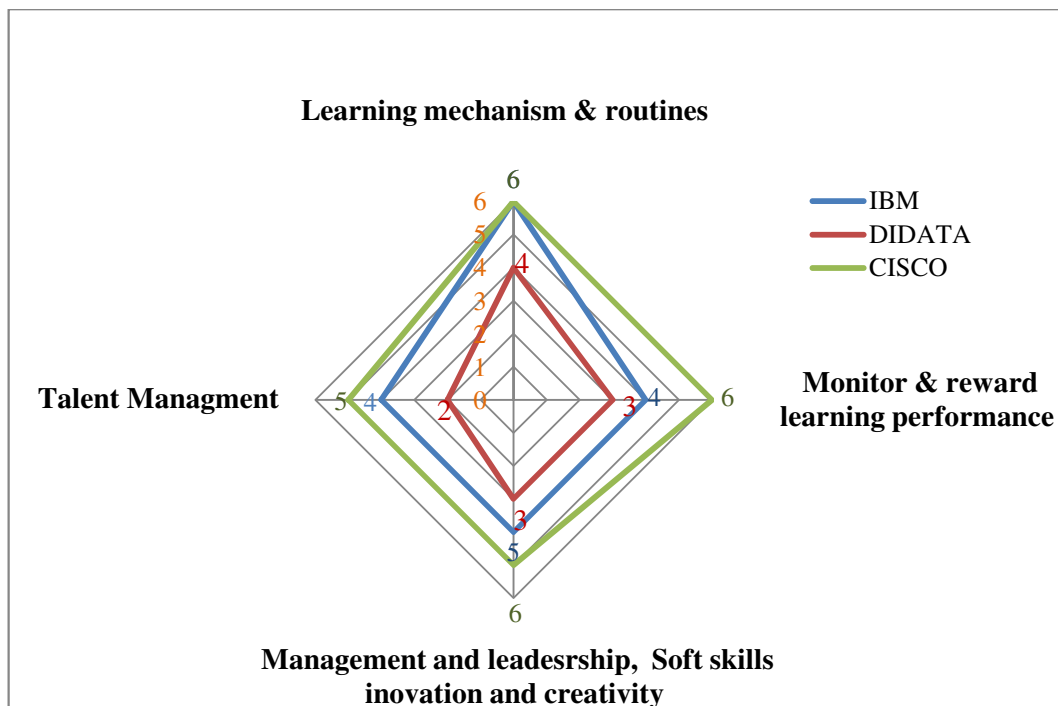


Figure 5. Cases comparison – Topic 2

The graph above represents the link between the four dimensions discussed above, in the first section of topic 2 summary. The graph part representing DiData reflects a less open culture, no formal innovation activities but an innovative informal approach to clients' needs and less talent management skills because talent is required only for their business routines.

IBM SA shifts its focus towards short-term profit with consequences towards openness and employees' commitment and Cisco SA is a pragmatic strategist for their employees who achieve management cohesion and alignment.

5.2.3. **Topic 3:** South African context influences investment in SD

SA academics and government use the imported concept of NSI in debates around how SA performs as a FDI business location.

Proposition 9: Investment in skills development within IT SA context

Commonalities

All three firms invest in CSI projects contributing to the reduction of the country's shortage of skills and poor education and further, to a faster integration of graduates into the available job positions. They all support entrepreneurship programs using their staff vocational contribution and they use these activities to boost their business image when they compete in parastatals or government tenders. The tender forms contain special references to the contribution of foreign firms to South African social progress. Further, the arguments and opinions part of UNIDO (2012), DST (2012), and OECD (2014) are in line with the findings.

The firms studied align their investment in SD to the skills deficiencies and overinvest to correct these deficiencies by keeping a track record of the rapid changes in the ICT sector, the creator of the "new economy". These ICT firms are highly "*misbehaving*" in production factors because they are using human and intellectual capital plus tacit and codified knowledge (Teece & Pisano, cited in Tylecote, 2007) that determine high investment in SD for competitiveness and high returns. The skills used by South African ICT sector are highly sought after with South Africa displaying skills gaps, mismatch, brain drain, weak general and university technical education.

IBM SA, Cisco SA and DiData also get incentives from the IT SETA Government scheme. In Jones and Grimshaw (2009), successful schemes are flexible, demand-driven and accompanied by an information campaign and technical assistance.

However, contradicting the literature, all participants complain about IT SETA slow pace in SDP approvals and this issue can damage the response to technology foresight signals.

Differences

At IBM SA, *“We overinvest in skills it is more than sixty per cent from the total running cost.” (IBM participant)*

“Our SDP is IT SETA approved and Government audits us at regular intervals; consider us the best and the auditors like Career Smart. IBMers in SA lack soft skills and business skills and local technical staff is not sufficient trained.” (IBM participant).

South Africa has pockets of excellence in skills, as an outlier says, *“There are high skills in this country in financial sector at the level of top class international firms.”* This statement is on line with DST (2012) opinion.

A Cisco participant says that there is a need of *“70,000 network engineers in the next years and cloud technology skills are not part of available SA pool of skills”*. The goal of all there firms is to integrate in the local culture for a better overall performance. Further, Cisco is an innovator in organisational structure because it created a new department called Globalisation Department for implementing its project to decentralise all Cisco main activities to its branches for a better global collaboration with the world.

“We launch our work in emerging markets countries with a memorandum of understanding of sorts with each government to form private/public partnership to address their most important issues such as improving healthcare, education and economic opportunities” Wim Elfrink, the Cisco Corporate Globalisation Officer.

DiData is intensively using MICT SETA incentives. However, MICT/IT SETA is full of red tape and not aligned with technological change as a participant stated and his statement is in line with DST (2012). DiData leadership approved large investment in Saturday school, DiData University and other projects like Hands, Hearts and Heads. It also invests more than other branches in CSI projects.

Moreover, DiData is a huge contributor to reducing the youths and women's skills deficiencies at general and technical level. The firm invests in these projects using its employees who enthusiastically volunteer for this work.

A DiData participant says that South African skills challenges is like "*a continue journey*" and it is not "*a back foot to the world*".

"It is an urgent need for a relevant solution in South Africa in SD to put South Africa at the forefront with out of the box thinkers." (DiData participants)

"Our differentiation is not merely in our footprint but in our ability to provide local, in-country expertise and delivery capabilities that few companies can match" (Dimension Data, 2007, p.12 cited in Meny-Gibert, 2012).

Discussion

David and Foray (1995) argue that, in the framework of the national system of innovation concept, like SA NIS, discussions are not properly emphasising the distribution of knowledge and the concept of a knowledge-based economy. South Africa is a special landscape with skills deficiencies in all high tech sectors. As global leaders of their sectors, these MNEs represented at South African branch level have an important role to play in transferring knowledge to other firms for the "catch up" phenomenon, which benefits "followers" who learn from this transfer of technology (Vespagen, 2005). Furman, Porter and Stern (1999) discuss the role of government in NSI pointing out the need to downsize its role in creating NSI innovative capacity in contradiction with Harney (2007) and Fairbrother (2007) who see the government's important role in the development of the economy. South African NSI must follow its own development without copying from SAP, imposed by IMF or other programs as Viotti (2002) says and is weak as Lorentzen (2009) and DST (2012) say.

The way to define a good government as La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1999) argue is first through assessing the achievements in education. There are statistics with high level of unemployment and high brain drain issues as discussed in Statistics South Africa, published in 2014 Quarterly Labour Force

Survey. Scerri (2014) talks about South African NSI proposing a module based concept for its ownership and Adrian Scofield, the expert and author of JCSE ICT Skills Survey done by JCSE WITS over six years period, says that it is clear that South Africa is falling behind its peers in Africa (countries like Kenya, Nigeria and Egypt). Both authors place greater emphasis on the contribution that technology plays in economic growth: *“There remains a significant lack of improvement in South Africa’s basic education as well as exposure to and familiarity with ICT. Learners need a better understanding of the ICT sector to equip them to adapt to the modern tools used in everyday lives.”* says Schofield.

Despite critics, there are positive statistics in the SONA 2014 report where the President of South Africa says that “Student enrolments at universities increased by 12% while further Education and Training college enrolments have increased by 90%.” from 2009. In addition, South African government gives incentives for SD through the MICT SETA project and encourages the firms’ investment in SD. In South Africa, the existence of such incentive schemes like SETAs, designed after The Skills Development Act of 1998, contribute to market failure in the provision of training, with employers less inclined to undertake training themselves, but prepared to lure skilled and trained workers away from firms that had trained them by offering premium wages. SETAs are systems similar to those in other countries and adopted in South Africa for employers to be partially reimbursed for their investment in training. The claim can be up to 70 percent of the cost they incurred in approved training. Further, Human Resource Development Strategy for South Africa designates the principle responsible agents for SETAs as the Department of Education and Department of Labour. The productivity growth of the country over a certain period measures the efficiency of SETAs. At present South African productivity has negative growth.

Niosi (2012) says that South African NSI weakness has implications for innovation and Pouris and Pouris (2009) says that SA inherited a highly protectionist economic system with two unknown variables: learning and innovations in firms. There are critics of the South African NIS concept that fits

into the developed countries context hence, National System of Technical Change model could be a better approach.

Two of the MNEs' studied have the HQs based in USA where the system is characterised by a "triple helix model" that is the Government, universities and businesses as Etzkowitz and Leydesdorff (2000) explain while South Africa has broken links in its NSI. Moreover, the studied firms have the perception of South African business landscape as being high risk and avoid committing to R&D and innovation investments even when these firms are innovation performers and abundant in resources (O'Sullivan, 2004). Further, despite of their resourcefulness, the firms are cautious and should look into the future to predict returns after investment in technological capabilities for assessing the risk (Tylecote, 2007).

Finally, SA NSI is weak and the knowledge flow has many dead ends. SA is in the category of developing countries with pockets of excellence but at MNEs HQ level, the overall perception is negative. In conclusion, MNEs investment in R&D and innovation needs special attention from South African policy makers. Furthermore, DST (2012) statement regarding the role that business should play in R&D and innovation needs a lot of work on South African side, as a host country, in preparing technological capabilities that will facilitate the technological transfer, as discussed below.

The study found that the goal of South African government is to stay abreast for ICT technologies (Akooje, 2008), developing skills aligned to demographic changes and equity imperatives. These goals are also costly for these studied firms to follow because there are logistic costs involved in searching for the proper candidates to fit the transformation criteria. *"We do not find women engineers for our positions and business skills of technical candidates are poor but the biggest costs are the universities graduates who take two to three years of internship to be Cisco qualified"* (Cisco participants). Hence, the skills formation agencies should pay attention to employable skills (Brown, Hesketh, & William, 2003) and South

African universities must update their curricula following “The Third National Skills Development Strategy” DST (2011). Another piece of advice is to enhance the importance of partnership between private and public sector and other stakeholders for alignment of curricula with market needs and policy makers.

Another major deterrent is the skills gap and the lack of clients’ education in new technologies. Skills shortage is a major constraint on growth. In 2007, there was an estimated shortage of 300,000 skilled workers. The unintended consequences of affirmative action have decreased the pool of skills, as skilled minorities have emigrated. In addition, the education sector is still not producing the type of skills the economy needs.

In conclusion and aligned with DST (2012) and DST (2008) as well NPC (2012), taking into consideration the context of South African market failures, the provision of training levies as part of the IT SETA program are a means of mobilising additional resources for skills development.

5.2.4. Topic 3 Summary

All the firms studied experience the weakness in South African NSI firstly through its skills deficiencies that create bottlenecks in knowledge flow. This will ensure that the parent HQs remain cautious in investments in R&D and innovation activities and skills. The three firms do not invest in R&D and innovations because of the negative projections and disabling factors in the South African context. The argument here is that South Africa host country characteristics and business factors influence the directions, priorities and intensity of investment in SD. All firms are looking to maximise their short-term profit and shareholder value with IBM HQs having the most intense focus on pleasing investors.

There are contextual causes that determine whether the MNES invest in South African R&D and innovation activities. Mosia (2012) and Samuel (2013) point out that the main cause of lack of investment in R&D is the FDI behaviour of maximising profits on short term and South African characteristics of poor

education, infrastructure and property rights. The situation may change if business government consultants will design policies.

All the firms studied behave in a certain way outside their borders when they invest in CSI or CSR projects. Several South African characteristics shape this behaviour and one of them is the ICT skills deficiencies. Therefore, the firms studied invest in general education and general technical education outside their borders using CSI and this investment contributes to a better business environment for them and for SA as a whole. The researcher focused on a number of factors/variables/ dimensions that contribute to the firms' efficient investment in skills of South African people's competitiveness. The following table uses the same three types of measurement for the four qualitative variables similar with the previous two tables with four different variables: transfer of technology, innovative capacity and R&D, CSI function and the transformational process related to investment in skills outside the firms' borders and at the level of South African society.

The first variable represents the way the transfer of technology outside the firms' borders takes place. The second variable represents the development of the innovation capacity that Porter (1999) defines by the number of IPs launched in a period and its link to R&D intensity. The third variable represents the CSI pool of projects implemented by the firms studied and the fourth variable represents the level of transformation from a white dominant to a fair representation of the demographics by applying South African legislation.

All these variables contribute to an investment in skills development with efficient results for the firms studied and for South Africa as a host country. No studied firm innovate but Cisco SA and IBM SA enhance the culture of innovation through supporting innovation competitions and emerging entrepreneurs (Cisco and IBM website).

Table 7. Qualitative variable table for topic 3 with the evaluation of the four dimensions

Level/variable	Transfer of technology	Innovative capacity and R&D	CSI	Transformation
High			Cisco SA (6)	
Medium	Cisco SA (4) IBM SA (4)		IBM SA (4) DiData (3)	Cisco SA (4) DiData (3)
Low	DiData (1)	Cisco SA (2) IBM SA (2) DiData (0)		IBM SA (0)
Projection IBM	High (5)	Medium (3)	High (6)	HIGH (6)

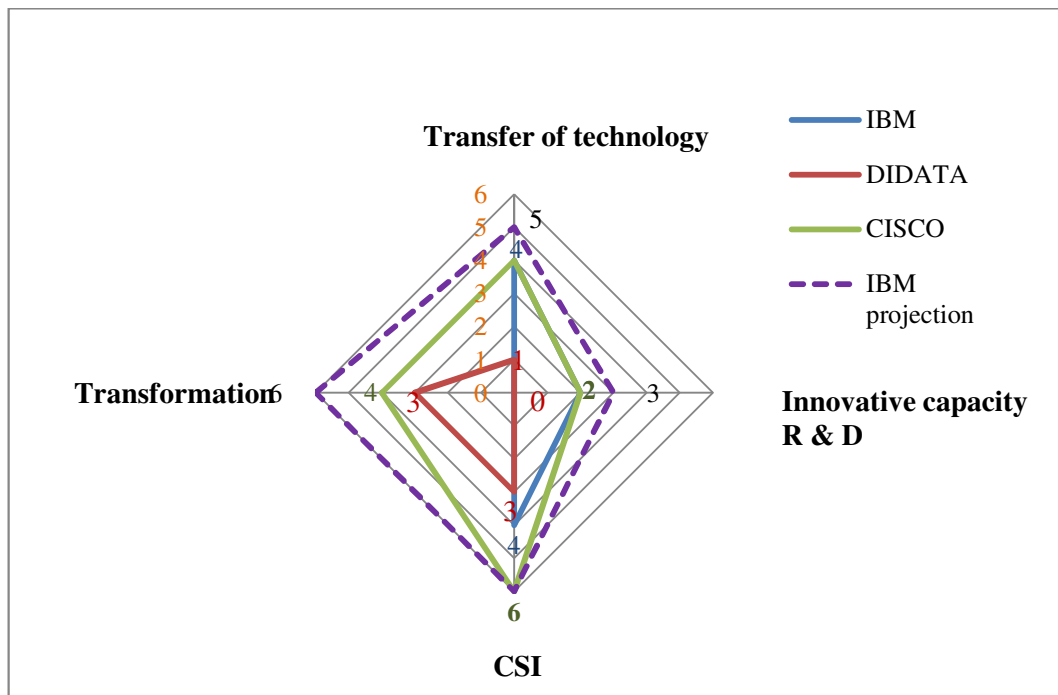


Figure 6. Cases comparison – Topic 3

The graph above represents the link between the four dimensions discussed and the value of the qualitative measured variables. The outcome points towards Cisco SA that has a better rating in transfer of technology because its focus is to train students in top technologies and not to transfer medium or low technical knowledge or in general education as the other two firms do. IBM SA works with universities in technical education but not in core ICT research. DiData is more involved in investment in skills development for social projects and its links with universities are not so active.

The South African government incentives for skills development offer all these firms opportunities to save part of their investment in SD in an on-going basis and IBM SA and DiData make intense use of them while Cisco SA offers niche certification and training to many firms, including IBM SA and DiData, being MICT SETA approved. If MICT SETA does not apply for special Cisco training, the firms pay for it because it is an investment in skills for their immediate business needs.

Transformation is an important socio political dimension that branches studied should apply to their workforce composition for the alignment to new South African laws and for social cohesion. Cisco SA participants revealed a higher level of transformation activities at their firm, which has the ambition to achieve the South African government targets despite the small pool of black skilled engineers available. The other two branches studied showed lower transformation. In January 2015 IBM global leadership promised to invest in SA R&D and high technical education seven hundreds millions rands over ten years period that should create a different perspective on how IBM SA influence South African economic development. The researcher added to the graph an estimated outcome of this investment represented by a purple interrupted line.

5.3. Chapter 5 Summary

The way parent MNEs perceive SA as the host country, and the SA NSI system characteristics are major determinants of the direction, priorities and intensity of investment in SD for all three firms.

The empirical findings are in line with the literature research on the topic of investment in SD. However, less alignment exists in government plans or ministerial reports regarding who should do the bulk of R&D and innovation in SA (DST, 2012; DST, 2008; NPC, 2012). One of the experts who participated to the interview says that MNEs in the IT sector do not create jobs [or many jobs] and another one says that their role is to transfer technology, but for this transfer to take place, South African Government must create technological capabilities.

CHAPTER 6 - CONCLUSIONS

6.1. Introduction

The goal of this research study was to find, under the topic of innovation studies, the answer to the research question of how the subsidiaries of ICT MNEs, part of the South African National System of Innovation (NSI), invest in skills. This chapter reaffirms the thesis statement regarding the way in which ICT innovative firms based in South Africa invest in SD and discusses the issues resulting from the findings based on the researcher's reasoning and on the evidence accumulated, followed by the conclusions reached by the research.

This chapter concludes by considering the findings of the analysis of the factors, conditions, processes and behaviours that shape the activity of inward investment in SD under the boundaries set by the research question. All through the history of economic development, a strong link between innovation and skills dimensions was the main factor of economic growth, and this study focuses on how the SA context shapes the link between the two dimensions.

Innovation is uncertain, contextual and path dependent, hence, South African NSI offers a different context for innovation activities, including ICT sector innovations, compared with other countries. Recently the intensity of innovation activities showed slow progress or stagnation and the South African government commissioned many academic advisory or recommendation papers in order to determine why this happens. Some of these papers comment on the involvement of business in R&D and innovation activities and underline the importance of this contribution for achieving a higher number of innovations. An example is DST (2012) which pays special attention to the role of FDIs and local businesses in R&D and innovation activities, calling them the main contributors. The firms studied, part of South African business sector and South African NSI, are branches of global enterprises or MNEs, with many innovations in the rapid technologically changing ICT sector.

On one hand, this research study focused on the way these innovative firms invest in SD at firm's microeconomic level and on the other hand, focused on how the SA context influences the investment in SD activity at macroeconomic level.

This chapter contains the synthesis of the empirical study, implications of the study, limitations, recommendations for further research and the conclusions.

6.2. Synthesis of the empirical study findings as answers to the research question

This study used a holistic approach that matches qualitative research methodology in the effort to answer the complex question of "How the innovative ICT firms based in South Africa invest in SD". The basis of the qualitative analysis was the multicase study of the data collected from participants and from the public domain under the findings from the literature research on the topic of innovation, skills, and innovative firms in the context of the South African ICT sector.

The research question sought answers in a SA context where, according to the Technology Ministerial Review Committee on the Science, Technology and Innovation Landscape (DST, 2012), the shortfalls of human capital are key weaknesses of SA NSI.

Innovation, the broad topic of this research study, is a highly uncertain process that takes place or not, in the studied firms, under many dimensions and subject to many circumstances. The most relevant dimension, correlated to innovation success in firms, is the set of skills as the main competitive resource and dynamic capability for innovation. South African NSI, a concept defined as the sum of all innovation activities within South African borders, is the stage for the three firms/actors. Innovation is contextual; consequently, the innovative firm's location determines the success of their innovative activities. The firms selected for this study are branches of MNEs that are global innovators in the ICT sector, resourceful and sustainable. On one hand, they are competing, on the other hand, collaborating by having special partnership agreements, like Cisco SA and DiData. Findings from the research of surveys in the public domain show that in the South African ICT sector there are few launched IPs. There are also few or no

innovative ICT South African based firms hence, studying the subsidiaries of firms known as global innovators, one should find the reasons for this situation.

The focus of the research was to determine which of all the factors that enable innovation, affect the studied firms' efficient investment in SD, how the three units of analysis behave in relation to these factors and which of these three firms displays a more efficient investment in skills.

The researcher conducted a multicase study of IBM SA, Cisco SA and DiData, firms that are similar in many instances but differ in the way they invest in SD. Further, the researcher analysed the literature review under the topic of investment in skills in innovative firms and uncovered three topics of major importance.

The first topic contains the main strategy issues in firms that are important in order for the research to find an answer to the *why* question: "*why the firms behave in the way described and why they invest in skills under the goal to stay abreast and be leaders in their sector.*"

The second topic contains the holistic analysis of the literature on management and operational tools in support of the *how* question: "*how efficiency of investment in SD could be achieved*" endorsed by research around the literature of firms' learning culture.

The third topic contains the broad analysis of literature under agency theory and globalisation issues in the ICT sector, specifically related to the question of "*how the contexts in which firms are active influence their innovation activities and consequently, their investment in SD in SA context*". Further, the researcher continued to refine the findings and this activity resulted in the final discussions of nine propositions divided under the three topics mentioned above.

The alignment with literature and data collected shows little or no differences at firm level in all propositions, which are part of topic 1, and proposition 6 part of topic 2.

Proposition 1/topic 1 is in alignment with the literature review findings of firms belonging to knowledge intensive sectors that overinvest in SD to be competitive, avert risk and be strategically flexible. Skills development is the main factor to create competitive advantage and, as the most dynamic capability in firms, must be properly planned.

Proposition 2/topic 1 follows the literature research findings on the collaborative role of HR department and HR management with the firms' leadership. HR manages individuals, leadership manages change, and both must fit into the firms' strategy.

Proposition 3/topic 1 found its alignment with the literature research because all firms studied drive their technologies to the edge of knowledge as ICT sector leaders and need to forecast the best ways to invest in skills ahead their competitors.

Proposition 4/topic 1 follows the literature review findings on agency theory about HQs allocation of mandates following a business model for maximising short-term profit.

Proposition 6/topic 2 considers monitoring and rewarding as a management tool under the firms' openness culture that works efficiently if proper measurements are in place and these findings are in line with the literature review.

All of the above propositions converge on the literature findings, but there are exceptions such as proposition 5, 7 and 8/topic 2, and proposition 9/topic 3.

Proposition 5/topic 2 claims, on one hand, that e-learning routines and mobile routines are the most efficient but, on the other hand, the researcher found that the firms use for the training of high potential employees normal off-line regular classes organized at headquarters. Despite the inconvenience and high costs, firms

have a different approach to skills development for disruptive technical change and over invest in technical training to prepare talented employees with knowledge required for the future.

Proposition 7/topic 2 claims that all soft skills are of major importance in the creation of a learning culture, as participants affirm, but innovation and creativity skills are ousted together with any innovation or R&D activities despite the firms' culture and experience in innovation through their global network. On one hand, the participants claim that management and leadership have exceptional qualities to create an ideal workplace in firms. Outliers have an opposite point of view that shows that management and leadership lack proper training and are misaligned to firms' values as found in DiData and IBM SA. Ambitious local CEOs may change the situation by designing a plan to shift from a marginal exploitation mode branch to an exploration and exploitation mode, but they show little signs that they intend to do so.

Proposition 4/topic 1 has valid arguments related to the priorities given to branches by HQs mandates but the proposition 9/topic 3 shows that the South African government review and advisory documents for R&D and innovation activities do not consider the motivation for the HQ decisions to allocate the exploitation mandates to their branches.

Finally, the findings revealed that Cisco SA has the best alignment between employees and firm's strategy and the best climate for innovation. Also Cisco SA has trained a number of engineers in top core high-tech skills because it shares a better vision of economic growth for South Africa through its ambitious locally based leadership. IBM SA has a strategy focused on growth and short-term profit, trying to increase shareholders' dividends, with negative consequences for its employees' commitment. Big Blue has been in turmoil since the end of 2013, looking for solutions by restructuring, reshuffling and deducting costs. DiData is strategically conservative and focused on systems integration and things that were "well-done" in the past. Cisco SA and IBM SA follow closely the technology foresight directions from HQs. DiData follows Cisco SA and its HQs. The firms'

mandates are in exploitation activities because the South African location is business risky, politically adverse to the free market and lacks infrastructure. This mandate can change in time and all depends on the host country's efforts to attract the FDIs.

Furthermore, through cross case analysis, valuable insights regarding how they invest in skills appeared. Learning and skills development are human activities, and the researcher found that the alignment of employees to strategic intent, together with the process of technology foresight for SDP and the alliance between HR and leadership are priorities. Furthermore, mechanisms of learning embedded with monitoring and rewarding tools help to enhance investment in SD. The glue of these firms is their learning culture infused with transparency, openness, autonomy and commitment embedded in their fibres with various degrees of intensity. The intensity of these attributes determines the success of the firms' investment in SD.

There is a multitude of research papers about skills and innovation but few are about investment in skills and innovation and fewer to none were in the South African context in branches of ICT MNEs. An academic from the South African Institute for International Affairs discussed the branches of MNEs related to what incentives should be allocated by the host countries, the only similarities with this research are some discussions regarding the IT SETA contribution to SD.

South Africa, as a business destination, is at present politically volatile and characterised by corruption and maladministration. The infrastructure for innovation activities is weak due to weak links among universities, businesses, research and standard institutes. Further, South African government documents, for example, the ministerial reviews and future economic plans already mentioned in chapter 1, reveal their opinion of the role of MNEs and FDIs in South African NSI and R&D. On one hand, DST (2012) and NPC (2012), as well as DST (2008), acknowledge the role of FDIs and branches of MNEs in boosting

innovation and economic growth in South Africa as a solution to the innovation weakness displayed by SA NSI.

On the other hand, the firms studied are intensely exploitative, with a focus on obtaining incentives for skills development and are short-term profit driven. There are skills deficiencies in South African ICT sector and South African government affirmative action and BBBEE policies are costly for MNEs to apply. This makes investment in SD expensive and not efficient. The present situation creates the possibility for HQs to decide that should downgrade the importance of South African branches compared to other branches of MNE's as a similar investment downgrade has already taken place in the South African automobile and mining sectors.

The three firms invest externally in SD, under the CSI framework, mainly in general education and support of young graduates, women and emerging entrepreneurs. These social projects are part of the firms' commitment to create social cohesion, but in a short timeframe, this general knowledge cannot contribute to the technical innovation advancement, but does provide much needed education for some.

6.3. Implications of the research study

3.1. The research study highlighted the connection between the priorities and intensity of investment in SD and the mandate allocated by the HQs to the branch as well as the connection between HQs' decision and the type of South African NSI. There is a strong connection between the way South Africa presents itself as an investment destination and the HQs decisions to invest in the long term and furthermore, the decision to invest in skills at branch level depends on the type of business model the local branch chose to follow.

3.2. South Africa as a business location projects a negative perception for FDIs because of the politics, infrastructure and skills factors that are seen as high risk by FDI. This negative perception is higher among FDIs who are not yet active in

the country than those that are now operating in SA and for this reason more must be done by government in creating effective advertising campaigns.

3.3. The effect of this FDI perception is the low level of investment in SD for innovation, transfer of innovation management skills and the non-existence of R&D activities in branches of these MNEs. Another effect is the lack of contribution of these branches to the increase of South African innovation and R&D capacity and the negative effect they project of the risk of downsizing or being dismantled. These effects are currently taking place in IBM SA, which is retrenching more than 40 percent of its South African employees.

3.4. To remedy the FDI negative perception, the government has to make sustained efforts to create incentives and infrastructure appropriate to MNEs needs and to amplify their role in the transfer of technology. The South African NSI links with MNEs branches need resources to function and incentives to reward creativity, innovation, and not routine work.

3.5. The negative perception affects not only the ICT sector but also all FDI activities in South Africa with grave consequences for economic growth, catch up capabilities, SMEs creation and poverty reduction. On one hand, the FDI perception is negative and on the other hand, the FDI numbers grew from last year by 4.7 percent, but this growth does not reflect in the creation of new jobs. Policy makers' task should be the design of more appropriate incentive schemes for FDIs that create jobs, differentiating them from the ones that do not.

6.4. Limitations of the research study

The research study has only three units of analysis that are too few to result in pattern recognition but only enabled a narrative interpretation of the findings. In addition, the limitations come from the large number of existing public and private domain documents about the firms studied, from which the researcher extracted the important ones.

There are functions, processes and constraints that the researcher did not include in the research framework and more needs to be analysed under this topic. The weakness of this research consists in the researcher's ambition to analyse relevant data from primary and secondary sources linked to expert opinions, which is a gigantic task of search, selection and solution finding. The firms selected are serial innovators and leaders, driving the global technical change in the ICT sector. They are global networks of firms, part of the most dynamic sector, and have been active for more than seventy years in South Africa.

The strength of the research comes from the triangulation process made of data links and data convergence, compared to the research findings during the desktop and field investigation that creates the basis for these conclusions. In addition, three experts participated to interview and expressed their qualified out-of-the-box opinions.

6.5. Recommendations

Although at the local level, this research study is extensive and multi-faceted, more case studies are needed for a further assessment of local context influence on innovation activities, in conjunction with FDIs' contribution to technological transfer and future research strategies which can facilitate the achievement of these goals.

The South African government should address the social and economic gaps through adequate policies for South African business sector of which these firms are part, which should enable the technological transfer, jobs formation and the transition to a knowledge economy. However, innovation is considered the new religion of the 21st century and the lack of investment in innovative activities and creative skills has a negative influence on the competitiveness of the firms' studied and their contribution to South African competitiveness. The South African government must also invest in technology foresight to support these firms in the most expensive and high demand process of all. At present, South

Africa does not have a government entity to produce technological forecasts for businesses as other countries do.

6.6. Conclusions

Finally, the topic of this thesis follows the research question and the thesis main statement, which considers the strong bond between investment, innovation and skills in innovative firms. These firms should be models for entrepreneurs, policy makers and emerging innovators in South Africa or other emerging market countries because of their successes. Many academics try to find the relation between innovation, investment in skills, economic growth and the location where innovation takes place but a straight answer is difficult to get. This research study contributes to the body of knowledge that has little coverage in the general literature reviewed under this research topic.

In spite of the reports found in the public domain about the benefits of FDIs for South African economic growth, boosting innovative activities, transfer of technology and job creation, FDIs concentrate their business activities towards intensive exploitation of their existing products for a high short-term profit. On a positive note, their role is of high importance for the transfer of technology, skills upgrade and South African integration in a knowledge economy. However, the lack of innovative activities in branches of MNEs has damaged their role in South African job creation, their importance among other branches, and has downsized their competitiveness and their sustainability in the long term.

The recent IBM decision to invest in South African R&D and South African academic education seven hundred millions rands over ten years period is a positive step taken by its leadership and SA government must follow by setting up the premises for a successful outcome of this cooperation.

The opinion found in many South African government documents differs from these research findings regarding decisions and responsibilities to invest, execute and commercialise the results of R&D and innovation activities outcome. There

are factors responsible for the perception of South African NSI for example, among others, its skills weakness. Government incentives and policies should change these negative perceptions, make better use of FDIs, and boost South African management and leadership innovations to be as successful as Google.

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APPENDIX 1 Information about the interview process

A.1.1. Letter of request to interview participants

Date: (dd/mm/yyyy)

I am an MM (Innovation Studies) student at the Graduate School of Business Administration, University of the Witwatersrand, and I am conducting research as part of the fulfilment of requirements for the degree.

My research aims to explore how ICT SA based large innovative firms are investing in skills during their daily business activities. This research is timely and addresses an area of importance for South African firms in the most technological challenged sector like ICT. Innovation and skills are the twin engines of growth and development and they contribute to jobs creation and SA competitiveness.

In carrying out this research project, I will be interviewing respondents who are knowledgeable about the issue under investigation and you have been identified as a qualified source of information and insight. I am writing to request your permission to interview you about your firm's view on skills development. The interview should take approximately one hour of your time and your co-operation would be much appreciated. Information supplied as part of the interview will be used for academic purposes only, and if you wish, any comments can be non-attributable.

I will be contacting your office to arrange a suitable and convenient time to undertake the interview; I look forward to your cooperation.

Professor Louise Whitaker supervises my research and she is available to answer any queries that you may have regarding the research process.

Yours Sincerely,

Raruca Pauna

MM (IS) student

Wits Business School

A.1.2. Participants’ names, positions, and the schedule of interviews conducted at the head offices of the three firms or their place of work (experts).

Participants and experts	Date	Firm/organisation	Respondent	Respondent title
01. Expert	08.10.2013 @ JCSE office	Johannesburg College of Software Education WITS	Adrian Schofield PhD computer science	Manager of the research unit of JCSE
02.	18.10.13 @ DD head office	Dimension Data	Jane Frankel	Training manager Middle East and Africa
03.	25.11.2013	Cisco Systems SA	Alfie Hamid	Regional manager Corporate Affairs CSR
04. Expert Anonymous	16.11.2013	Independent consultant	Anonymous PhD statistics Actuary	Innovator of “360 degrees” application for HR departments
05.	23.11.2013	Dimension Data	Grant Morgan	General Manager
06.	20.11.2013	Cisco Systems	Alpheus Mangale	CEO CISCO Systems SA
07.	19.11.2013	Dimension Data	Unathi Mothiba	Business Development
08.	15.11.2013	IBM SA	Flavia McClean	Business and technical

Participants and experts	Date	Firm/organisation	Respondent	Respondent title
09.	15.11.2013	IBM SA	Michelle Johnson	Skills development
10.	15.11.2013	IBM	Nomvula Sithole	HR partner recruitment
11.	15.11 2013	IBM	Ntokozo Khumalo	HR partner performance
12.	18.11 2013	DD	Reshma Reddy	HR manager recruitment
13.	29.11 2013	CISCO syst.	Jack Naidoo	HR senior manager
14.	10.12.2013	CISCO syst.	Lesley Mamaila	Project manager for
16.	15.12 2013	IERI,TUT Mario Scerri	Mario Scerri	Prof. at TUT Policy in

A.1.3. Interview Questions

Investment in Skills Development is a Strategic Activity and is aligned with firms' strategic goal in support of a better performance.

1. Please tell me, how the conceptualisation of your firm's skills development plan is part of your staff shared vision and team building as Senge said in his book called "Fifth Discipline"?
2. Please tell me how is your skills development plan assess towards your strategic firm's goals and technology changes by using an important key financial indicator like the return of investment in skills? Is your HR and leadership working together to evaluate it?

3. Please tell me, how do you create a dynamic perspective for optimising the investment in skills and adapt to market and technological changes?

4. Who approves the investment in skills development and what are his/her incentives?

NB. The leadership has to take responsibility for decisions and rewards for success.

5. How does skills development rank among other firm's activities if your firm pursues better performance and new markets? Or if your firm pursues new products and technological change?

6. How do you decide when your firm's skills development plan is optimal and how is the firm's leadership willing to change it if it is not?

Mechanisms and routines of effective investment are managing tools for skills development in firms

7. Please tell me how is affecting the complexity of ICT technology the investment in developing internal talent? Are you breeding talent or do you procure it from the market?

8. How does the firm allocate the investment between professional and soft training? How do you distribute the resources among project team training, management/leadership training or/and innovation management training? How are rewarded your top employees?

9. How do you nurture creative behaviour among your staff and how is your management rewarding new ideas and new solutions?

10. Please tell me, how is your firm engaging in activities such as investment in technological gate keeping, technological change or in network building or in customer satisfaction?
11. How is your risk of investment in skills minimised? What type of employees' incentives and agreements are you using to maximise the return of investment in skills?

Skills deficiencies present among ICT firms based in SA

12. Please tell me, how do you intend to solve exiting skills gaps and shortage of skills specific to your firm / ICT SA sector?
13. Which are the skills deficiencies that your firm encounter at present? Are they specific to ICT SA sector?
14. In your experience, how does the ICT sector of SA compare to other international ICT sectors in in terms of skills deficiencies? In what ways do you promote the diffusion/adoption of your technological solutions in South Africa?

Thank you very much for your time!!

APPENDIX 2 Display of collection and codification of data

A.2.1. IBM - Tables with themes, subthemes and codes

TABLE T1.S1 (Theme 1, Subtheme 1)

THEME	CATEGORIES / SUBTHEMES	(IBM) CODES
T1. Investment in Skills Development as a strategic activity	S1. Investment in SD follows leadership strategic intent	In Egypt a global sales force trained in IBM platforms with a large number of employees from IBM SA branch
		"Think Friday" a project driven by the top leadership
		Large investment for 400,000 employees one day per month
		Egypt project for large number of internships
		Critical capabilities required for successful implementation of firms' strategy are core technology skills
		The E2E is here and IBM leadership must prepare for symbiotic, cognitive, orchestrated and contextual experiences
		We are customer centric and deeply influenced by customers' needs
		IBM is a customer activated enterprise
		Leadership wants a workforce more informed, agile and capable to work beyond their job description
		Social media is a leadership tool to accelerate engagement and innovation at employees' level

		IBM “smarter workforce” is a project where leadership uses collaboration, behavioural science and analytics to study the new empowered employees
		Leadership and management look for the best fit for business advancements
		Leadership sees the workforce as a bridge between the firm and its customers
		The ability to develop employees’ skills will be decisive in winning the battle for a bigger market
		The firm needs an engaged workforce that can deliver
		Leadership must develop skills to deliver business growth
	S2. HR and Leadership design and implement SD hand in hand	for codes see Table T1.S2
	S3. Technology foresight drives SD for change	for codes see Table T1.S3
	S4. Efficient exploitation requires investment in skills for efficient exploitation activities	for codes see Table T1.S4

TABLE T1.S2 (Theme 1, Subtheme 2)

THEME	CATEGORIES / SUBTHEMES	IBM CODES
T1. Investment in Skills Development as a strategic activity	S1. Investment in SD follows leadership strategic intent	for codes see Table T1.S1
	S2. HR and Leadership design and implement SDP hand in hand	External auditors impressed by SDP
		Business Units and CFO department are finally deciding how much to invest in SD and how to invest
		FALL project links managers who plan to invest for staff training and BU leaders approve together with CFO
		Training is changed by MANAGEMENT AND LEADERSHIP if it is found not optimal
		Intensive training is attached by HR to every personal portfolio with performance monitoring by tracking indicators
		IBM is a leader in SD
		Outlier: HR is not always viewed as a strategic contributor to the firm because of top down leadership model at SA branch
		HR was not always sitting at the same table with leadership
		Change in customer demands will imply change in the workforce

		Recruitment of talent needs cooperation and alignment with management and leadership to identify business priorities
		HR and leadership use daily tracking sensors to benchmark employees' performance
		Leadership can improve employees engagement for gaining competitive advantage
		HR is IBM strategic partner
		IBMers in HR function call themselves business managers
		HRLDP is a program to develop HR skills competencies that support leadership
		HR might be focused on change and not on administration
	S3. Technology foresight drives SD for change	for codes see Table T1.S3
	S4. Efficient exploitation requires investment in skills for efficient exploitation activities	for codes see Table T1.S4

TABLE T1.S3 (Theme 1, Subtheme 3)

THEME	CATEGORIES / SUBTHEMES	IBM CODES
T1. Investment in Skills Development as a strategic activity	S1. Investment in SD follows leadership strategic intent	for codes see Table T1.S1
	S2. HR and Leadership design and implement SDP hand in hand	for codes see Table T1.S2
	S3. Technology foresight drives SD for change	Technical trajectories are followed by managers and leaders using ACE
		Accelerating Critical Expertise (ACE) is a management & leadership tool for tracking change
		MANAGEMENT AND LEADERSHIP uses dynamic strategies to learning new skills as cloud computing
		Long term thinking is very important at IBM
		GTO or Global Technology Outlook together with TMAG [technology market analyse group]) are forecasting new technologies
		Academy of Technology for all IBM leaders and FOAK [first of a kind] for early adopters
		Innovation Jam [online and

		brainstorms discussions] &Global Innovation Outlook (multidisciplinary)
		Horizonwatch made of 1900+ IBM employees for sensing the future
		Expert Access Services staff or On-Demand Consulting has the deepest skills within IBM for the most complex projects. Bridging the skills gap
	S4. Efficient exploitation requires investment in skills for efficient exploitation activities	for codes see Table T1.S4

TABLE T1.S4 (Theme 1, Subtheme 4)

THEME	CATEGORIES / SUBTHEMES	IBM CODES
T1. Investment in Skills Development as a strategic activity	S1. Investment in SD follows leadership strategic intent	for codes see Table T1.S1
	S2. HR and Leadership design and implement SDP hand in hand	for codes see Table T1.S2
	S3. Technology foresight drives SD for change	for codes see Table T1.S3
	S4. Efficient exploitation requires investment in skills for efficient exploitation activities	Analytical tools used from present to the next known future
		Necessity to do things is higher than to innovate
		During daily activities employees are working in pockets of excellence
		We do and develop things already known
		We are successful because we work for stability and efficiency
		IBM is an over-exploiter
		IBM is improving accuracy and efficiency in core business activities by investing in training and skills development

		High investment in certification and licensing
		We scale our activities to obtain maximum benefit
		We scan the environment for new opportunities for our technologies
		IBM Global training providers for exploitation

TABLE T2.S5 (Theme 2, Subtheme 5)

THEME	CATEGORIES / SUBTHEMES	IBM CODES
T2. Factors, processes and routines that shape the investment in SD	S5. Investment in efficient training/learning routines	Core skills and product training only for core teams under BU leadership
		MANAGEMENT AND LEADERSHIP prioritise investment and allocate resources for SD
		Executives measure the outcome of investment on a regular basis
		Good planning of capability and resources
		Good planning of workforce and scheduling the workforce
		Business requirements must be linked with effectiveness in investment in skills planning
		Collecting and analysing performance measures and workforce productivity
		Internal collaboration for optimising investment in SD
		Leverage mobility to reinvent business
		Using e - learning and online courses
		Creating a budget for SD yearly

	S6. Monitoring and rewarding employees' learning performance	for codes see Table T2.S6
	S7. Soft skills, MANAGEMENT AND LEADERSHIP , innovation and creativity are influencing	for codes see Table T2.S7
	S8. Investing in talent management skills to win the war on talent	for codes see Table T2.S8

TABLE T2.S6 (Theme 2, Subtheme 6)

THEME	CATEGORIES / SUBTHEMES	IBM CODES
T2. Factors, processes and routines that shape the investment in SD	S5. Investment in efficient training/learning routines	for codes see Table T2.S5
	S6. Monitoring and rewarding employees' learning performance	Improvements by individual discussions on monthly basis using Career Framework, Career Smart &Think Friday
		Staff retention is high because IBM builds rewards and compensations
		Global Learning team takes care of performance tracking tools and rating scales of employees performance from 1 to 4 using management plan to boost performance
		ACE and Advanced Education monitored by follow up meetings
		Tracking systems for analysing the budget spent and guidance for professional career called Career Smart
		"IBM career Smart Framework" - is a system that helps identify individuals by roles, assesses them, and gives guidance
		Continuous enrolment in learning activities
		Flexible hours, days off and verbal and written praise beside monetary rewards
		Bursaries for three years MBA and IBM contract at the end

		Nine practice grid for training in creativity called cherries and ducks
		The focus on training is leadership development training & other soft training
		Collaboration with IBMers students and universities with annual Career day
		Leadership not encourage does creativity
	S7. Soft skills, MANAGEMENT AND LEADERSHIP , innovation and creativity are influencing	for codes see Table T2.S7
	S8. Investing in talent management skills to win the war on talent	for codes see Table T2.S8

TABLE T2.S7 (Theme 2, Subtheme 7)

THEME	CATEGORIES / SUBTHEMES	IBM CODES
T2. Factors, processes and routines that shape the investment in SD	S5. Investment in efficient training/learning routines	for codes see Table T2.S5
	S6. Monitoring and rewarding employees' learning performance	for codes see Table T2.S6
	S7. Soft skills, MANAGEMENT AND LEADERSHIP , innovation and creativity are influencing the efficiency of investment in SD	IBM SA is a structured firm with no space for creativity
		Nine practice grid called cherries and ducks for creativity training
		Leadership development training and other soft training is the focus on employees training
		Career Smart is highly evaluated by Government representatives
		Collaboration and links between IBMers and students one day/year at Career day
		IBM SA is not innovating
	S8. Investing in talent management skills to win the war on talent	for codes see Table T2.S8

TABLE T2.S8 (Theme 2, Subtheme 8)

THEME	CATEGORIES /	IBM CODES
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	SUBTHEMES	
T2. Factors, processes and routines that shape the investment in SD	S5. Investment in efficient training/learning routines	for codes see Table T2.S5
	S6. Monitoring and rewarding employees' learning performance	for codes see Table T2.S6
	S7. Soft skills, MANAGEMENT AND LEADERSHIP , innovation and creativity are influencing the efficiency of investment in SD	for codes see Table T2.S7
	S8. Investing in talent management skills to win the war on talent	TOP GUN is a talent development training
		Breeding talent using training in new technologies
		Competitors like Microsoft are winning the war on talent
		IBM leaders and sales force are learning to find talent in communities
		Talent gaps are at the leadership level and in the front line
		Effective talent management means better business performance
		Talent management is an integrated function
		The investment is focused on attraction, retention, motivation and development

TABLE T3.S9 (Theme 3, Subtheme 9)

THEME	CATEGORIES / SUBTHEMES	IBM CODES
T3. SA context influences investment in SD	S9. investment in SD within IT SA context	IBM SA developed a training projecting in 2013 for 14,000 SA women and youth graduates in Cape Town
		IBM SA shares its global experience with SA Government to resolve the skills gap in SA
		IBM SA creates an environment for partners and the whole world for developing skills
		IBM SA is a client driven organisation that needs many skills but compared with other courtiers the need is higher and the pressure on employees to keep the quality of IBM brand is high
		IBMers in SA lack soft skills and business skills and technical staff is not sufficient trained
		IBM SA projects includes Sat School, Hilbrow [Community] Initiative, Mentor Place, Mandela Park Mosaics
		IBM on demand community is a global project applied locally in SA
		Various available websites built by IBM for general use and free access including SA

A.2.2. CISCO - Tables with themes, subthemes and codes

TABLE T1.S1 (Theme 1, Subtheme 1)

THEME	CATEGORIES / SUBTHEMES	CISCO CODES
T1. Investment in Skills Development as a strategic activity	S1. Investment in SD follows leadership strategic intent	Learning disciplines applied in SD but employees share vision and more importantly the company values
		HR recommends and management approves investment in SD
		Cisco is a flat firm with only four hierarchical levels
		CISCO is a customer centric organisation
		90% of investment is done in skills
		Investment in skills has high return in our organisation
		Leadership approved over \$5 billion /year investment in SD
	S2. HR and Leadership design and implement SDP hand in hand	for codes see Table 1.S2
	S3. Technology foresight drives SD for change	for codes see Table 1.S3
	S4. Efficient exploitation requires investment in skills for efficient exploitation activities	for codes see Table 1.S4

TABLE T1.S2 (Theme 1, Subtheme 2)

THEME	CATEGORIES / SUBTHEMES	CISCO CODES
T1. Investment in Skills Development as a strategic activity	S1. Investment in SD follows leadership strategic intent	for codes see Table T1.S1
	S2. HR and Leadership design and implement SDP hand in hand	HR specialists say it is better to have "bigger jobs and chunkier roles"
		HR and managers decide in teams how to measure KPIs all over the organisation
		HR and managers are working in teams sharing vision and value
		HR and management and leadership are working together as they always did
		Strategic HR is similar with talent management
		HR and leadership understand technology diversification followed by skills diversification
	S3. Technology foresight drives SD for change	for codes see Table T1.S3
	S4. Efficient exploitation requires investment in skills for efficient exploitation activities	for codes see Table T1.S4

TABLE T1.S3 (Theme 1, Subtheme 3)

THEME	CATEGORIES / SUBTHEMES	CISCO CODES
T1. Investment in Skills Development as a strategic activity	S1. Investment in SD follows leadership strategic intent	for codes see Table T1.S1
	S2. HR and Leadership design and implement SDP hand in hand	for codes see Table T1.S2
	S3. Technology foresight drives SD for change	Investment in SD is highly regarded because IT is a rapidly changing sector
		Employees have access to the full knowledge repertoire and training, coaching and mentoring to discover any new change in technologies
		CISCO is the [global] innovator driver for IoT as a new technological trajectory that must be done in SA where CISCO must prepare its partners and customers for it
		Technology foresight leads technological change and investment in SD
		CISCO is at the edge of knowledge and a leader in Internet connectivity
		CISCO is a leader and comes to the market with new technologies that must be like Magic and not a frustrated collision of worlds
		It has an optimised investment in R&D because it purchases needed technologies

		CISCO is good at transfer of knowledge and scans the environment for new streams of profitable sources
		High level of rapid integration of new technologies by large investment in human resources
	S4. Efficient exploitation requires investment in skills for efficient exploitation activities	for codes see Table T1.S4

TABLE T1.S4 (Theme 1, Subtheme 4)

THEME	CATEGORIES / SUBTHEMES	CISCO CODES
T1. Investment in Skills Development as a strategic activity	S1. Investment in SD follows leadership strategic intent	for codes see Table T1.S1
	S2. HR and Leadership design and implement SDP hand in hand	for codes see Table T1.S2
	S3. Technology foresight drives SD for change	for codes see Table T1.S3
	S4. Efficient exploitation requires investment in skills for efficient exploitation activities	CISCO certified engineers are the most marketable in the world and they are good at doing the right things
		CISCO courses are of a holistic nature for routine activities
		CISCO SA is focused on daily activities for maximum return
		The mainstream component of CISCO SA business is specialised certification courses and Internet/network equipment where the SA market shares are more than 60%
		CISCO is not innovating in SA

TABLE T2.S5 (Theme 2, Subtheme 5)

THEME	CATEGORIES / SUBTHEMES	CISCO CODES
T2. Factors, processes and routines that shape the investment in SD	S5. Investment in efficient training/learning routines	Retention is high because of the brand
		No risk in investment in SD because we cater for that
		High retention and high achievements because of a relaxed culture
		Training content is changing fast for employees
		CISCO brand opens the doors anywhere in the world
		High retention compared with other IT firms
		Optimisation [skills training] is done on system thinking and not in isolation
	S6. Monitoring and rewarding employees' learning performance	for codes see Table T2.S6
	S7. Soft skills, M & L, innovation and creativity are influencing the efficiency of	for codes see Table T2.S7
	S8. Investing in talent management skills to win the war on talent	for codes see Table T2.S8

TABLE T2.S6 (Theme 2, Subtheme 6)

THEME	CATEGORIES / SUBTHEMES	CISCO CODES
T2. Factors, processes and routines that shape the investment in SD	S5. Investment in efficient training/learning routines	for codes see Table T2.S5
	S6.Monitoring and rewarding employees' learning performance	CISCO rewards the core solutions and not the routine
		Rewards for good performance are in place
		There are no rewards for short benefits
		Creating open space for staff with a vibe
		HR aligns reward systems with strategy and value
	S7. Soft skills, M & L, innovation and creativity are influencing the efficiency of investment in SD	for codes see Table T2.S7
	S8. Investing in talent management skills to win the war on talent	for codes see Table T2.S8

TABLE T2.S7 (Theme 2, Subtheme 7)

THEME	CATEGORIES / SUBTHEMES	CISCO CODES
T2. Factors, processes and routines that shape the investment in SD	S5. Investment in efficient training/learning routines	for codes see Table T2.S5
	S2. Monitoring and rewarding employees' learning performance	for codes see Table T2.S6
	S7. Soft skills, M & L, innovation and creativity are influencing the efficiency of investment in SD	Soft skills and entrepreneurship skills with Passport 21 project
		Firm with collaboration structure and flat company
		Strong network of suppliers at CISCO managed by using intranet and extranet
		Training done internally for routine work and certification and only outside CISCO SA training for innovation
		NETSCAPE project is training for creativity and problem solving for the entrepreneurs
		Relaxed culture and collaboration going back to the founders' principles
		CISCO SA is user centric and incremental in solving their problems
		In SA broader skills are needed like entrepreneurial skills

		Creativity training is done in pockets and no product innovation in SA
		Acquisitions are built on integration of skills and knowledge
		CISCO works in a net of partners and suppliers that are bringing problems and CISCO finds solutions in an ECOSYSTEM in harmony
	S8. Investing in talent management skills to win the war on talent	for codes see Table T2.S8

TABLE T2.S8 (Theme 2, Subtheme 8)

THEME	CATEGORIES /	CISCO CODES
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	SUBTHEMES	
T2. Factors, processes and routines that shape the investment in SD	S5. Investment in efficient training/learning routines	for codes see Table T2.S5
	S6. Monitoring and rewarding employees' learning performance	for codes see Table T2.S6
	S7. Soft skills, M & L, innovation and creativity are influencing the efficiency of investment in SD	for codes see Table T2.S7
	S8. Investing in talent management skills to win the war on talent	GTP is fundamental for breeding talent
		GTP has developed 293 SA engineers since 2008
		CISCO finds and retains talent because of its brand
		Connecting the right talent with CISCO using CISCO Partner Talent Network
		CISCO has a Talent Acquisition Team in SA and globally
		Core strategy at CISCO is acquisition firstly of engineering talent
		CISCO is in top of talent management and the attrition is only 8%

TABLE T3.S9 (Theme 3, Subtheme 9)

THEME	CATEGORIES /	CISCO CODES
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	SUBTHEMES	
T3. SA context influences investment in SD	S9. Investment in SD within IT SA context	Equity ratios creates logistic problems
		The basic education situation will have long term consequences for SA population
		Education serves minorities until now
		SA entrepreneurs are using Passport 21 for problem solving
		It is very costly to align to SA Gov. policies
		Top skills are obtained by training outside SA
		The way to deliver education is flawed and the education is not relevant
		SA is in crisis with huge technical skills gaps
		CISCO SA must educate the market as a priority
		CISCO has career days and websites accessible to all
		Like FELLOW project at IBM it will be needed to teach at UNIV with engineers
		No practical on job training at univ. level there is a need to retrain all graduates employed
		CISCO must transfer the skills to its partners but it is challenging in SA

		Skills gaps vary from industry to industry but CISCO is in the forefront of knowledge
		There are big skills gaps among previously disadvantaged
		CISCO contributed by training 28,000 people from 2008
		Gaps in IT skills are in cloud technology and big data
		CISCO wants to contribute to people's lives and community knowledge
		More must be done for IT transformation in SA and for market adoption of new technologies
		Courses are offering more than nuts and bolts of IT
		CISCO uses its global experience for advising GOVERNMENT policies but it is very costly to align to government policies
		CISCO created centres in 300 schools
		SA has a brain drain problem and a gap of 70,000 network specialists

A.2.3. DIMENSION DATA - Tables with themes, subthemes and codes

TABLE T1.S1 (Theme 1, Subtheme 1)

THEME	CATEGORIES / SUBTHEMES	DD CODES
T1. Investment in SD as a strategic activity	S1. Investment in SD follows the leadership strategic intent	Investment is bias towards skills
		Employees share vision and value working in functional teams
		The firm has a strong drive to invests in skills over mergers and acquisitions
		DD has a strategic plan for SD
		Investment in skills is a key priority
		The firm follows a network of transformation using a hierarchic set up but the skills/training manager is an independent entity
		The firm is focusing on incremental change without a huge investment in skills; more investment in skills than acquisitions
		Skills development is strategized, it is included in the total picture and tested through values and behaviour
		Key strategic investment in training the clients [by pre sales engineers], by assessing clients' needs and knowing their goals
		Studying the clients' environment and putting on their table what they need

		Leadership intention is to invest in skills and be competitive in the IT industry
	S2. HR and Leadership design and implement SDP hand in hand	for codes see Table T1.S2
	S3. Technology foresight drives SD for change	for codes see Table T1.S3
	S4. Efficient exploitation requires investment in skills for efficient exploitation activities	for codes see Table T1.S4

TABLE T1.S2 (Theme 1, Subtheme 2)

THEME	CATEGORIES / SUBTHEMES	DD CODES
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T1. Investment in SD as a strategic activity	S1. Investment in SD follows the leadership strategic intent	or codes see Table T1.S1
	S2. HR and Leadership design and implement SDP hand in hand	The talent and leadership training manager is independent
		OUTLINER = a top down leadership will decide who will fill the leadership position without the HR advise
		Management, leadership and HR working hand in hand to design SDP
		Line managers and employees' contracts decide the curriculum for new training for employees and their KPI
		In DD University line managers and internal departments managers are trained
		Outliner = leadership is conservative and traditional and does not collaborate with HR
		Outliner=leadership follows the culture of conserving the past success
	S3. Technology foresight drives SD for change	for codes see Table T1.S3
	S4. Efficient exploitation requires investment in skills for efficient exploitation activities	for codes see Table T1.S4

TABLE T1.S3 (Theme 1, Subtheme 3)

THEME	CATEGORIES / SUBTHEMES	DD CODES
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T1. Investment in SD as a strategic activity	S1. Investment in SD follows the leadership strategic intent	for codes see Table T1.S1
	S2. HR and Leadership design and implement SDP hand in hand	for codes see Table T1.S2
	S3. Technology foresight drives SD for change	The business landscape is changing from traditionalist to dynamic
		An internal strategic plan is designed for new technical areas and HR is involved to keep pace with technology change
		The communication sessions for forecasting are connected by a global broadcasting set up; investigative teams connects the forecast reports to leadership
		SDP is done by knowing the competitors. forecasting the technological trajectories and sensing the future trends
		When necessary SDP is changing fast
		When is need for new technological transfer of skills, the transfer starts small and continues with on job training using a small pilot unit to avoid risk
		If you do not keep changing, you fall apart because of so much change in technology. DD is forced to be on the technology edge

		The internal high technical gurus drive the technology change
		Forum centres of excellence and global heads are tracking technological change
		Global heads funnel up to the leading edge
	S4. Efficient exploitation requires investment in skills for efficient exploitation activities	for codes see Table T1.S4

TABLE T1.S4 (Theme 1, Subtheme 4)

THEME	CATEGORIES / SUBTHEMES	DD CODES
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T1. Investment in SD as a strategic activity	S1. Investment in SD follows the leadership strategic intent	for codes see Table T1.S1
	S2. HR and Leadership design and implement SDP hand in hand	for codes see Table T1.S2
	S3. Technology foresight drives SD for change	for codes see Table T1.S3
	S4. Efficient exploitation requires investment in skills for efficient exploitation activities	Return of investment for new certifications will create new streams of revenue
		Subsidiaries are driving a hackaton, but not for DiData
		Exploitation of existing technologies reinforced by certification
		Heavy investment for product specialisation and licensing
		Leaders in their fields are "stars"- like product managers
		Outliner = talking but not doing and not taking opportunities on hand
		DD studies the technical environment and its challenges and find ways to improve it
		DD is doing massive training for exploitation using top quality management and gurus
		If investment in certification is high, DiData receives discount from vendors

TABLE T2.S5 (Theme 2, Subtheme 5)

THEME	CATEGORIES /	DD CODES
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	SUBTHEMES	
T2. Factors, processes and routines that shape the investment in SD	S5. Investment in efficient training/learning routines	Cross skills by offering different roles for managers. They do not to stagnate in their current role.
		All staff has an average of 2 to 3 weeks of training/year
		DD uses an internal recruitment agency
		DD hires externally not to create internal shortages in resourcing the best talent
		Attractive contracts; Best packages offered to mitigate the risk and make retention high
		Top position in the market & known brand = high retention
		Internally coaching and mentoring employees for senior positions gives best results for less investment
		DD University and dynamic e-learning capabilities are more effective
		Outsourcing SD to cover for a rapid technological change need for disruptive innovations
		Never ending journey in SD; mechanisms to reach people that advertise their skills , like in LinkedIn; DD innovates to keep the communication links ; talent tracking courses

		DD prefers internal SD even for brand new technology
		Risk of investment in SD is covered by great employees' climate and culture
		HR and employees have one to one discussions at regular intervals
	S6.Monitoring and rewarding employees' learning performance	for codes see Table T2.S2
	S7. Soft skills, M & L, innovation and creativity are influencing the efficiency of investment in SD	for codes see Table T2.S3
	S8. Investing in talent management skills to win the war on talent	for codes see Table T2.S4

TABLE T2.S6 (Theme 2, Subtheme 6)

THEME	CATEGORIES /	DD CODES
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	SUBTHEMES	
T2. Factors, processes and routines that shape the investment in SD	S5. Investment in efficient training/learning routines	for codes see Table T2.S1
	S6. Monitoring and rewarding employees' learning performance	KPI and quarterly KPI assessments followed by incentives is done by line managers and HR; for everybody
		The key indicators are using "how many" in performance remuneration
		Measurement of effectiveness by numbers; Everyone is measured to a number; Increase the number of graduates, and their job opportunities
		DD Hall of Fame ; verbal and written recognition
		KPI system is the base of the contracts between the firm and employees
	S7. Soft skills, M & L, innovation and creativity are influencing the efficiency of investment in SD	for codes see Table T2.S3
	S8. Investing in talent management skills to win the war on talent	for codes see Table T2.S4

TABLE T2.S7 (Theme 2, Subtheme 7)

THEME	CATEGORIES /	DD CODES
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	SUBTHEMES	
T2. Factors, processes and routines that shape the investment in SD	S5. Investment in efficient training/learning routines	for codes see Table T2.S1
	S2.Monitoring and rewarding employees' learning performance	for codes see Table T2.S2
	S7. Soft skills, M & L, innovation and creativity are influencing the efficiency of investment in SD	Investment in soft skills training is 50%up to 60%
		Soft skills is expensive with coaching used for 5% to 10% of the total staff
		Investment in sales and marketing training and educating some of the top 50 clients in new technologies
		Outliner = culture of respect of opinion, but top down hierarchies
		Client centric innovative, unique in the way they engage the client to match his needs
		Customer satisfaction is DD's core value
		Innovation is in business to out-design competitor 's cost of ownership
		Heavy investment in building relations; business entertainment
		Preferred partner program open to clients worldwide

		Not good reward for creativity
		No innovation training
		Network of staff through intranet and Yamma (internal social media platform); stimulate exchange of information
		Very supportive climate; culture of cooperation
	S8. Investing in talent management skills to win the war on talent	for codes see Table T2.S4

TABLE T2.S8 (Theme 2, Subtheme 8)

THEME	CATEGORIES / SUBTHEMES	DD CODES
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T2. Factors, processes and routines that shape the investment in SD	S5. Investment in efficient training/learning routines	for codes see Table T2.S1
	S6. Monitoring and rewarding employees' learning performance	for codes see Table T2.S2
	S7. Soft skills, M & L, innovation and creativity are influencing the efficiency of investment in SD	for codes see Table T2.S3
	S8. Investing in talent management skills to win the war on talent	High investment in internal talent development
		DD is using a box grid and other methods of key talent discovery to screen talent
		DD is organically breeding talent "we grow the oak trees rather than buy the oak trees"
		Hiring talent from competitors or partners, from unfertile hunting grounds or from customers like DSTV and CSIR
		85% hiring locally
		Outliner= a big need for MANAGEMENT AND LEADERSHIP training; more assessment must be done to discover management talent; recruitment is not always efficient; after sourcing talent learning is done in pockets

TABLE T3.S9 (Theme 3, Subtheme 9)

THEME	CATEGORIES / SUBTHEMES	DD CODES

T3. SA context influences investment in SD	S9. Investment in SD within IT SA context	Anxious learning environment, but DD is dynamic and adaptive
		Saturday school is building skills within the IT segment
		A community project called triple H (Hearts, Heads and Hands) part of CSI
		In SA there is a huge gap of MANAGEMENT AND LEADERSHIP skills
		Difficulties in recruitment: a small pool of people to call; recruitment is done aggressively hiring from an unfertile hunting ground
		It is a common practise to use LinkedIn to source people, but SA people are not using LinkedIn
		SETA rules forbid optimisation and dynamic planning for skills development
		SA shortage of skills is in the new technologies like cloud; SA is not a back foot of skills to the world
		There are many shortages and gaps and in SA it is harder to fill the gaps

		DD is constantly evolving to enhance skills set capability, value & composition
		Minimising the gap though global courses and seminars ; gaining confidence; transferring technology from the first world country to a third world evolving economy
		Education will shorten the rate of adoption and create a revenue generating path
		It is an urgent need for a relevant solution in Africa [in SD] to put Africa at the forefront ; out of the box thinkers
		SD in SA "is a journey" and not everybody understands the meaning
		DD - cloud service is at the bottom layer or infrastructure layer that is at high need in SA

APPENDIX 3

A.3.1. Expert opinion – Adrian Schofield

CODE CYCLE ONE	CODE CYCLE TWO
<ul style="list-style-type: none"> • Investment in SD is not properly done • Investment in SD aims to cover immediate needs • Crisis in filling the vacancies • Investment lost due to brain drain • No investment in soft skills or innovation skills • MNCs create less jobs than SMMEs • Insufficient training for process driven software development • No pockets of excellence - innovation departments do not exist • Employees are not creative because they are afraid of being fired • HR employment policy is aligned to daily needs and not to new technologies • Management has no foresight skills for new technologies • The hierarchy is top down • The adoption of existing technologies is slow and inefficient • Investment is low and risky • Investment has to be properly managed to be effective • IBM is tapping into talent and invests in research • CISCO is pragmatic and benefit driven • DD is conservative and did not change for long time 	<ul style="list-style-type: none"> • More leadership skills are required for investment in skills because is not efficient • No pockets of excellence for innovation in software driven applications • Execution driven firms with less jobs creation • No foresight skills • IBM is tapping into talent and invests in research • CISCO is pragmatic and benefit driven • DD is conservative and not changed for long time

Adrian Schofield comments by email to the conclusions of this research.

Feedback: Dear Raluca

Thanks for this – an interesting read. I wonder if IBM’s decision (in January 2015) to locate a research laboratory in Braamfontain, adjacent to Wits University, would make any difference to your findings about their investment in skills development and innovation in South Africa? I also found Dimension Data’s characteristics interesting, given that they are a South African MNE that became owned by a Japanese corporation. I regret I don’t have time for a more in depth analysis at present but I would like a copy of your final paper, when published.

Kind regards

Adrian

A.3.2. Expert opinion – Mario Scerri

CODE CYCLE ONE	CODE CYCLE TWO
<ul style="list-style-type: none"> • It is important for SA to develop human capabilities • The disaster in education comes in early ages • Students must be trained in problem solving • Free market and neoliberalism do not fit SA • Conceptual thinking does not have resources, attitudes or rewards to back it up • Innovation failed • Banking system and financial sector is better • MNEs do not innovate but transfer skills and develop more cumulative HC • Crisis in opposite directions because SA sucks HC from the rest of Africa where education was better than in SA • Education experiments started in 1994 cleaned SA schools and [technical colleges] of experienced teachers • SA is the least literate and has the lowest numeracies skills in Southern Africa 	<ul style="list-style-type: none"> • Need for investment in SD at country level • Fundamental deficiencies in education • Big need for cognitive as well as innovation and creativity training • Conceptual thinking is needed but not supported • SA failed innovation and the Policies only aim to please the market • Only banking system and financial sector is better at

<ul style="list-style-type: none"> • Students unprepared to learn technical skills • Change in the system is required rather than a reinforcement of privileges at individual level • Resources wasted in investment wrongly done • The need for regional integration of ICT as a node of excellence • SA is diversified and has a banking sector that makes it capable to transfer skills but when compared with the best practises the result to the skills matching problem looks depressing 	<p>innovation</p> <ul style="list-style-type: none"> • MNEs transfer technology at low speed due to SA' reduced teaching capabilities • DoE must change the directions but is like an ocean liner moving very slow to the right direction
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Feedback: Mario Scerri considered the conclusions part of the research study in line with literature reviewed and correct.

A.3.2. Expert opinion – Anonymous

(PhD in statistics and innovator of a HR software application for monitoring employees)

CODE CYCLE ONE	CODE CYCLE TWO
<ul style="list-style-type: none"> • Very diversified approach • Managers assign tasks to HR • Managers are not involved in developing employees' careers • Leadership decides to outsource rather than nurturing skills • The better the manager the more likely they are to be involved in their employees' development. Poor managers are not involved at all • Maybe performance has to be awarded by tracking the score cards • Creative behaviour is not nurtured in SA • The structures in place make innovative people to fail 	<ul style="list-style-type: none"> • Leadership decisions leave a lot of tasks on HR shoulders and some good leaders are working together but generally they are not interested in developing employees' careers • The better the managers the more likely are they to be involved in their employees' development. • Poor managers are not involved at all

<ul style="list-style-type: none"> • Innovation training is not a key strategic objective • Very... very... few see it as part of their core DNA • Big companies are against taking risk • Incremental ideas are preferred • A culture of punishing failure • Failure impacts on the person's career • Very few companies that embrace radical new ideas for change • Basic and university skills are a massive problem in SA also because of government policies • The gap in skills is particularly large in SA • Not just IT but across the board because they do not have a plan to fill the gap at all • South Africa is in dangerous waters now • The skills gap on one hand and the unemployment on the other • So tragic about SA is that the unemployed people do not have the skills to fill the gap mismatch • The gaps must be filled from within because SA is not attractive for outsiders • SA government claims they created jobs in fact they have massively destroyed jobs in the economy • SETA is just a complete disaster and they only benefit themselves • Poor quality training providers • Well intentions are implemented really, really badly • True that the static development of skills is part of SITA's red tape approach 	<ul style="list-style-type: none"> • High investment in outsourcing training • Score cards tracking performance awards for employees but creativity and innovation are not part of it • There are structures to make people fail rather than win and failure is affecting persons' careers • Very... Very... few see it (innovation skills) as their core DNA • Massive gap and government bad policies make SA to be in dangerous waters with badly implemented SETA plans and poor quality of training • It is a mismatch between unemployment and job needs and the situation is tragic.
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