Gordon Institute of Business Science
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Influence of economic upgrading on South African small-to-medium enterprises' participation in telecommunication global value chain

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Abstract

The ability to access, successfully compete and participate capture gains within global value chains (GVC) is important for poverty and unemployment reduction and economic development, especially in developing countries like South Africa. The telecommunication sector has experienced rapid change over the last decade that has necessitated a restructuring of how stakeholders interact with the value chain. This study therefore sought to investigate the influence of economic upgrading of South African (SA) small to medium enterprises (SME) on their integration and participation in the telecommunications GVC. A broader picture was sought using the GVC framework theory to understand how and why SMEs economically upgrade in the telecommunications GVC including the challenges, benefits and critical success factors of such an endeavour. The study utilised a qualitative methodology using semi-structured interviews with 15 purposively selected SA SME directors operating in the telecommunications GVC for over 5 years. This means the results are limited to their viewpoints based on their judgement, perceptions and experience on the subject matter.

The results show that SA SMEs are more involved in process, product and functional upgrading than interchain upgrading within the GVCs. The pace of economic upgrading is being slowed down by stiff competition, cost and cashflow challenges, lead firm challenges, skills gaps and bribes conduct. However, the economic upgrading results in the benefits of operational efficiency and effectiveness, economic zoning and black empowerment, telecommunications economic interplay, learn from lead firms, revenue growth, compliance advantages and attainment of a green environment. To ensure economic upgrading success, it is critical for SMEs to have competent and highly skilled employees, to continuously develop employee skills, to adapt to telecommunication environmental changes, to be leaders with entrepreneurial spirit, to have good relations with lead firms and to ensure compliance. It is therefore recommended to SME management that they prioritise employee skills development and introduce workplace mentoring, cross-departmental training and team building to improve the competences and skills of employees and form clusters. Other stakeholders such as lead firms are encouraged to promote more SME upgrading initiatives. Government should introduce funding initiatives specifically for SME upgrading and initiate changes in educational curriculum. Collective anti-corruption drive is called for across the industry.

Key words: Economic upgrading, global value chains, small to medium enterprises, telecommunications

Declaration

I declare that the work reflected in this research is my own. It is submitted in partial fulfilment of the requirements for the degree of Master of Philosophy in International Business at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

Date: 28 November 2022

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List of acronyms and abbreviations

2G	Second Technology Generation
3G	Third Technological Generation
4G	Fourth Technological Generation
5G	Fifth Technology Generation
BDS	Business Development Service
BOT	Build Operate Transfer
BPO	Business Process Operation
CA	Competitive Advantage
CEO	Chief Executive Officer
CPE	Customer Premise Equipment
CSF	Critical Success Factors
DNS	Domain Access Network
DWT	Discrete Wavelet Transform
GDP	Gross Domestic Product
GVC	Global Value Chain
HR	Human Resources
IOT	Internet of Things
IP	Internet Protocol
IPR	Intellectual Property Rights
ISP	Internet Service Provider
IT	Information Technology
KZN	Kwa Zulu Natal
MD	Managing Director
MNC	Multinational Corporation
OEM	Original Equipment Manufacturers
R & D	Research and Development
RAN	Radio Access Network
RF	Radio Frequency

SA	South Africa
SME	Small to Medium Enterprises
UI	User Interface
UN	United Nations
UX	User Experience
WTO	World Trade Organisation

Chapter 1: Introduction

1.1 Introduction

The global economic landscape is constantly changing which affects participation and competitiveness of small firms within global value chains as evidenced by the substantial growth of global exports and imports since 1980s (Gerrefi et al., 2021). The way products and services are organised within value chains has also changed. According to Antros (2020), small firms are more of followers than leaders in global value chains and must continuously respond to changing market prospects by innovation and boosting their value added through the process of economic upgrading within the value chain. This economic upgrading, according to Sima et al. (2020), refers to economic upgrading as when high added value activities are being added to a business, due to the usage of sophisticated competencies, knowledge, or technologies. As small firms economically upgrade, they are also regularly seeking to maintain partnerships and trade with large firms within global value chains to remain relevant and active. However, these global value chains are mostly dominated by large firms such as Microsoft, Apple, Samsung, Nike, Huawei and Nestle and small firms due to the lack of enormous investment capital, occupy the low end of global production (World Trade Organisation (WTO), 2019). Yet, these small firms are many in developing countries with a great potential to generate more employment creation and economic growth in these global value chains which are a countenance of unique production processes disintegration in a progressively interconnected international markets (Marcato & Baltar, 2020).

This chapter introduces the research subject and further presents the study background, problem statement, research objectives, research scope, theoretical and business implications, research aims, research contribution, limitations, delimitations, assumptions and ethical considerations.

1.2 Background to the problem

In addition to the preceding introductory discussion, it is important to note that the international markets are increasingly structuring across global value chains to account for a rise in the portion of global gross domestic product (GDP), employment and exports (Gerreffi et al., 2021). To this end, within the last two decades, it can be observed that the world has become more deeply interdependent and integrated by value chains (Antros, 2020). According to Kordalska and Olczyk (2022), two thirds of the world trade occur through GVCs. Within the globalisation perspective, these value chain activities are executed by inter-firm networks sequencing tangible and intangible value-added services and products from origin to its time

of consumption (Kowalski et al., 2015). However, the GVC evolution is occurring in diverse sectors such as business service outsourcing, tourism, electronics, apparel, commodities including the telecommunication sector (Gereffi & Fernandez-Stark, 2016). This has important consequences in terms of how firms in both developing and developed nations take part in the global economy (WTO, 2019). For numerous nations, including developing nations, the ability to access, successfully compete and participate, capture gains within global value chains are paramount for poverty and unemployment reduction and economic development (Hollweg, 2019).

GVCs are associated with job creation, growth and productivity in many nations (Criscuolo & Timmis, 2017). The exporting countries have high employment through domestic companies working with exporters in the GVC. However, GVC production has become highly linked with the superior capital intensity and fewer labour concentration with some nations contributing to a decreased employment level (Farole et al., 2018). In addition, these GVC benefits are not evenly distributed among participants, with some firms gaining more than others.

Several factors have led to the rapid increase in production of GVCs. According to Kaplinsky (2019), rising intermediate goods and services due to production technologies advancements, growing investment and trade liberalisation, improvement in logistical efficiency, rapid ICT improvements and manufacturing offshoring by big global companies. As such, GVC has been largely concentrated by firms from advanced and developed countries. However, the role of SMEs from developing countries to participating more in GVC, has been gradually rising as economic policies are becoming increasingly focussed on promoting global trade. GVC participation is often seen as a tool for a firm's growth and entering a global chain serves as a ladder for increasing innovation, capabilities and economic upgrading to higher value-added activities. Hence, firms upgrade through transfer of technology, knowledge flows from lead firms, exposure to foreign markets, access to better quality (Taglioni & Winkler, 2016).

Within the telecommunication sector, the current rapid change in technology has made the telecommunication GVC to evolve into a complex ecosystem with new business models (United Nations (UN), 2021). The evolution of the mobile access technology is occurring with great force and speed over the past decade to create a dynamic change within the telecommunication value chains and its stakeholders (Bamber et al., 2017). According to Willis and Pater (2021), value delivered by telecommunication operators has changed from voice on second generation (2G) networks to more progressive faster broadbands of fifth generation (5G) networks as shown in Figure 1 below.

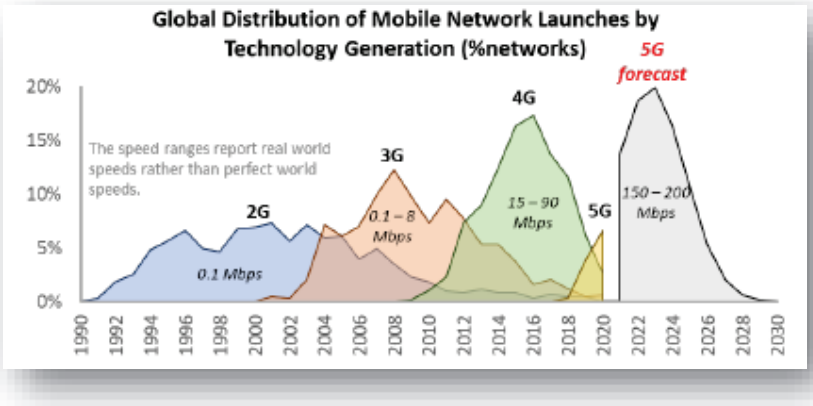

Figure 1: Global Distribution of Mobile Networks

Source: Willis and Pater (2021)

According to Willis and Pater (2021), the dynamic evolution presents to firms with the need to align business models to speed of change to remain greater customer value creators. This means the aggressiveness of telecommunication operators such as Vodacom South Africa, MTN South Africa to adopt second generation (2G), third generation (3G), fourth generation (4G) and fifth generation (5G) was the main driver for population coverage and densification to at least 80% to remain competitive (GSMA, 2020). Each successive wave of technological implementation resulted in faster download and upload speeds (Africa Analysis, 2017). These network attributes constantly increased clients' expectation of better network speeds that permit a wider range of smart mobile device applications. Yet, according to the UTVC (2020), the telecommunication value chain in the 1990s was dictated by monopolistic and simplistic market structures where an operator owned infrastructure and retail channels whilst providing customer premise(s) equipment (CPE) to clients. However, in the 2000s, a more complex value chain emerged bringing multiple stakeholders of infrastructure manufacturers and business process operation (BPO) system integrators to become a set of interdependencies existing between interdependent value chain participators (GSMA, 2020). Figure 2 below shows the telecommunication value chain in 2020.

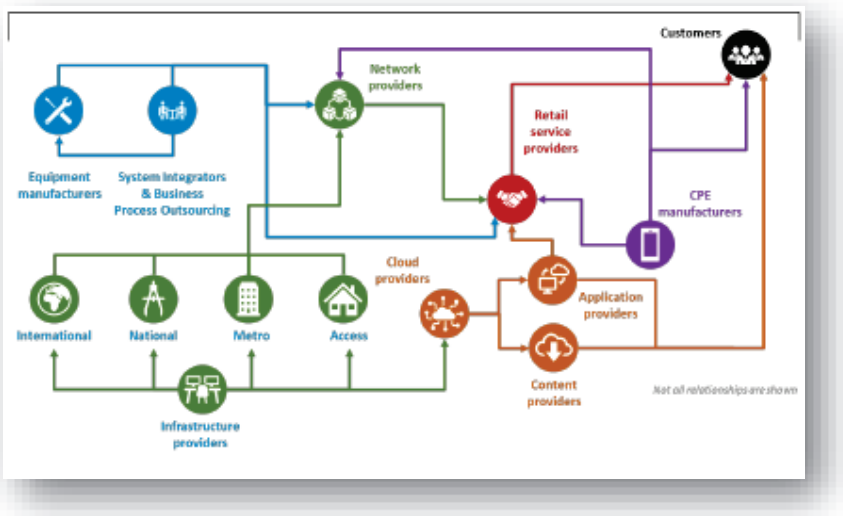

Figure 2: Current Telecom Value Chain

Source: UTVC (2020)

The telecommunication value chain depicts the input-output structure that brings service and products from the onset to a customer's hands, connecting both tangible and intangibles that map the value adds within the chain (UTVC, 2020). Some relationships have disappeared from the past value chains whilst new relationship and interdependences have been created leading to many participators in the value chain with many small to medium enterprises (SMEs) now being part of the telecommunication value chain.

In a world of vertical specialisation, outsourcing and offshoring; production of a single service or product takes place in several countries (Antros, 2020). For instance, new opportunities for original equipment manufacturers (OEMs) have arisen as BPOs for telecommunication hardware and software. However, with this increasing level of complexity and multiple relationships, it is not clear exactly how firms, for example infrastructure build SMEs in South Africa, can maintain or increase their participation within the telecommunication global value chain through economic upgrading. According to Bamber et al. (2017), the economic upgrading of local SMEs in global value chains should create new opportunities to specialise in business functions and tasks rather than just specific products to form part of global production networks.

In South Africa, many SMEs have become part of the global value chain by virtue of being sub-contracted to carry out physical equipment installation activities within the

telecommunication global value chain for technology infrastructure build projects. Based on the definition of a GVC, it “consists of a series of stages involved in producing a product or service that is sold to consumers, with each stage adding value and with at least two stages being produced in different countries” (Antros, 2020, p.3). A firm participates in a GVC if it produces at least one stage in a GVC. Thus, SMEs can be part of such a telecommunication succession of stages concerned with production of a service or product that is sold to customers. As mentioned previously, in a GVC, these activities in each stage add value and are produced in different countries (Antros, 2020).

1.3 Problem statement

GVC economic upgrading is the rule the game in today’s global trade in order for participants to integrate and participate more. Despite this, firms in developing countries are reported to be struggling to upgrade within GVCs (Slany, 2019). This should be seen against the background of economic researchers such as Kowalski et al. (2015) who argue that more participation in GVC benefits emerging economies in terms of diversification, sophistication, and productivity of exports. However, Multinational Corporations (MNC) operating as OEMs are generating an increasing portion of employment and value in GVCs through intellectual property and innovation (Hollweg, 2019) and this is taking place in their countries of origin and not these emerging economies. These OEMs are large multinational organisations such as Huawei, Nokia and Ericson who are earning income for their respective countries of origin. This means less income is being earned to boost local GDP with less participation by local firms in the telecommunication GVC. Hence, this study aimed to understand the factors affecting South African small to medium enterprises (SMEs) to economically upgrade and increase participation in the telecommunications GVC.

This study investigated how and why SMEs in South Africa (SA) are economically upgrading their business activities within the global value chain (GVC) of the telecommunications sector. The study specifically focussed on the SME’s economic upgrading behaviours and sought to understand the broader picture of the challenges and benefits they encounter when economically upgrading with the aim to identify recommendations that could facilitate increased participation within the telecommunications GVC, including the critical success factors influencing their economic upgrading decisions.

1.4 Research questions

Based on the preceding discussions and literature, this study sought to answer the main research question: What influence does economic upgrading have on South African SMEs

participation in telecommunication GVC? The main question is answered through the following questions:

- How and why does economic upgrading affect South African SMEs participation within the telecommunication GVCs?
- What challenges do South African SMEs experience when economic upgrading within telecommunication GVCs?
- What benefits does economic upgrading bring to South African SMEs operating in telecommunication GVCs?
- What are the critical success factors affecting the economic upgrading of South African SMEs operating in telecommunication GVCs?

1.5 Research scope

The study sought to investigate and determine how SMEs in South Africa are involved in economic upgrading processes to increase their chances of integrating and participating more within the telecommunication global value chain. The study examined specifically SME owners or directors of the firms actively involved in the value chain for the previous five years. The study helps to understand the extent to which economic upgrading is a driving force and a source of advantage so that firms can integrate and participate more in telecommunication GVCs by examining the challenges, benefits and critical success factors of economic upgrading.

The focus of the study was on aspects of economic upgrading which is one of the six dimensions of the GVC concept (Fernandez-Stark et al., 2014). Sampath and Vallejo (2018) argue that the capacity to innovate and continuously develop new processes and products is what determines whether a firm follows marginalisation or economic downgrading in the GVC. That is why researchers such as Kano et al.(2020) regard economic upgrading as synonymous with innovation that leads to a higher generation of value through improved functions, products, processes and inter-sectoral migration using comparative and absolute advantages resulting in increased GVC participation.

1.6 Theoretical and business implications

In the theoretical framework by Fernandez-Stark et al. (2014), GVC is regarded as a multidimensional concept that consists of six dimensions, namely elements or aspects of (i) input-output structure, (ii) geographic scope and (iii) governance and firm level elements with aspects of (iv) upgrading, (v) institutional context and (vi) industry stakeholders. According to

Kano et al. (2020), research is growing in these six dimensions in varying contexts leading to fluctuating understanding at both country and firm level. The upgrading dimension is also becoming an area of interest to many researchers. That has led to the understanding that the upgrading element consists of economic, social, environmental upgrading and many other categories (Choksy et al., 2017; Fernandez-Stark et al., 2014). However, past research (Kano et al., 2020; Marcato & Baltar, 2020) focussed more on country level upgrading than firm level upgrading. Additionally, most studies have sought to rather examine environmental and social upgrading (Marcato & Baltar, 2020). Yet, other studies on economic upgrading have not focussed on the telecommunications GVC but on other GVCs such as textile (Bernardt & Pollak, 2015), manufacturing (Banga, 2022) and machinery (Elteto et al., 2015). Therefore, the economic upgrading element was the main area of focus in this study with the specific aim to explore the economic upgrading factors affecting South African SMEs' participation within the telecommunication GVCs. According to Gerrefi (2019), firms can upgrade in a value chain using the value chain framework through process upgrading, product upgrading, functional upgrading and interchain upgrading to increase their participation. Process upgrading involves the transformation of inputs into outputs more proficiently by introducing more advanced technologies or re-organisation of the production systems (Fernandez-Stark et al., 2014). Product upgrading is the procedure of moving into more advanced product lines which increases the unit value (Hollweg, 2019). Functional upgrading is the process of obtaining new value chain functions or leaving current functions to raise the entire skills content of the value chain activities (Gerrefi, 2019). Inter-chain upgrading is the process of mixing different products that can sell using the knowledge gained in a certain value chain function to change into another sector (Hollweg, 2019). The concept of economic upgrading commonly refers to the collection of methods by which companies can increase their competition using investments in knowledge acquisition, specialisation and productivity (Marcato & Baltar, 2020). Furthermore, Armando et al. (2016) hypothesise that there is some motivation for companies to change enforcement and factor setting when they upgrade. Similarly, according to Gereffi (2019), economic upgrading is a critical pillar of the GVC framework which grows from the conviction that globalisation is viewed from the way in which international production networks of firms are controlled and organised and how the uneven distribution of the globalisation gains can be accessed by firms in other developing countries.

From a business perspective, this study therefore sought to understand how South African SMEs upgrade to influence their participation within the telecommunication GVC to enhance productivity and value-added activities. Understanding effective economic upgrading techniques assists managers to make better strategic decisions to compete and perform effectively within GVCs.

According to Ukwando (2015), companies can learn from David Ricardo's theory of comparative advantage to achieve benefits from global value chains through specialisation achieved by economic upgrading. However, Lee et al. (2017) argue that these benefits do not essentially need the production of more technologically advanced products. Therefore, according to Bamber et al. (2017), a GVC offers the advantage of participating into the increasingly fragmented production segments of an array of processes, functions, tasks, or products that are needed. This is where SMEs can participate more through productive involvement. Additionally, Adam Smith's theory of absolute advantage encourages free trade between two firms when one firm can buy from another a commodity or service produced at a lower cost than having to make it (Ukwando, 2015). SMEs can trade with large and leading firms when they offer a service or commodity at a low cost. Therefore, this study underpins the theory of comparative and absolute advantage to understand how SMEs' businesses can emerge in telecommunication GVC through process upgrading, product upgrading, functional upgrading and inter-chain upgrading and increase their participation in business with foreign and local companies in the GVC. Comparative and absolute advantage assists firms to determine which profitable value chain segments to exploit using production capabilities, resource endowment and relative skills (OECD, 2015). According to Heckscher-Ohlin standard trade theory (1991), trade thus impacts what companies can trade, how they trade and the efficiency and effectiveness of the production processes (Elteto et al., 2015). This means that, based on the comparative advantage theory, labour intensive nations have firms trading more in labour intensive goods than capital intensive goods as might be the case with the telecommunication SMEs in South Africa.

From a theoretical perspective, therefore, this study sought to understand what drives SMEs' economic upgrading from a comparative advantage perspective in the telecommunications sector. It is not clear which competencies SA SMEs use to upgrade in the telecommunications GVCs and what benefits, challenges and success factors arise.

1.7 Research aims

The study aim was to investigate how and why South African SMEs operating in telecommunication upgrade with emphasis on economic mechanisms that enhance productivity growth and ultimately GVC participation. The study further examined how the four types of economic upgrading were used by SMEs in the telecommunication GVC. In addition, the benefits and challenges in embarking on economic upgrading in GVC had to be identified in order to understand the factors influencing the economic upgrading of SME business within telecommunication GVCs. The GVC was used as a logical analytic tool and structure to

understand how small firms upgrade and participate in global trade. In addition, the study took a bottom-up viewpoint of economic upgrading to understand what influenced small firms' upgrade and increased participation in the global value chains.

1.8 Research contribution

The research contributes to the academic and policy debates on what influences SMEs to upgrade and increase their participation in a GVC in a developing economy context. The analysis brings an understanding to SMEs strategies of deepening their integration into the telecommunication GVC and how they seek to improve greater access and competitiveness in global markets using economic upgrading techniques.

The research analyses how SMEs upgrade in a GVC highlighting the benefits and challenges encountered when trying to upgrade. This helps to understand the risks and opportunities related to economic upgrading or bigger integration into global chains by SMEs in a developing nation context. Since the type of value chain and geographical location is unique, this study assists SME managers to understand the concept of economic upgrading within the telecommunication and South African context. The use of the GVC as an analytic tool is valuable in its capacity to assess the outcomes of participating in a GVC.

1.9 Ethical considerations

To respect and preserve the freedom and rights of the participants involved in the research, clearance permission to carry out the study was obtained from the Research Ethics Committee of GIBS. Informed consent, maintenance of participants' privacy and removal of harm were some moral factors to consider in this research (Creswell, 2014). As such, a consent letter was administered on all targeted or sampled study participants. A letter of introduction that highlighted a brief study background and the aims of the study was also sent to the participants. Additionally, the letter of introduction highlighted to participants that there were no personal gains as reward for participating and no one was forced or threatened to participate. Participation was strictly on a voluntary basis with freedom to withdraw at any stage without facing any penalties for doing so.

Data collected from participants are confidential and are not related to specific participants unless approved prior to release of such data and its associated respondent. As such, anonymous identifiers were used and not full respondent names. Additionally, the research results were colluded so that the results do not relate to an individual respondent. The

research only proceeded after the ethical approval was obtained from the GIBS Research Ethics Committee and the chosen telecommunication SMEs.

1.10 Limitations and delimitations

According to Leedy and Ormrod (2013, p.42), limitations are “research biases that are unknowing or can be controlled, which could negatively influence the research findings”. This research’s limitations include the usage of purposive judgment in choosing SME owners/directors as participants and the process of SME selection from the telecommunication sector of South Africa. As such, limiting data collection to a single place might lower the chances for data transferability of the results (Yin, 2014). Another limitation is that data were collected from the sole viewpoints of a few SME owners, namely twelve South African SMEs operating within the telecommunication GVC. Furthermore, the study did not explore social and environmental upgrading. The results cannot be generalised because of the exclusion of other telecommunication SMEs that would have enhanced the study positively. However, the study did not aim to generalise the results, but led to the creation of extended future studies.

According to Theofanidis and Fountouki (2019, p.155), delimitations are “features that arise from the research scope limitations”, for example the sole perspective of some SME owners/directors and the choices and decisions that researchers make to exclude or include variables, questions and objectives. The first such delimitation is the usage of criteria in sample selection. The usage of sample criteria guides the selection and recruitment of participants (Creswell, 2014). This study was limited to events ranging from 2017 to 2022.

1.11 Assumptions of the study

According to Kivunja and Kuyini (2017), assumptions in research are what are assumed as true in research. Assumptions of this study were that the findings would add value add to South African SMEs within the telecommunication GVC industry, all participants would truthfully answer the interview questions and the SME sample would be adequate to represent the population (Creswell, 2014).

The study further assumed that multiple economic upgrading is possible within the telecommunication GVC and this can be easily distinguished and identified. It was also assumed that successful economic upgrading does not automatically match with value chain better positions and the economic upgrading process is uneven leading to moments of downgrading (Blazek, 2016). Downgrading can be passive, where a firm is involuntary in

moving towards the production of simpler goods or services, adaptive, where a firm is not able to sustain competitive pressures and forced to move to low-value market, or strategic, where the business move to simpler goods or services through a business strategy change (Bamber et al., 2017). The global value chain itself is assumed to be a practical and useful analytical tool that provides an explanatory framework on how firms engage in the process of value capture, distribution and creation (Blazek, 2016).

1.12 Research outline

The study outline is represented as follows:

Chapter 1: This is the introduction chapter of the study. The background to the problem, problem statement, research questions and aim, research contribution, ethical considerations, limitations and delimitations and assumptions were introduced and discussed.

Chapter 2: This is the literature review chapter where the key concepts and terms regarding the research subject are discussed. The theoretical framework and literature as guided by the research questions are discussed to help identify existing findings leading to the current literature gaps.

Chapter 3: This chapter presents the research questions as aligned to the research gaps and the research problem.

Chapter 4: This chapter discusses the research methodology, reflecting the research process and how it was conducted. The selected research methodology, research design, population, sampling method and size, data gathering approach, data analysis approach, quality controls, limitations and ethical considerations are explained and justified.

Chapter 5: This chapter presents the findings of the study.

Chapter 6: This chapter presents the analysis and discussions of the results to permit the reaching of conclusions.

Chapter 7: This chapter presents the principal theoretical conclusions, research contributions, recommendations, limitations and areas for further research.

Chapter 2: Literature review

2.1 Introduction

This chapter presents the literature review based on current theories and frameworks and past empirical studies on GVC participation and economic upgrading from various researchers that lead to the research questions. The gaps in literature are thus highlighted guiding the research process to the answering of this study's research questions. The chapter discusses definitions and contextualisation of GVC participation and economic upgrading, theoretical framework, the four-fold economic upgrading trajectory, challenges of economic upgrading in GVC and benefits of economic upgrading. The critical success factors of SME effective economic upgrading in GVCs are lastly discussed, leading to the conclusion and conceptual framework that guided the study.

2.2 Definitions and context of GVC economic upgrading and participation

The following key terms are defined and contextualised according to literature:

2.2.1 GVC concept

The global value chain is defined as "the set of inter-organizational networks, around a commodity or product, connecting families, firms and countries in the global economy" (Gereffi, 2019, p.23). According to Jones, Meryem and Erika (2019), the global value chain concept utilises the value chain as its organisational structure for visualising and describing detailed firms and industry studies for both service-oriented and product-oriented activities. In addition, whilst a single geographic location or firm can conduct these activities, multiple firms in different locations around the globe can be divided into doing these activities (Choksy et al., 2017). When a global value chain is analysed, how and why factors such as interfirm relationships, institutions are linked together and sought to understand the influence on competitiveness, development and location of a service or product (Brazinskasa & Beinoravičius, 2014). De Marchi and Alford (2022) argue that understanding by whom, how and where economic value is created and distributed along the value chain is paramount in determining the leverage points and optimal intervention. Thus, within the GVC context, economic upgrading is perceived as the innovation that is aimed at increasing added value (Gereffi, 2019). As such, firms in GVC with their profit motive are constantly searching for opportunities, competencies to develop more tasks that add more value. The past few decades have witnessed rapid changes in technology that have led to MNE global competitiveness changes (Antros, 2020). Global businesses activities have become more

dispersed and fragmented from past sophisticated patterns to permit linkages between MNEs, lead firm buyers and offshore production sites. Service and product manufacturing services are increasingly carried out through the global inter-firms. Firms can now participate in GVC either by forward or supply side participation and backward or demand side participation. Consequently, MNEs have successfully increased their externalisation of their value chain activities to global buyers without being directly involved in production stages entirely (Kano et al., 2020). This leaves the lead companies with the task to coordinate dynamic and complex economic network of activities made up of intrafirm and interfirm relationship (Gereffi, 2019). Figure 3 summarises the common parts of a global value chain of services or goods that include supply chain, value-adding, support environment and end markets activities.

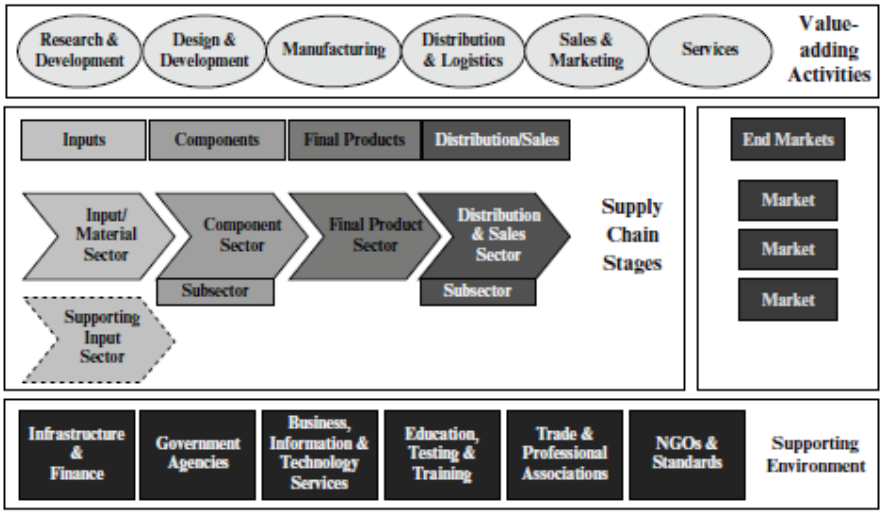

Figure 3: Global Chain Model Components

Source : (Jones, Meryem & Erika, 2019)

Armando et al. (2016) contends that value chain activities include firm's functions that bring a service or product from concept to its creation which begins with R&D, through to manufacturing and distribution and finally to marketing, sales and services. However, according to Gereffi and Fernandez-Stark (2016), GVC trade statistics fail to capture the intangible activities even though most of trade now is becoming increasingly intangible.

2.2.2 Economic upgrading in GVCs

Fernandez-Stark and Gereffi (2019, p.115) defines economic upgrading as "the strategies that firms implement to move towards increased value capture, higher value-added activities and learning opportunities arising from participation in GVCs". Taglioni and Winkler (2016, p.76)

also refers to economic upgrading as “the enhancement of a company’s competitiveness and productivity using the formation of managerial and technological capacity to make sure its enclosure in GVC”.

According to Sima et al. (2020), economic upgrading is when high added value activities is being added to a business, due to the usage of sophisticated competencies, knowledge, or technologies. That is why researchers such as Kano, Tsang and Yeung (2020) regard economic upgrading as synonymous with innovation that leads to a higher generation of value through improved functions, products, processes and inter-sectorial migration. This means by economic upgrading, a firm earns more profits and benefits more from participating in the GVC (Choksy, Sinkovics & Sinkovics, 2017). Marcato and Baltar (2020) argues that economic upgrading is a strategic move and such economic upgrading is not easy to accomplish and does not happen automatically in developing countries companies. Therefore, the quality and occurrence of economic upgrading depends on various firm choices that relates to the business strategy that it follows (Armando et al. 2016).

Firms’ participation in international trade and market need to incessantly learn how to execute its activities in the value chain (Antros, 2020). Sima et al. (2020) argues that when firms upgrade, they are climbing upwards on the value chain to execute activities that are more profitable. Within the context of developing countries, economic upgrading is important to react to competition pressures in higher value-added sectors, tasks and products (Gereffi, 2019). Thus, a firm’s upward movement on the value chain is more desirable to permit more value-add activities to increase and maximise benefits. However, Marcato and Baltar (2020) argue that economic upgrading is not always an upward movement on the value chain but can be changes in the mix and nature of intra-chain activities.

The economic upgrading concept explains how firms shift towards making better services and products with increased efficiency, skilled activities, performance and rewards in high value markets (Algieri, Aquino & Succurro, 2022). However, studies by Chen, Wu, Huang and Chang (2022) found economic upgrading as a highly uneven process whereby the potential for growth and learning does not always result in economic upgrading. In some cases, downgrading occurs and trade off need to be made between economic upgrading techniques. Additionally, lead firms’ coordination mechanisms that influence the possibility for small firms to learn and develop from GVC participation depending on their technological endowment (Chen et al., 2022). Within economic upgrading processes, firms learn through their relationship with other enterprises in the value chain to acquire skills and knowledge that translate into improvements and innovation that increase the value of services or goods (Armando et al., 2016).

Sampath and Vallejo (2018) argue that economic upgrading overcomes comparative advantage theories on cheap labour costs through pursuance of development built on value added and skills. The economic upgrading concept was introduced as a means for organisational learning that improves global trade networking and position for firms. As argued by Kano, Tsang and Yeung (2020), economic upgrading is a dynamic movement of firms to occupy more sophisticated and profitable positions through competencies, capital or technology which yield increased benefits. However, when a firm fails to upgrade, it is going through marginalisation which constraints the business to less profitable markets or activities (Brazinskasa & Beinoravičius, 2014). In this case, the firm remains in low entry barrier market segments and being excluded from high entry barrier market segments due to lack of capacity. Economic upgrading is thus a long-term strategy for capturing and preserving more gains in GVC participation through being able to invent and to incessantly create new processes and products (Armando et al. 2016). However, according to Brazinskasa and Beinoravičius (2014), economic upgrading is sometimes not entirely a process that is independent, but it can be because of the firms' inputs. Lead firms normally have control over technology in use within the value chain.

2.3 Theoretical framework

This research is underpinned on the following theories:

2.3.1 GVC framework

In the theoretical framework by Fernandez-Stark et al. (2014), GVC is regarded as a multidimensional concept that consists of six dimensions namely elements of aspects of (i) input-output structure, (ii) geographic scope and (iii) governance and firm level elements with aspects of (iv) upgrading, (v) institutional context and (vi) industry stakeholders. The economic upgrading element was the main area of focus in this study with the aim to explore the economic upgrading factors affecting South African SMEs' participation within the telecommunication GVCs. According to Gerrefi (2019), firms can upgrade in a value chain using the value chain framework through process upgrading, product upgrading and functional upgrading to increase their participation. Process upgrading involves the transformation of inputs into outputs more proficiently by introducing more advanced technologies or re-organisation of the production systems (Fernandez-Stark et al., 2014). Product upgrading is the procedure of moving into more advanced product lines which increase the unit value (Hollweg, 2019). Functional upgrading is the process of obtaining new value chain functions or leaving current functions to raise the entire skills content of the value chain activities (Gerrefi, 2019). Inter-chain upgrading is the process of mixing different products that can sell

utilising the competences learnt in a certain value chain function to move into another industry or sector (Hollweg, 2019). The concept of economic upgrading, commonly, refer to the collection of ways when companies can improve their competition with other firms through investing in knowledge-intensity, specialisation and productivity (Marcato & Baltar, 2020). Furthermore, Armando et al. (2016) hypothesise that a reward exists for companies to change enforcement and parameter setting when they upgrade. Similarly, according to Gereffi (2019), economic upgrading is a critical pillar of the GVC framework which grew from the conviction that globalisation is viewed from the way international production networks of firms is controlled and organised and how the uneven distribution of the globalisation gains can be accessed by firms in other developing countries.

According to Antros (2020), it is important to note that there is false homogeneity and false heterogeneity in the definition of economic upgrading stages due to the variation which occurs by industry and by time. Hence, economic upgrading in electronics GVC cannot be visualised the same as in telecommunication GVC. In addition, lead firms in GVCs often block functional upgrading efforts of small firms, though they may support process and functional upgrading (Armando et al., 2016). Hence the need in this study to explore how South African SMEs upgrade within the telecommunication GVC.

2.3.2 Absolute advantage theory

Adam Smith's theory of absolute advantage advocates on free trade between two firms when one firm can buy from another a commodity produced at a lower cost than having to make it (Ukwando, 2015). Therefore, this study is underpinned on the theory of comparative and absolute advantage to understand how SMEs can emerge in telecommunication GVC through process upgrading, product upgrading, functional upgrading and inter-chain upgrading and increase their participation in business with foreign and local companies. Comparative and absolute advantage assists firms to determine which profitable value chain segments to exploit using production capabilities, resource endowment and relative skills (OECD, 2015). According to Heckscher-Ohlin standard trade theory (1991), trade thus impacts what companies can trade, how they trade and the efficiency and effectiveness of the production processes (Elteto et al., 2015). This means that based on the comparative advantage theory, labour intensive nations will have firms trading more in labour intensive goods than capital intensive goods as might be the case with the telecommunication SMEs in South Africa.

However, according to Marcato and Baltar (2020), the traditional supply and demand theories and comparative advantage have little meaning due to the rising global integration complexity. Global integration of trade has disintegrated production process of firms to become more

competitive using non-core outsourcing activities both abroad and domestic. Therefore, global value chains are no longer analysed passively using traditional theories but using an asymmetric and dynamic systems of coordination and organisation by non-economic and economic players (Neilson et al., 2014). This study thus went beyond the use of traditional theories and examined SME economic upgrading in GVCs using both traditional and modern theories.

2.3.3 Comparative advantage theory

According to Ukwando (2015), companies can learn from David Ricardo theory of comparative advantage to achieve benefits from global value chains through specialization achieved by economic upgrading. However, Lee et al. (2017) argues that these benefits do not essentially need the production of more technologically advanced products. According to Wang, Nei and Zhu (2018), a GVC offers the advantage to participate into the increasingly fragmented production segments of an array of processes, functions, tasks, or products that are needed. This is where SMEs can participate in productive involvement.

In the comparative advantage theory, the concern is producing comparatively and ascertaining various inter-industry specialty patterns (Algieri et al., 2022). This theoretical perspective of a perfect market of competition means that companies must target to achieve production efficacy. In other words, it is insufficient and analysing SMEs' performance using competitive advantage is important due to the presence of types of imperfect competitiveness in global and local markets and the existence of varying dynamics of externalities in other sectors and GVC stages (Bamber et al., 2017). However, focussing on economic upgrading need the movement away from Ricardo's inert Comparative Advantage concept (CA) (Schumacher, 2013). Whist, the comparative advantage concept registers ex-post gaps in relative productivity which determine international trade flows, company-level economic upgrading success permits dynamic competitiveness acquisition in new market phases, sectors or niches of the production chain (Ukwando, 2015). In total, it is logical to move from innovation to economic upgrading to acquire company-level competitiveness. Hence the need in this study to understand how SMEs upgrade economically to increase their participation in telecommunication GVC.

2.4 Four-fold economic upgrading trajectory categorisation

A four-fold categorisation of possible economic upgrading trajectory was created by Kaplinsky and Morris (2001) as inter-chain upgrading, product upgrading, functional upgrading and process upgrading (Marcato et al., 20190). Literature is therefore reviewed on the different aspects of economic upgrading namely inter-chain upgrading, product upgrading, functional upgrading and process upgrading:

2.4.1 Process upgrading

Armando et al. (2016, p.21) defines process upgrading as "the transformation of inputs into products or services or outputs more efficiently using superior technologies or reorganisation of production processes". This means the business activities are performed more efficiently with process upgrading to integrate more in a GVC. As such, firms that deal with physical products or services use their capabilities to achieve a higher efficiency in process tasks with lesser defect/rejection rates (Kano, Tsang & Yeung, 2020). With process upgrading greater efficiency of internal processes and increased output is therefore achieved.

According to Marcato et al. (2019), process upgrading takes place when companies are developing their value-added portion in their current GVC activities by having a better organisation of internal systems than competitors. Thus, Kano et al. (2020) contends that process upgrading is led by cost-cutting requirements and output improvement needs to respond to competitors in the GVC. Competition come in the form of low-cost alternatives to put pressure on the pricing (Sima et al., 2020). The firms are thus forced to look at ways to process upgrade to increase its production efficiency and overcome competition in the GVC.

Bamber et al. (2017) contends that process upgrading is focussed on economic upgrading the product and optimization of distribution and production processes. Through process upgrading, new technologies such as modern transportation technologies, cooling installations, packing lines and automated production can be introduced (Sampath & Vallejo, 2018). Similarly, new processes that improve supply chain communication facilities such as mobile phone usage in transport and production planning, can be introduced (Lee et al., 2017). This in turn can permit the processing of more complex tasks, that lead to reduction of per unit costs and efficiency gains (Lee et al., 2017). In a study by Elteto, Maghashazi and Szalavetz (2015) of Hungary firms, process upgrading was achieved through continuous improvement of root cause elimination and waste identification programs. However, Bamber et al. (2017) argued that the main challenge for small firms wanting to upgrade in GVCs, is to increase access to technology and knowledge to compete and increase productivity thereby reducing

cost to achieve absolute advantage. In contrast to the Hungary study, studies of Brazilian firms by Armando et al. (2016) found that service-oriented firms obtained high gains through process upgrading by embarking on commercial liaisons. However, Bamber et al. (2017) contended that the global buyers were not attracted by the firm's economic upgrading in terms of impending their development, branding and distribution channels and better-quality designs. This means there are many ways for firms to achieve process upgrading but not all process upgrading will be successfully accepted by stakeholders in the global value chain.

Kowalski et al. (2015) found that more productivity improvement increased profits and sales of local firms in China. Such enhancement of productivity was achieved with access to the location of demand and supply of intermediate inputs. Therefore, firms need to carefully select their inputs and a well-functioning value chain to facilitate process upgrading in the GVC (Banga, 2022). Production systems are reorganised, or new technologies introduced to permit a more efficient transformation of inputs into outputs.

According to Bamber et al. (2017), vertical and horizontal linkages are vital as an information source and technical help for process upgrading. The technical help constantly originate from embedded services as part of product packages. Horizontal linkage is the source of learning and information for process upgrading (Sampath & Vallejo, 2018). The creation of SME networks occasionally assists small firms to gain access to advice, information, finance and training from other companies within the GVC. Additionally, horizontal linkages whether informal or formal are vital to SMEs in sharing important information and experiences on processes that enhance productivity (Lee et al., 2017). Hence, a firm should use its internal resources to process upgrade but in alignment to other value chain players such as the lead firm, suppliers and its clientele.

2.4.2 Product upgrading

According to the Armando et al. (2016), product upgrading is the sophistication of products or services to obtain higher market prices. This happens when a company obtains capabilities to supply high value-added goods and services as compared to its competitors. Horizontal and vertical innovation, research and development investment, cutting-edge technology adoption leads to product upgrading (Lee et al., 2017). In product upgrading, old products are improved and updated through process upgrading that shift production towards sophisticated products that capture higher unit value (Bamber et al., 2017). Hence, some firms achieve product upgrading by shifting from customers low-end market to high-end markets. This is achieved because of greater skills needed to produce sophisticated products that capture a higher unit

value. However, some firms use process and product upgrading at the same time to achieve better integration and participation in the GVCs (De Marchi & Alford, 2022).

Kowalski et al. (2015) argue that GVCs permit SMEs specific segment product specialisation, therefore, for comparative advantage there is no need for SMEs to know all processes to produce all product lines in the global production chain. Production growth and differentiated products help to increase value within the value chain (Choksyet al., 2017). However, the value created by a company within a GVC is dependent on competitors' difficulty to produce similar products or services. Replicable products that can be copied easily such as those not protected by intellectual property rights (IPRs) can easily be developed into substitute products or services in a GVC (Choksy et al., 2017). Yet, other researchers such as Marcato and Baltar (2020) contends that product upgrading of SMEs in GVC through supplying of intermediate services or goods to lead firms which can either local or foreign owned is more effective.

Armando et al. (2016) contends that product and process upgrading are common in developing nations' value chains partnership than inter-chain and functional upgrading. Similarly, in a study of apparel GVCs, Pietrobelli et al. (2021) argued on how developed nations lead firms easily partnered with SMEs for process and product upgrading and not for functional upgrading thus limiting movement of value-added activities from developing nations to developed nations. Consequently, product upgrading requires greater capability on part of the local firms to change into new product manufacturing (Gerrefi, 2019). These companies produce new services or products in current value chains or improving old products or services quicker than their competitors and products or services align to lead firms' requirements.

A functional value chain conveys information to producers about customer needs and the pricing indications related to their needs (Marcetti et al., 2020). Intermediaries thus play an important role in promoting product upgrading using vertical information flowing about changing demand or consumer preferences (Bamber et al., 2017). Thus, when customers want different or new products, all companies in the GVC receive this pressure which needs a respond. Additionally, buyers also give non-price incentives besides putting up price premiums for improved products, such as input advances, training, design assistance and technical assistance (Gereffi & Fernandez-Stark, 2016).

2.4.3 Functional upgrading

According to Armando et al. (2016, p.24), functional upgrading is “the performance of new functions such as designing, maintenance, or marketing to capture high values”. Within firms, functional upgrading occurs when more sophisticated technologies bring capabilities to function in GVC segments with higher value-added production (Gerrefi, 2019). This works better in a firm that is human capital rich with sufficient skills to handle these advanced technologies into new value add functions (Gerrefi, 2019). Additionally, the new superior functions added in the GVC, result in an overall increase in skills content in the firm such as R and D, designing, marketing, branding, maintenance. Lee et al. (2017) notes that an important driver of functional upgrading in a firm is knowledge-based capital investment. Gereffi and Fernandez-Stark (2016) argue that functional upgrading can take place when a company upgrades from low value function to high value function. Therefore, a firm can abandon low value-added function to primarily focusses on new high value-added function which can generate more revenue. In this case, the firm is increasing value added by changing the activities or by the movement of its central activities to a new GVC segment. An example is when a firm moves from manufacturing activities to branding, retailing, marketing, designing, maintenance or research and development. However, there are bigger demands on a company’s skills set and greater barriers to entry into such activities (Marcato & Baltar, 2020). Similarly, Choksy et al. (2017), argue that functional upgrading requires greater capability on part of a local firm to add new functions within a GVC. Hence, Gerrefi et al. (2021) concluded that developing economies SMEs should start with product or process upgrading which might be easier to undertake with less obstacles and execute functional upgrading when they have more economic upgrading experience.

Within a GVC, firms are seeking for high level value creation in upstream activities as well as downstream activities (Bamber et al., 2017). New superior functions in the value chain are acquired that focus on higher added value. For example, upstream activities may be key components or parts manufacturing, R & D, design, or new concept development whereas downstream activities may be customer service, branding, or marketing. Similarly, Mehta (2021) regards functional upgrading as impacting global value chain participation level using backward and forward linkages and integration within the value chain. Most of these activities involve non-codified and tacit knowledge in areas of complex systems, cutting-edge technology and original design (Gamble, 2020). Hence, a company ought to have the necessary skills set or know how to create and manage the new functions. However, Armando et al. (2016), argue that companies can build on their lacking competences by outsourcing knowledge intensive services. This means a firm can either use its internal human capital or

outsource expert knowledge that enable it to functional upgrade its business activities and participate more in the GVC.

Gerrefi (2019) argues that too much product and process upgrading leaves a firm with tight relationships that prevent functional upgrading due to overreliance on a few powerful clients. Most companies operating in developing economies struggle to functionally upgrade their businesses than the ones from developed countries (Gamble, 2020). However, past studies such as Marcato and Baltar (2020) examined functional upgrading at country level rather than at firm level to show how exports could be improved when firms move to intermediary functions in commodities GVC to increase their participation. Hence the need in this study examine how SME firms are functional upgrading within telecommunications GVC.

According to Gerrefi et al. (2021), functional upgrading is driven by the need to eliminate the intermediaries market power and the need to change market signal flows to producers. However, movement to a new value chain level leads to risks related with changing power balances, shifting relationships and the desire for new skills and knowledge segments (Mehta, 2021). New level value chain movement occasionally include the involvement of new vertical relationship establishment that may need SMEs dealing with varying business types and interacting with new cross class boundaries or social groups (Gamble, 2020). In addition, functional upgrading regularly needs SMEs to learn complex and new skills associated with product design, product development, marketing and branding (Gereffi et al., 2021). Therefore, for SMEs to successfully functional upgrade they need a high skilled and knowledgeable human capital to handle the change in functions and be able to handle relationships in the new level of the value chain.

2.4.4 Inter-chain upgrading

According to Armando et al. (2016), interchain upgrading occurs when a firm uses its current competencies learnt to move to a new industry GVC to capture higher value added. Similarly, Sampath and Vallejo (2018) regards interchain upgrading as a firm's economic upgrading of its services or products into an associated GVC. Additionally, Gerrefi (2019), regards interchain upgrading as the application of competencies obtained in one value chain and moving horizontally into another value chain. This is different from functional upgrading in the sense that functional upgrading occurs within the same GVC whilst interchain upgrading occurs when the firm moves to a new GVC whilst leveraging from existing capabilities and competencies acquired in the current value chain (Marcato & Baltar, 2020). In this case, a firm moves into a new GVC and can capture high value add. An example is Apple's ability to move to the smart phone global value chain using its core competences learnt in computer global

value chain. The movement is thus horizontal to a new GVC to produce higher value added per unit using current skills, knowledge and competencies.

A firm's strategic option is then to effectively use value chain knowledge acquired, continuously search for excellence in production and to embark on market diversification (Armando et al., 2016). An example is the studies in developing countries value chain which found that interchain upgrading was achieved through making horizontal partnerships or collaborations such as joint production facility usages, joint product/services marketing or joint production inputs purchasing to achieve product or service differentiations (Choksy et al., 2017).However, these different paths of economic upgrading do not only depend on domestic value added and value-added trade participation but also rely on increased GVC participation to boost volumes in a multi-linear manner (Sampath & Vallejo, 2018). In addition, the success of the economic upgrading is the finding of markets that offer opportunities for increased value add and permit value to be extracted by different stakeholders in the value chain (Zakic et al., 2018).

In a study in Canada by Choksy et al. (2017), it was held that SMEs fail to interchain upgrade due to a lack of power asymmetries in the network and their degree of explicit coordination. SMEs are either hold hostage by lead firms who have assisted them to acquire capabilities. From the lead firm perspective, they have an interest in allowing an SME to benefit from its investment and from the SME's viewpoint, it may be loss-making to move to unfamiliar or new market segments (Armando et al., 2016). These dynamics leads to the existence of barriers to economic upgrading that either accelerate or decelerate participation in value chains. This study thus explored at firm level the extent to which SA SMEs within the telecommunication GVC executed these four types of economic upgrading to increase their participation in GVCs.

2.5 SME challenges of economic upgrading in GVCs

SMEs are occasionally regarded as less developed or less equipped to provide better quality products or services (Gereffi & Fernandez-Stark, 2016). Additionally, according to Bamber et al. (2017), SMEs struggles to upgrade because of amongst other things, lack of government support, limited finance, skilled workers' shortage, higher infrastructure costs.

2.5.1 Gaps in technology and marketing

According to Marcato et al. (2019), SMEs from developing countries face the challenge of technology gap and marketing gap to participate effectively in GVCs. The technological gap exists from the difficulty in accessing the much-needed technologies. This makes SMEs

connected with innovation capacity and weak technologies (Gereffi, 2019). Whereas marketing gap is the high barrier to entering into these intense GVCs. These SMEs face the challenge of heavy information costs to enable them to establish a brand in the global value chain.

2.5.2 Governance

Kano et al. (2020) argues on the effect of governance on economic upgrading, whereby lead firms have the upper hand to guide and enable process and product upgrading. As such, governance affects the degree of power asymmetries and explicit coordination in the global value chain where a firm is held hostage because of the value chain relationships especially where the lead firm has invested capabilities into a small firm. This means economic upgrading will alter with the governance patterns and power relations characterising the GVC. According to Elteto et al. (2015), lead firms organise GVC and plays a critical role in supporting and nurturing the economic upgrading process of smaller firms. However, with functional upgrading, the decision to upgrade should be driven internally or be the result of learning dynamics created separately by producers.

2.5.3 Lead firm non-acceptance of upgrade

In a study in Canada by Choksy et al. (2017), it was held that SMEs fail to inter-chain upgrade due to a lack of power asymmetries in the network and their degree of explicit coordination. SMEs are held hostage by lead firms who have assisted them into acquiring new capabilities (Brazinskas & Beinoravicius, 2014). From the lead firm perspective, they have interest in allowing an SME to benefit from its investment and from the SME's viewpoint, it may be loss making to move to unfamiliar or new market segments (Chen et al., 2022). These dynamics leads to the existence of barriers to economic upgrading that either accelerate or decelerate participation in value chains.

A study in Brazil by Sampath and Vallejo (2018) found that firms in the value chain benefited from commercial liaisons to process upgrade and obtain higher gains. However, this success was limited to buyers or lead firms that accepted the new processes. In the Brazilian study, SMEs that process upgraded in terms of better distribution channels, branding and quality designs were faced with buyers who were not interested in their upgrades. Sometimes, small firms are forced to abandon upgrades because of supplier/buyer requirements or changing buying patterns of consumers (Choksy et al., 2017).

2.5.4 Excessive business exposure

Care must be taken when undertaking interchain upgrading, lead firms might not allow competitors to benefit from its investment (Armandi et al., 2016). Interchain also exposes a firm to new forms of competition in the new value chain which might turn unprofitable going after other clients or market segments. Cattaneo et al. (2013) argue that small firms must make a strategic goal to avoid locked up value chain relationships such as market diversification, continuous production excellence and effective use of knowledge.

2.5.5 Product and process shocks

According to Gereffi and Fernandez-Stark (2016), process shocks such as new foreign regulations about production methods standards can threaten process upgrading. Additionally, emerging competitors who can produce more efficient product or services also affect process upgrading. (Pietrobelli et al. (2021) also argue on the impact of service or product shocks on product upgrading which threaten what a firm can produce to collapse the foreign or domestic demand in the GVC.

2.5.6 Lack of knowledge and skills

Lwesya (2021) contends that intensified competition, internationalisation, trade liberalisation and managerial skills are factors affecting SMEs to upgrade. SMEs lack in market intelligence, financial resources, necessary manpower, economies of scale, institutional support and inabilities to network and meet large demand. SMEs have inabilities to internationalise their operations because of inadequate capabilities to segment, penetrate and analyse foreign markets. Gamble (2020) found that SMEs lack skills and knowledge to respond to contracts and have less challenges and opportunities awareness deduced from a trade agreement. Mehta (2021) found that SMEs have managers that lack skills on new techniques and strategies to position new designs and productions. SME owners lack skills to permit time and manpower to obtain new skills, e-commerce usage, hire appropriate talented and qualified individuals and to stop anti-competitive practice (Gereffi, 2019).

2.5.7 Lack of an enabling environment

According to Choksy et al. (2017), SMEs lack an enabling environment that create favourable conditions to upgrade including but not restricted to technology, entrepreneurial, infrastructure, regulatory frameworks, factor endowment and economic policies. The central roles of

governments in creating this enabling environment but in developing nations, they lack knowledge and skills to create and put in use of the right policies (Mehta, 2021).

2.5.8 Lack of a dynamic entrepreneurial environment

Gerrefi et al. (2021) argue also that SME development thrive when driven by entrepreneur and a dynamic entrepreneurial environment. This spirit ignites SMEs to continuously upgrade by doing something new or different with calculated risk-taking behaviour for future gains and to add value to society (Bamber et al., 2017). However, entrepreneur success comes from internal entrepreneur traits, solid business plan, adequate resources, favourable external environment, wider political, social and cultural contexts (Antros, 2020). Consequently, a study in Asia by Lee et al. (2017) found that SME managers did not upgrade due to the fear of failure.

2.5.9 Lack of financial resources

Lwesya (2021) argue that SMEs have challenges to finance their economic upgrading initiatives. SMEs lack access to sufficient and sustained finance from government subsidies, government grants, leasing, asset-based, equity, debt, internal, or informal. Foreign direct investment must be enabled since small businesses can participate more in GVC. According to Marcato and Baltar (2020), investment capital incapacity can be a critical limitation to process upgrading. Investment in equipment, heavy tools or powerful machinery require availability of financing to make process upgrading possible. Access to finance is critical for the entrepreneur's capacity to investing in global trading, market research, product quality and HRD (Bamber et al., 2017). In addition, finance access improves a small business owner's risk-taking readiness.

2.5.10 Lack of business development services

Lwesya (2021) argues that SMEs lack in business development services capabilities that enables its economic upgrading processes in GVCs. SME's business development services consisting of operational, advisory and advocacy as core segments, must be comprehensive, affordable and high quality to yield good results for the business (Kowalski et al., 2015). A study in Asia by Lee et al. (2017) found that SME advisory and advocacy were underdeveloped to trigger SMEs to upgrade their services. In addition, the study also found SMEs having difficulty to build their innovation capabilities. Very few SMEs were associated with a strong R and D culture.

2.5.11 Intellectual Property Rights (IPR) protection problems

In a study of software and film value chain by Lwesya (2021), inability to implement IPR was found to be a major barrier affecting SMEs to use innovations to upgrade. The fact that most SMEs in developing nations are unable to adequately protect and exploit their intellectual property indicates that most of these SMEs are low on knowledge, capability and financial resources (Brazinskasa & Beinoravičius, 2014). This critical relationship exists for small and mid-sized companies in developed countries. According to Chen et al. (2022), SMEs are dependent on IPRs for investment and for the sale of their cutting-edge innovations. In addition, these SMEs depend on IPRs to protect them from being copied, increasing the value of intellectual assets and intellectual property earned by SMEs (Lwesya, 2021).

2.6 SME benefits of economic upgrading in GVCs

The following are some of the benefits of upgrading as found in literature:

2.6.1 Increased integration in GVCs

According to Sima et al. (2020), economic upgrading is an act of executing high value add activities, due to the usage of sophisticated competencies, knowledge, or technologies. This means by economic upgrading, a firm earns more profits and benefits more from integrating and participating in the GVC (Choksy et al., 2017). According to Slany (2019), economic upgrading is a stepping-stone for more participation in GVCs which ensures a higher and better trade integration with others on the global markets. SMEs become more exposed to opportunities they can exploit with speed and flexibility permitting a niche within the global market (De Marchi & Alford, 2022). Therefore, economic upgrading is moving upwards on the smile curve through the shifting of production towards services or products that capture more rent and have higher barriers to entry (Gereffi, 2019).

2.6.2 Increased value added

Researchers such as Kano et al. (2020) regard economic upgrading as synonymous with innovation that leads to a higher generation of value through improved functions, products, processes and inter-sectoral migration. Lee et al. (2017) contends that economic upgrading increases value added by economic upgrading of services, products, processes. The economic upgrading can also be in packaging, insourcing production, distribution functions (functional) or product differentiation (interchain) (Bamber et al., 2017). However, according to Armandi et al. (2016), process and product upgrading without functional upgrading proved

ineffective in Brazilian shoe industry small firms. These firms improved well their flexibility, response time and product quality but considered horizontal collaboration with a producer leading to their dismal performance. Additionally, the economic upgrading must also meet standards consistently as defined by the market. GVC are governed by standards that can offer value-added production opportunities (Elteto et al., 2015). However, adherence to GVC standards to gain a specific portion of market access, does not essentially mean economic upgrading.

2.6.3 Improved efficiencies and output

Sima et al. (2020) argue that these greater internal process efficiencies are achieved using advanced information technologies. Lee et al. (2017) argues that process upgrading takes place within companies in a GVC or between companies in a GVC to increase output or frequency of production. In studies of Brazilian firms by Armando et al. (2016), it was found that firms obtain high gains through process upgrading by embarking on commercial liaisons. However, Pietrobelli et al. (2021) argues that the global buyers are not attracted by the firm's economic upgrading in terms of moving into research and development, branding, distribution or designing.

2.6.4 Improved specialisation

Armando et al. (2016) contends that economic upgrading results in greater specialisation that enable the generation of more income, productivity gains and employment opportunities. However, researchers such as Antros (2020) found that firms that upgrade do not always yield better competitive positions. In some cases, short lived benefits were found which deteriorated over time leaving the small firms deteriorated and compromised over time. Consequently, studies in Brazil by Kowalski et al. (2015) found that small firms upgrade were left handicapped when they had foregone important learning process aspects and high value-added outsourcing functions.

As such Kano et al. (2020) argues that economic upgrading improves market access possibilities. According to Marcato and Baltar (2020), market access means economic upgrading of vertical as well as horizontal relationships. As such, collaboration with horizontal partners is vital. This can include joint product marketing, joint production facility uses and production input purchasing. Sima et al. (2020) thus found that intersectoral economic upgrading was achieved through horizontal collaboration resulting in product differentiation. However, Armando et al. (2016) found that economic upgrading vertical relationship by SMEs

is very difficult to move into another market channel. The focus is to move to the right market that differentiate market segments to bring more independence.

2.7 Critical success factors in SME economic upgrading to increase participation in GVCs

A critical success factor represents an activity or area that needs careful and constant attention to attain a desired performance, whilst involving additional managerial participation to raise business success or survival and decrease start up failures (Hyytinen et al., 2015). The GVC research field has created an instrument for assessing the viewpoints on critical success factors by value chain actors for competitiveness, where the producers rate own performance in connection with supplier's expectation and gap for the improvement realised (Gerrefi, 2019). This is used by garment industry in the Dominican Republic (Bamber et al., 2017). The following are critical success factors for small firms to economic upgrade successfully.

2.7.1 Standards and quality compliance factors

SMEs must comply with international standards in the GVC and ensure its technologies is inextricably linked to and dependent on this (Kano, et al., 2020). According to De Marchi and Alford (2022), process and product upgrading must ensure quality and compliance regulatory requirements. Because the product doesn't need to meet rigorous testing standards, validation of product compliance is possible by conducting tests on the product. Process compliance, however, necessitates regular factory audits and is often connected to process certification such as ISO 9001:2015 (Sampath & Vallejo, 2018).

Prior to the introduction of an international standard such as ISO 9001, generic standards such as ISO 9001 were believed to be sufficient for producing consistent quality (Kano et al., 2020). In addition to industry-specific and proprietary process standards, a number of proprietary process standards and/or industry-specific standards have also been used by lead firms. Many small businesses encounter significant expense and time dealing with a range of standards, particularly in terms of training for certification. This can be a barrier to entry for these businesses into a GVC.

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2.7.2 Business environment factors

A study by Loewe et al. (2013) in Egypt showed that business environment was key to individual SMEs upgrade. The components of business environment such as infrastructure,

non-financial business development services (BDSs), access to insurance, access to finance, trade policy, skilled labour availability, corruption, competition, regulation, political instability and macroeconomic stability impact SME's investment behaviour, growth and innovation potential (Bamber et al., 2017). Unfavourable laws and regulations such as company inspection, custom inspection, taxation, licensing, including the existence of corruption impact how SMEs integrate and grow. Country specific challenges such as political instability and regulations impact firms to accelerate or decelerate economic upgrading. SME economic upgrading in nations is importantly affected by infrastructure. Reliable access to up-to-date Information Technology (IT), water supply, energy supply, good transportation links, are needed to effectively run businesses, whilst sub-standard infrastructure could lower private investment level and returns (Armando et al., 2016). The state of the infrastructure influences a nation's SMEs and affects economic upgrading probability of each company depending on the overall resource availability and the access conditions (Bamber, et al., 2017).

Stable macroeconomic conditions ease a nation's SME economic upgrading (Bamber et al., 2017). Real exchange rate stability and moderate inflation gives companies more ease in future development predictions and greater security, that positively influence upgrading efforts and their investment behaviours (Slany, 2019). However, the impact differs with each firm size and access to finance for instance. Companies with social capital, that is good influential individuals in government or the bureaucracy, may get taxation, licencing, registration and preferential treatment, or when applying for government tender or credit that can help expand the business and ease market access (Bamber et al., 2017). These companies accrue rents developed. Contrary to this, some owners of SMEs might not be well connected and not able to affect public administration or government decisions. Such unfair competition becomes an obstacle to economic upgrading and a high market entry barrier (Marcato & Baltar, 2020)

2.7.3 Inter-firm linkages factors

Su et al. (2020) argue that SMEs are likely to upgrade due to the existence of vertical and horizontal interfirm linkages. Such linkages provide owners of SME with access to collective action, resources and knowledge (Lwesya, 2021). Providing goods or services in large quantities to global buyers is able to create occasional demand to produce sufficient cashflows for local firms. The accumulated capital can then be reinvested, thereby facilitating expansion (Gereffi, 2019). However, integration's potential benefits into global value chains are not applicable to all small businesses: economic upgrading probability grossly rely on the value chain power relations and governance (De Marchi & Alford, 2022). A study by Lwesya (2021) found that SME benefitted less from integrating with big firms if there was power asymmetry.

Chen et al. (2022), in a study of Italian firms, also argued that clusters or agglomeration of SMEs raised their competitiveness and helped them to upgrade. Clusters divide labour amongst members and specialise and share costs of innovation crucial for economic upgrading (De Marchi & Alford, 2022). Clusters are reported to positively influence the spread and application of knowledge (Elteto, et al., 2015). These clusters can be formed through formalised business networks that facilitate collective efficiencies, access to markets, access to resources and providing knowledge. Additionally, trade associations' business members can select risk sharing to improve bargaining power. The probability of affecting policy-making is increased with greater bargaining power and encouraging a favourable economic upgrading environment (Bamber et al., 2017). Nevertheless, the business network structures are very different in other nations. The formalised network benefits are meaningfully decreasing in nations where a firm's connection is controlled (De Marchi & Alford, 2022).

Small firms learning from demanding clients and lead firms is key to functional upgrading success (Armando et al., 2016). Competencies come from the knowledge learnt when being outsourced by lead firms (Edvardsson & Durst, 2019). SMEs working with GVC lead firms is a great advantage which facilitates learning and enhances its developmental potential (Gereffi, 2019). For the SME, economic upgrading enables them economic competitiveness since profits, employment and skills are poised to increase. However, De Marchi and Alford (2022) argue that economic upgrading is not a straightforward process when one considers the diverse GVC stakeholders' interests, fragmented supplier bases and power asymmetries. According to Brazinskasa and Beinoravičius (2014), partnership between SMEs and lead firms is one of the most efficient strategies for integrating domestic suppliers into GVCs.

According to Mallinguh et al. (2020), SMEs must keep up with both global and industry standards for technological advancement. Such primary drive towards innovation by SMEs is from the lead firm in the GVC which occasionally provide details of the methods and types of product development and innovation. According to Bamber et al. (2017), government can also intervene to incentivise SME to purchase relevant technology. In addition, Brazinskasa and Beinoravičius (2014) contends that SMEs R and D can be facilitated and supported at national level to ensure they have capacity to upgrade adequately.

2.7.4 Firm characteristics factors

A study by Su et al. (2020) found that SME characteristics impacted the firm's economic upgrading potential than the owner's characteristics. According to Bamber et al. (2017), structural variables such as an enterprise's policies, formal status, location, sector, size and age, including organisational variables such as innovation and knowledge management are

important factors that determine the success of economic upgrading by an SME. An SME's innovation and knowledge management affect its likelihood of upgrading (Loewe et al., 2013). Firms involve themselves in market research, which is critical for idea generation, market niche identification and makes entrepreneurs' aware of the need of top-quality services or products (Antros, 2020). Old and big firms are more likely to grow because of greater business sophistication (Brazinskasa & Beinoravičius, 2014). However, De Marchi and Alford (2022) argue that younger and smaller firms are more associated with innovation than older firms. According to Chen et al. (2022), the sector in which an SMEs operates affects its potential to upgrade. The level of competition and governance differ in each sector. According to Brazinskasa and Beinoravičius (2014), informal small businesses are less probable to upgrade than formal small businesses. The SMEs cannot approve contracts and are mostly avoiding the costs of formalisation such as paying taxes. Marcato and Baltar (2020) argue that economic upgrading is a strategic move and such economic upgrading is not easy to accomplish and does not happen automatically within companies operating in developing countries. Therefore, the quality and occurrence of economic upgrading depend on various firm choices that relate to the business strategy that it follows (Armando et al. 2016).

2.7.5 Entrepreneur characteristics' factors

Kano et al. (2020) argue that the entrepreneur characteristics are critical to a small business's economic upgrading potential. The entrepreneur's gender, risks taking, motivation achievement, social capital and human capital, are key to the successful implementation of economic upgrading techniques (Loewe, et al., 2013). The human capital of small business owners based on quality vocational education and basic education, global exposure and quality work experience is important to impact how an SME conduct market research, quality product and process, creativity and innovation necessary to upgrade (Su et al., 2020). In a study of SME in Egypt by Lwesya (2021), it was found that a lack of risk aversion and motivation were amongst the principal explanations for lack of employee training and new product or machine investment by entrepreneurs. Knowledge and skills are attained by persons who invest in wok experiences, on the job training and schooling (Antros, 2020). The more knowledge and skills the owner has, the more the capability to access opportunities and take risks, develop a growth strategy and learn about new processes (Bamber, et al., 2017). An owner of a small business's social capital can enable access to resources and information such as financial usefulness, advice, support for economic upgrading. However, social capital impact depends on SMEs' societal context (Brazinskasa & Beinoravičius, 2014).

2.8 Summary

The literature review carried out in this chapter revealed the concept of GVC and economic upgrading as well as its theoretical foundation that includes the GVC, framework, absolute advantage and comparative advantage. The literature review also found that firms in value chains increase their integration, specialisation, added value, efficiencies and output in GVCs through economic upgrading. However, this does not occur without challenges and limitations, especially with regard to SMEs operating in developing countries in various GVCS with technological and marketing gaps, governance, lead-firm non-acceptance of upgrading, excessive business exposure, product and process shocks, lack of knowledge and skills, lack of an enabling environment, lack of dynamic entrepreneurial environment, lack of financial resources, lack of business development services and IPRs. However, the gap remains to exist on what specific challenges and benefits SA SMEs that operate within telecommunication GVCs encounter when economically upgrading. The critical success factors of economic upgrading for GVC SME players as found in literature are factors that have to do with standard and quality compliance, business environment, interfirm linkages, firms' characteristics and entrepreneurs' characteristics. Whereas other studies have been conducted at country level and in other industries, this study focussed on economic upgrading at firm-level to understand the dynamics, including the challenges, benefits and critical success factors of economic upgrading within the telecommunication global value chain for SA SMEs, a very important sector for economic growth and employment in South Africa. The next chapter presents the research questions arising from the literature review.

Chapter 3: Research questions

3.1 Introduction

This chapter deduces and explains the research questions arising from the literature review. These questions assisted in exploring the research problem and helped to guide the research process of gathering primary data. The literature review led to the following conceptual framework:

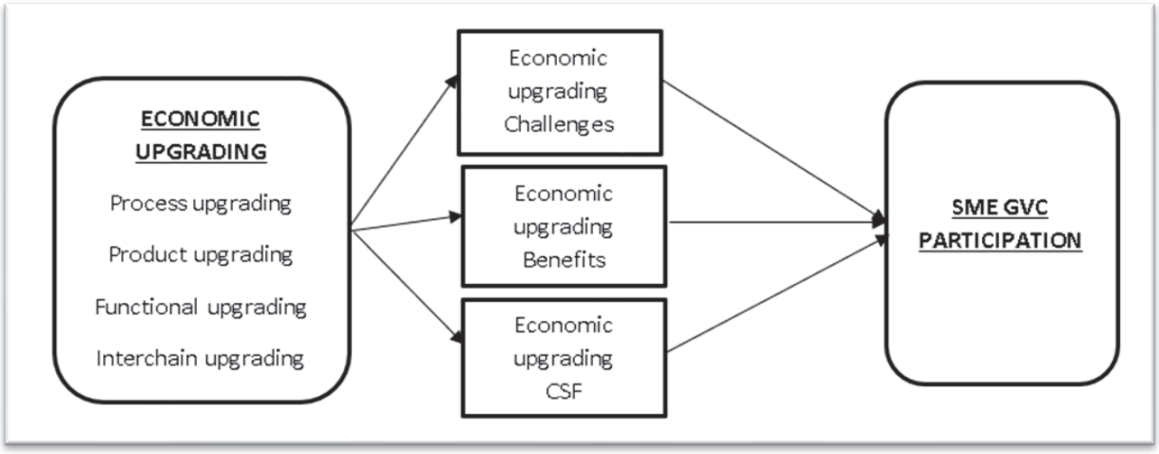

Figure 4: Conceptual Framework

Source: Research's Own

3.2 Research questions

3.2.1 Research question one

GVC economic upgrading to integrate and participate more is the rule of the game in today's global trade. However, the possible economic upgrading trajectory consists of process upgrading, product upgrading, functional upgrading and interchain upgrading (Marcato et al., 2019). According to Marcato and Baltar (2020), process upgrading happens when organisations want to increase their value-added shares in the current global value chain activities through improved organisation of internal procedures. In Bamber et al.'s (2017) study, it was contended that the global buyers were not attracted by the firm's economic upgrading in terms of impending their development, branding and distribution channels and better quality designs. This means there are many ways for firms to achieve process upgrading but not all process upgrading will be successfully accepted by stakeholders in the value chain.

According to the Armando et al. (2016), product upgrading is the sophistication of products or services to obtain higher market prices. This happens when a company obtains capabilities to supply high valueadded goods and services as compared to its competitors. Horizontal and vertical innovation, research and development investment and cutting-edge technology adoption lead to product upgrading (Lee et al., 2017). However, some firms use process and product upgrading at the same time to achieve better integration and participation in the GVCs (De Marchi & Alford, 2022). Armando et al. (2016) contend that process and product upgrading

are more common in developing nations' value chains partnerships than inter-chain and functional upgrading.

Functional upgrading occurs when more sophisticated technologies bring capabilities to function in GVC segments with higher value-added production (Gerrefi, 2019). This works better in a firm that is human capital rich with sufficient skills to use these advanced technologies for new value-added functions. However, there are bigger demands on a company's skills set and greater barriers to enter into such activities (Marcato & Baltar, 2020). Similarly, Choksy et al. (2017) argue that functional upgrading requires greater capability on the part of a local firm to add new functions within a GVC. Hence, Gerrefi et al. (2021) concluded that SMEs in developing economies should start with product or process upgrading which might be easier to undertake with less obstacles and execute functional upgrading when they have more economic upgrading experience.

According to Armando et al. (2016), interchain upgrading occurs when a firm uses its current competencies learnt to move to a new industry GVC to capture higher value added. A firm's strategic option is then to effectively use value chain knowledge acquired, continuously search for excellence in production and to embark on market diversification (Armando et al., 2016). In a study in Canada by Choksy et al. (2017), it was held that SMEs failed to interchain upgrade due to a lack of power asymmetries in the network and their degree of explicit coordination.

Therefore, these economic upgrading dynamics lead to the existence of barriers or opportunities to economic upgrading that either accelerate or decelerate participation in value chains. This study thus explored at firm level how and why SA SMEs within the telecommunication GVC executed these four types of economic upgrading to increase their participation in GVCs.

The first research question is as follows:

RQ1: How and why does economic upgrading affect South African SMEs participation within the telecommunication GVCs?

3.2.2 Research question two

Firms in developing countries are reported to be struggling to upgrade within GVCs (Slany, 2019). However, the reviewed literature reveals that SMEs are occasionally regarded as less developed or less equipped to provide better quality products or services (Gereffi & Fernandez-Stark, 2016). Additionally, according to Bamber et al. (2017), SMEs struggle to

upgrade because of, amongst other things, lack of government support, limited finance, skilled workers' shortage and higher infrastructure costs. In addition, there are also gaps in technology, governance, inter-firm non-compatibility, excessive exposure, product or process shocks, lack of human capital capabilities, lack of financial resources, lack of an enabling business development environment and lack of IPR protection. However, with functional upgrading, the decision to upgrade should be driven internally or be the result of learning dynamics created separately by suppliers. Entrepreneur success comes from the internal traits of the entrepreneur, a solid business plan, adequate resources, a favourable external environment and wider political, social and cultural contexts (Antros, 2020). Consequently, a study in Asia by Lee et al. (2017) found that SME managers did not upgrade due to the fear of failure.

These challenges highlighted from literature are for firms operating in different sectors and not the telecommunications' GVC. In addition, the studies on economic upgrading challenges were not carried out at firm level in the telecommunication sector nor within a South African context. Hence the need in this study to explore at firm level how South African SMEs within the telecommunication GVC encountered challenges when economically upgrading to improve their participation in the GVCs.

The second research question is as follows:

RQ2: What challenges do South African SMEs experience when economic upgrading within telecommunication GVCs?

3.2.3 Research question three

Kowalski et al. (2015) argue that more participation in GVC benefits emerging economies in terms of diversification, sophistication and productivity of exports. However, the reviewed literature of mostly country level studies, developed firms and firms not in a South African context revealed that, when firms upgrade, specialisation, output, efficiency, added value and integration are increased. SMEs become more exposed to opportunities they can exploit with speed and flexibility permitting a niche within the global market (De Marchi & Alford, 2022). Therefore, economic upgrading is moving upwards on the curve through the shifting of production towards services or products that capture more rent and have higher barriers to entry (Gereffi, 2019). Additionally, the economic upgrading must also meet standards consistently as defined by the market. GVCs are governed by standards offering prospects for value-added production (Elteto et al., 2015). However, adherence to GVC standards to gain a specific market access level does not essentially indicate economic upgrading. According to

Armandi et al. (2016), process and product upgrading without functional upgrading proved ineffective in Brazilian shoe industry small firms. These firms improved their flexibility, response time and product quality but gave restricted attention to horizontal collaboration with suppliers leading to their dismal performance. However, Pietrobelli et al. (2021) argue that the global buyers were not attracted by the firm's functional upgrading in terms of moving into research and development, branding, distribution or designing. Therefore, this study explored at firm level how South African SMEs within the telecommunication GVC benefitted from economic upgrading.

The third research question is as follows:

RQ3: What benefits does economic upgrading bring to South African SMEs operating in telecommunication GVCs?

3.2.4 Research question four

The reviewed literature showed that, for SMEs to successfully upgrade and increase their participation in GVC, there is a need to ensure that they take into cognisance standards and quality compliance factors, business environment factors, inter-firm linkages factors, firm characteristics factors and entrepreneurial characteristics factors. SMEs must comply with international standards in the GVC and ensure that its technologies are inextricably linked to and dependent on this (Kano et al., 2020). According to De Marchi and Alford (2022), process and product upgrading must ensure quality and compliance regulatory requirements. A study by Loewe et al. (2013) in Egypt showed that business environment was key to individual SMEs' upgrade. Components of business environment such as infrastructure, non-financial business development service (BDS), insurance, access to finance, trade policy, skilled labour availability, corruption, competition, regulation, political stability and macroeconomy impact SMEs' investment behaviour, growth and innovation potential (Bamber, et al., 2017).

Su et al. (2020) argue that SMEs are likely to upgrade due to the existence of vertical and horizontal interfirm linkages. However, business network structures are very different in each nation. The formalised network benefits are importantly low in nations with too much business association control (De Marchi & Alford, 2022). The potential benefits from integration into GVCs do not equally apply to all SMEs: economic upgrading chances largely depend on the governance and power relations within the chain (De Marchi & Alford, 2022). Small firms learning from demanding clients and lead firms is key to functional upgrading success (Armando et al., 2016). However, De Marchi and Alford (2022) argue that economic upgrading

is not a straightforward process when one considers the diverse GVC stakeholders' interests, fragmented supplier bases and power asymmetries.

According to Bamber et al. (2017), structural factors such as an enterprise's formal status, location, sector, size, age, of the SME including the organisational factors, for example innovation and knowledge management are important factors that determine the success of economic upgrading by an SME. According to Chen et al. (2022), the sector in which an SME operates affects its potential to upgrade. The level of competition and governance differ in each sector. The entrepreneur's gender, motivation, achievement, social capital, human capital and preparedness to take risks are key to the successful implementation of economic upgrading techniques (Loewe et al., 2013).

Therefore, the need in this study was to explore the critical success factors of economic upgrading by South African SMEs that were participating in telecommunications GVCs.

The fourth research question is as follows:

RQ4: What are the critical success factors affecting the economic upgrading of South African SMEs operating in telecommunication GVCs?

3.3 Summary

This chapter summarised the research questions that guided this research enquiry based on the research problem and the literature review that were carried out. The literature gaps that arose and gave rise to the research questions were explained. The next chapter is the research methodology.

Chapter 4: Research methodology

4.1 Introduction

This chapter presents the research methodology guiding this research inquiry on the influence of economic upgrading on participation of SMEs in GVCs. The research methodology is described, explained and justified in terms of the research approach, research design, population, sampling method, data collection method, data analysis method and quality controls.

4.2 Research approach

The research philosophy chosen for this study was interpretive phenomenology to solve empirical questions. Interpretive phenomenological philosophies permit qualitative non-numerical data collection with meanings to be explored in non-standardised form (Creswell, 2014). According to Saunders et al. (2016), in this technique, individuals are sensitive to their surroundings. Hence, in this approach Strauss and Corbin (2013) argue that what is targeted are the particulars of realities and its subjective meanings, obtained within a socially constructed world. Thus, in this study, the target was specific details of realities and subjective means of South African SMEs economic upgrading and the impact it had on participation in telecommunication GVC.

Interpretivism encourages the understanding of variations amongst individuals in their roles as 'social actors' (Leedy & Ormrod, 2013). This stressed the need to carry out a study amongst human beings as opposed to objects. The words 'social actor' suggest that people play a theatrical role in human life stages, performing a part in compliance with this interpretation. In addition, the interpretive approach permits the observing of an incident in real-life and natural settings and permits the development of a more precise understanding of the phenomena (Saunders et al., 2016). Therefore, the interpretive approach permitted the exploration of the economic upgrading techniques and how they influence participation of SMEs in the telecommunication GVC.

The study adopted an exploratory research approach. Saunders et al. (2016, p.139) define an exploratory research approach as a vital manner of exploring "what is happening; to seek new insights; to ask questions and to assess phenomena in a new light". In this approach, clarity is achieved when facing a problem. Therefore, this research sought to clarify the nature of telecommunication GVC and define why and how SMEs increased their participation in telecommunication GVC using economic upgrading techniques. The study sought to present a holistic picture of how economic upgrading influenced SMEs in a GVC to integrate and increase their business activities. The process was reflective and interpretive focussing on the participants' views within natural settings to provide multiple subjective views. The researcher, being an SME business owner within the telecommunication GVC, was key in the data collection process and used their own experience to deeper explore the research subject. The research, however, relied more on the participants' views to align and reduce the researcher's own subjective viewpoint on the research subject.

According to Creswell (2014, p.54), in a cross-sectional study, "the investigator measures the outcome and the exposures in the study participants at the same time". This study took a cross

sectional time horizon to investigate the influence of economic upgrading on SME participation within the telecommunication GVC. The choice to use cross sectional approach instead of longitudinal was motivated by the fact that a longitudinal survey design takes a longer time to understand the predictor variables. A cross-sectional design uses a survey technique to collect data, is not expensive and does not consume a lot of time to administer (Collis & Hussey, 2014). In addition, cross-sectional studies take the slate of a population at a specific time (Leedy & Ormrod, 2013).

4.3 Research design

The study adopted a qualitative design to acquire an in-depth understanding of how SMEs upgraded and influenced their participation in telecommunication GVCs. Strauss and Corbin (2013, p.17) define qualitative studies as “the type of studies that comes up with findings not attained through means of quantification or statistical procedure”. Qualitative strategies allow data gathering based on a non-standardised format that can be examined (Creswell, 2014). In addition, qualitative studies are focussed on subjective meaning interpretation and social context descriptions (Welman et al., 2014).

The qualitative research design has been criticised by some scholars in that it can be manipulative and does not allow for the comfort in the research process that one gets when using a quantitative study (Haradan, 2018). The concern in this regard is that scholars who use this methodology can assume the meaning of data in favour of their personal agendas. Another challenge that has been raised regarding the use of the qualitative research methodology is the subjectivity inherent in summarising the information obtained through the methods of collecting the data.

The researcher recognised the challenges raised in relation to the use of the qualitative method. However, the qualitative design is widely used and recognised in research and the methodology is appropriate in understanding how economic upgrading impacts GVC participation of SMEs because a qualitative study shows richness of comprehension and depth of details. Qualitative techniques were appropriate for this study to allow for data gathering using non-standardised definitions (Saunders et al., 2016). Due to the inductive technique, the qualitative method was used in guiding the collection process of non-numeric, rich and in-depth data.

The study implemented a multi-case study design as the most appropriate strategy for the purposes of the qualitative study. Saunders et al. (2016) argue that a case study helps to get a deeper comprehension of the study context. Creswell (2014) explains that a case study

strategy is aimed at understanding the factors in a single setting which can involve one or multiple cases. Case studies permit a multiple level analysis in one study (Yin, 2014).

In selecting a case or cases, Yin (2014) recommended that the cases should be “easy and willing subjects”. For purposes of this study, multi-cases were selected due to the practical reasons regarding access. The secondary reason for selecting a multi-case was to increase the depth and breadth of the research enquiry by exploring more than one SME that is in the telecommunication GVC that has encountered economic upgrading in one way or another.

According to Saunders et al. (2016), case studies target depth rather than breadth, occur in natural settings, are holistic and allow many sources of techniques for wider coverage of source of data. In addition, Yin (2014) described case studies as the preferred study technique when the occurrence and the context are not readily categorisable. Cooper and Chandler (2014) also described case research as a study in which various cases in a real-life context are chosen and grades gained from these situations are assessed qualitatively. Hence, this study took a case study design by targeting 13 SMEs within the telecommunication GVC.

Yin (2014), however, highlighted the lack of strain, bias and rigour, hefty document production and time-consumption as criticisms to the case study technique. To deal with the challenges, the study adopted a multi-case study design using interviews as methods of gathering data. The qualitative method was used to seek knowledge and acquire an understanding of how SMEs upgraded in telecommunications GVCs.

4.4 Population

According to Creswell (2014, p.46), a population is “a full group of objects, set of cases, events or people with ordinary attributes worth researching”. A population becomes the unit of assessment of a study where data can be collected. Thus, in this study, the population was all the strategic level executive directors, founders and/or owners of SMEs within South Africa operating in the telecommunication GVCs. To further focus the study, these SMEs needed to have been operating in the telecommunication industry for five years and longer and had to have worked with any of the multinational OEMs present in South Africa or any of the telecommunication operators. The purpose of this was to ensure that the SMEs had sufficient experience working with lead firms (i.e. operators and/or OEMs) in the telecommunication GVC in order to get rich data that would enable the understanding of the influence of economic upgrading on South African SMEs’ participation in telecommunication GVC.

4.5 Sampling method and size

The sampling method and size adopted are explained in the following sections:

4.5.1 Sampling method

Non-probability and purposeful sampling were chosen to guide participant selection in this study. Saunders et al. (2016) argue that non-probability sampling is a sampling type that is most ideal for qualitative techniques. This sampling method means there is no guarantee of a known and equal chance in choosing an element from the population (Creswell, 2014).

Purposive sampling is “a type of non-probability sampling whereby research participants are selected intentionally based on their ability to elucidate a specific phenomenon, concept, or theme” (Robinson, 2014, p.2). When the sampling process is purposive sampling, a resolute participant selection is done in accordance with a predetermined non-probability criterion. According to Collis and Hussey (2014), there are four forms of purposive sampling, namely deviant or extreme case sampling, maximum variation or heterogeneous sampling, typical case sampling and homogeneous sampling. The critical case sampling was selected for this study to facilitate the gathering of data that describe and explain events within a specific firm identified by critical themes. The research questions posed in this research became important for each firm (Saunders et al., 2016). Hence, business owners or directors of SMEs operating in the telecommunications GVC who had evidence of having upgraded their business were selected based on their ability and knowledge about economic upgrading dynamics within telecommunication.

The choice to use purposive sampling was derived by the power and reason of purposive sampling in choosing information-rich cases that could provide relevant rich and detailed information. The researcher was thus able to use own judgement to identify and select participants who were able to provide in-depth data about the substantive research problem.

4.5.2 Sample size

Sekaran and Bougie (2013, p.21) describe a sample as “part of a population with characteristics of the complete population”. During the selection of the sample size for the study, the logical approach was to view a small sample size as being less representative of the imagery to the entire population and a big sample size as being too time consuming and costly (Creswell, 2014). Saunders et al. (2016, p.311) define saturation as the point at which “new data tends to be redundant of data already collected”. Hennink and Kaiser (2022) found

that a good sample size for saturation is 9-17 participants. Thus, the sample size of 15 was regarded sufficient to reach saturation in this study.

This study sample was 15 strategic level executive directors, founders and/or owners from 13 SMEs who worked or had worked with multi-national OEMs or telecommunication operators within South Africa for five years or longer. By nature of their job, these managers articulated telecommunication GVC dynamics within their normal responsibilities and performance targets. Firms headquartered in different regions or provinces in South Africa that fit the SME definition and sample criteria either from the researcher's immediate informal network and/or secondary sources like LinkedIn then snowballed once the research had begun. By interviewing owners or executive directors of SMEs, an insider perspective was obtained within a natural setting to facilitate a deeper understanding and meaning of complexities within their business environments.

4.6 Data gathering process and measuring instrument

The data gathering process and research instrument are discussed in the following sections:

4.6.1 Data gathering process

In this research, qualitative data were collected using semi-structured interviews. According to Strauss and Corbin (2013), semi-structured interviews are a useful way that can allow researchers to learn and understand central themes about the world and specific experiences of others. Semi-structured interviews were held to permit the participants to give meaningful views about the world being studied (Creswell, 2014). Bell and Bryman (2013) argue that the use of interviews enables the interviewer to comprehend the main themes in the interviewee's life qualitatively in the subject's world based on one's experiences and knowledge.

According to Cooper and Schindler (2014), flexibility is important because it allows the participants to give answers "in their own terms and in the way that they think and use language". Hence, flexibility in the interviews was achieved through semi-structured interviews giving room for modification, order, pace and style of questioning to achieve more detailed answers from the participants. A number of questions were put across to the participants. More focus was put on the participants' views, the capacity to obtain detailed and rich content and flexibility given to the interviewees to encourage more detailed responses using probing questions. For this reason, a list of open-ended questions was administered. Open-ended questions are questions whereby the interviewee speaks openly (Bell & Bryman, 2013). In the interviews, broad topics emanating from open-ended questions were asked to elicit detailed

views and opinions of the interviewees (Bell & Bryman, 2013). A purposeful conversation was engaged in to enable relevant and reliable information to be provided by the participants (Saunders et al., 2016). Semi-structured interviews were favoured as they allowed focus and a greater comparability degree in the interview style (Bell & Bryman, 2013). The interviewer also probed the participants to obtain more specific and detailed information.

The interviews were recorded to permit the discussion to be transcribed verbatim. Due to COVID-19 and location and time restrictions, interviews were held on online platforms that permitted recording. The data transcription and interview recording ensured that the data collection process took place in natural settings, permitting the research to capture what the participants said and conveyed about the research focus. This confirms Cooper and Schindler's (2014) assertion that qualitative investigators are interested in what the participants say and how they convey it.

4.6.2 Measuring instrument

According to Creswell (2014), interview questions must be prepared as guided by the central research theme in a methodical way with questions designed to get more intricate answers. An interview guide is defined as "a list of memory prompts for the research issues of focus, which allows for the gleaning of the participants' social world" (Saunders et al., 2016, p. 218). In addition, Saunders et al. (2016) noted that questions in semi-structured interviews are to be immaculately done to assist in solving the problems of an enquiry that achieves a specific order. Therefore, the interviews in this study were guided by pre-designed open-ended questions to attain further detailed answers and views about the research questions compiled to form an interview guide (see Appendix 3). These interview guide questions were derived from the literature review and the study questions. The interviewer conducted one-on-one interviews with interviewees using flexibility and probing techniques to obtain specific and detailed responses. In addition, the interviewer used straightforward language that was easy for the interviewees to comprehend and abstained from asking leading questions. Instead, the interviewer used a series of sub-questions to address the lead questions.

4.7 Data analysis approach

Data collected in this research were primarily word-based since the method was qualitative. As such, the data needed to be dismantled, segmented and reassembled to enable data synthesis (Collis & Hussey, 2014). In this regard, Collis and Hussey (2014) noted that the study questions are used to guide the analysis process. This study used a thematic analysis to analyse the qualitative data collected inductively. According to Creswell (2014), the main

goal of a qualitative data analysis is to reveal emerging understanding, insights, concepts, patterns and themes in line with the research questions. The transcribed data were coded, categorised and grouped into common themes using Atlas.ti software. The inductive approach ensured that common themes arose for the data analysis rather than present theories. Themes were explained using direct quotations from transcripts and were also summarised and grouped per each research question into tables and Atlas.ti generated reports to enhance an understanding of the findings. The themes were also explained in narrative format and further analysed linking them to secondary data to enable conclusions to be made.

4.8 Quality controls

To make sure the research process was valid, reliable and trustworthy, the following were taken into consideration:

4.8.1 Validity

According to Saunders et al. (2016, p.513), validity is “the extent to which a research measures what it is intended to measure”. Validity can either be internal or external. Internal validity is concerned with the extent of accuracy in the quantity being measured, whereas external validity reveals the degree of findings describing the population from where the sample is drawn (Creswell, 2014). The researcher used face validity by engaging an expert in global trade to check the research instrument and confirm its ability to measure the research interest accurately. In this way, content validity was achieved when the research instrument was able to evaluate and measure the interest (Yin, 2014).

4.8.2 Reliability

Reliability is ensured if the used data collection methods are stable and consistent (Saunders et al., 2016). According to Creswell (2014), a reliable research instrument generally results in the same answers when different participants are interviewed. The generalisability of the study findings ascertains the degree to which the study has correctly or accurately related numerous roles (Creswell, 2014). This study used purposive sampling to warranty reliable findings. Nevertheless, the sample size was not big enough to warrant the generalising of results. The study was conducted within the shortest possible time to eliminate any risks and threats to validity.

Creswell (2014) argues that, in qualitative studies, reliability is replaced by trustworthiness. Therefore, to ensure validity and reliability of this study, the researcher ensured that the results

have credibility, confirmability, dependability and transferability (Bell & Bryman, 2013). This was achieved by making sure there were always truthfulness, accuracy and an audit trail with backup records of the entire research procedure that was built on the participants viewpoint and not the researcher's subjectivity.

4.8.3 Trustworthiness

According to Yin (2014), trustworthiness ensures that the study results are transferable, confirmable credible and dependable. Credibility ensures that there are honesty and accuracy in the study outcomes (Leedy & Ormrod, 2013). Transferability ensures that the study results utilise rich descriptions to maintain relevancy to comparable populations, occurrences, or situations (Creswell, 2014). Conformability utilises an audit trail to search through the data analysis process to make sure that the outcomes have a degree of neutrality based on the respondent's answers and that there are no researcher interferences (Babbie & Mouton, 2013). According to Braun and Clarke (2014), dependability gives assurances that the study outcomes are normal indicating that same findings are achievable when the research is redone. A qualitative analysis was done using thematic analysis after transcribing, coding and categorising in-depth description. An audit trail was also used to detail the data collection and data analysis procedure as evidence of neutrality in the findings.

4.9 Limitations

According to Leedy and Ormrod (2013, p.42), limitations are "controllable and unknown biases faced within a research process which can affect the findings". The study was restricted to 15 participants selected from 13 SMEs operating in any of the provinces of South Africa working with any of the telecommunication operators such as, MTN, Vodacom, Telkom, CellC and multi-national OEMs such as Nokia and Huawei. The sample was limited to SMEs which had been operating for five years and longer. Since the telecommunication GVC is highly dynamic, the study was focussed on the 5G era to understand the SMEs' influence of economic upgrading on participation within the global value chain. In addition, SMEs operating longer that five years had gone past most inexperience and had a more established history.

4.10 Ethical considerations

To respect and preserve the freedom and rights of the participants involved in the research, clearance permission to carry out the research was approved by the MBA Research Ethics Committee of GIBS. Informed consent, maintenance of participants privacy and removal of harm were some of the moral factors to be observed in this research (Creswell, 2014). As

such, a consent letter was administered to all targeted or sampled study participants. A letter of introduction that highlighted a brief study background and aims of the study was also sent to the participants. Additionally, the letter of introduction highlighted to participants that there were no personal gains as reward for participating and no one was forced or threatened to participate. Participation was on a voluntary basis with freedom to withdraw at any stage of the study without facing any penalties for doing so.

Data collected from participants are confidential and not related to specific participants unless approved prior to release of such data and its associated respondent. As such, anonymous identifiers were used and not full respondent names. Additionally, the research results were colluded so that the results do not relate to an individual respondent. The research only proceeded after the ethical approval had been obtained from GIBS MBA Research Ethics and the chosen telecommunication SMEs. The data is kept on an encrypted external hard drive for five years.

4.11 Summary

This chapter presented the research methodology and design that were used to guide the research process. It was argued that an interpretive and exploratory approach was appropriate and adequate to guide the process of collecting primary data using a multi-case study research design. An inductive and qualitative approach was adopted and centred on the study nature and the need for more descriptions and detailed data. Such qualitative data were collected using semi-structured interviews that were held with 15 SME strategic level executive directors, founders and/or owners using an interview guide. The study utilised thematic analysis to analyse data. This chapter also outlined the limitations and the procedure that was followed to ensure that the data were obtained in an ethical and trustworthy manner. The next chapter presents the findings.

Chapter 5: Results

5.1 Introduction

The results of the study are presented in this chapter as guided by the research questions of the study introduced in Chapter 1. The questions are: How and why does economic upgrading affect South African SMEs participation within the telecommunication GVCs? What challenges do South African SMEs experience when economic upgrading within telecommunication GVCs? What benefits does economic upgrading bring to South African SMEs operating in telecommunication GVCs? What are the critical success factors affecting the economic upgrading of South African SMEs operating in telecommunication GVCs? The chapter also includes a summary of the participants' demographics and the data collection and analysis procedure followed. The results are presented qualitatively including direct quotations and output from qualitative word processors used to analyse data. The chapter ends with a summary of the results.

5.2 Data collection and analysis procedure

The participants were interviewed separately using an online meetings platform (Microsoft teams) for periods ranging from 30 minutes to 45 minutes using the predesigned interview schedule set out in Appendix 2. The demographics were captured separately together with the informed consent agreements. The interviews were recorded and subsequently transcribed using Otter.ai, an application that transcribes video and voice recordings. The transcripts were submitted on ATLAS.TI for coding and thematic analysis.

Following the coding, a thematic analysis was conducted to select the categories, themes and sub-themes which emerged from the data to interpret the text, tagging meaningful text into codes, determining the most significant codes and to generate and gather the most significant codes into categories, tagging the categories and determining their relations and relevance and arranging the results into meaningful themes (Sattar et al., 2022). To ensure that confidentiality was maintained, the names of participants were not used and each transcript was coded using numeric numbers instead. To ensure quality, the interviews were transcribed verbatim and an audit trail was maintained to make sure the results remained an indication of the participants viewpoints free from interviewer biases.

The subsequent results with meaningful themes are presented in the following sections.

5.3 Main findings

The main findings are presented as follows:

5.3.1 Demographics

The demographics of each participant that was interviewed were collected and are summarized in Table 1.

Table 1: Participants Demographics

Demographics	N=15	Percentage
GENDER:		
Female	1	6.67%
Male	14	93.33%
AGE:		
< 20 years	0	0%
20-30 years	0	0%
31-40 years	4	26.67%
> 40 years	11	73.33%
YEARS IN TELCOM GVC:		
< 5 years	0	0%
5-10 years	5	33.33%
11-15 years	7	46.67%
> 15 years	3	20.00%
SME SIZE BY EMPLOYEES:		
< 20	2	13.33%
20-50	7	46.67%
51-100	5	33.33%
101-200	1	6.67%
> 200	0	0.00%
POSITION IN SME:		
Chief Executive Officer (CEO)	5	33.33%
Managing Director (MD)	5	33.33%
Other Executive Director	5	33.34%

OEMS WORKED WITH:		
Huawei	13	86.67%
Nokia	14	93.33%
Ericson	11	73.33%
ZTE	10	66.67%
Others	9	60%
OPERATORS WORKED WITH:		
Vodacom	15	100%
MTN	12	80%
Telkom	8	53.33%
Cellc	6	40%
Other-	17	113.33%

Source: Author's compilation

The majority of the participants in this study were males (93.33%) and the female respondents were 6.67%. Most of the participants were aged 40 years and older (73.33%) while 26.67% were aged between 31-40 years. The participants had experience in the telecommunication global chain that varied from 5-10 years (33.33%), 11-15 years (46.67%) and over 15 years (20%). None of the participants were from SMEs with over 200 employees, but instead came from SMEs with less than 20 employees (13.33%), 20-50 employees (46.67%), 51-100 employees (33.33%) and 101-200 employees (6.67%). All the participants were either CEOs (33.33%), MDs (33.33%) or other executive directors (33.33%). The participants showed their hands-on working relationship with OEMs by reflecting 86.67% had dealt with Huawei, 93.33% with Nokia, 73.33% with Erickson, 66.67% with ZTE and at least 60% with the other nine OEMs. The participants also showed their hands-on working relationship with Telecommunication Operators by reflecting 100% dealt with Vodacom, 80% dealt with MTN, 53.33% dealt with Telkom, 40% dealt with CellC and all the participants had also dealt with other operators from other countries outside of South Africa such as Namibia, Zimbabwe, Zambia, Congo, Rwanda, Mozambique, Lesotho, Uganda, Malawi, Botswana and Swaziland. In addition, this showed a very mature age group, well experienced, working in sizable organisations, with responsible positions and able to articulate the dynamics of economic upgrading within SA SMEs operating in the telecommunication global value chain. However, gender disparities were regarded as a factor that did not directly impact the result.

5.3.2 How and why economic upgrading impacts SA SME's participation in telecommunication GVCs

Table 2 summarises the main themes that arose from the qualitative analysis of the responses on how and why economic upgrading impacted SA SMEs' participation in telecommunication GVCs:

Table 2: Research Question One Main Themes

FUNCTIONAL UPGRADING	PRODUCT UPGRADING	PROCESS UPGRADING	INTERCHAIN UPGRADING
Accessibility creation through information technology	Innovation in products and services	Internet based communication tools	Work done in other industry GVC
Health and safety processes creation	Innovation in technologies	Security improvement tools	Work done in GVCs outside of South Africa
Strategic alignment with industry changes	Innovation in technologies	Cyber-security services to clients	No work done outside of telecommunication GVC
Sub-contracting elimination	Innovation in security systems	SME business functions processes improvement	
	Asset ownership		
	Full turnkey solutions		

Source: Primary data

These themes are discussed in detail in the following sections.

5.3.2.1 How and why SMEs have been strategically re-organising production systems with superior technologies to participate more in the telecommunication GVC

The main themes emerging from the participants' responses on how SMEs had been strategically reorganising production systems to participate more in telecommunication GVCs are as follows:

Accessibility creation through information technology

The participants were of the view that SMEs were modernising their internal systems to remain relevant in the global value chain. Some participants alluded to upgrading their payroll system, financial system, servers and their project management to cloud based to improve accessibility. They were also in the process of upgrading a health and safety application. Participant 1 had the following view on the information technology usage for accessibility to ensure business continuity in the value chain:

"*With new Human Resources and accounting systems, it's about accessibility, we've had so many disruptions in KZN, we've had so many, we've had riots, we have floods, we have COVID-19, we have, if you if you want to try any disaster, KZN is about the place you try to lead. So, we've had quite a few challenges. And so those challenges have taught us that business continuity is something that we've got to pay a lot of attention to. So, this is about making sure that we can operate from anywhere at any given time. And then thereby making ourselves available to the client continuously and consistently….*" Participant 1

Accessibility is thus important to SMEs to ensure business continuity characterised by continuous and consistent operations without disrupting participation in the telecommunication value chain activities. SMEs should upgrade their internal systems so that the businesses have continuity and do not face disruption and downtimes.

Health and safety processes creation

Several participants showed their understanding why, within the telecommunication business, health and safety systems are regarded gatekeepers to operations. Without putting health and safety procedures in place, a business cannot succeed in complying and keeping a safe work environment that is effective and efficient to permit participation in the global value chain. Participant 8 and Participant 9 showed why SME organisations had to introduce and maintain health and safety systems such as Safety 360 application that are acceptable to OEMs and telecommunication operators.

"*the system that we've upgraded on our end is basically just to make things easier for monitoring our health and safety. So, what we've done, I think, like Safety 360, but we've had an in-house system, where we are taught well, we digitize our health and safety processes for the guys that go onsite. So instead of using paper, like for instance, or even I have the safety file, we don't keep it on a paper file, everything is basically digitized. But that application is in house*." Participant 8

"*we've introduced a system at the start of 2022. The system is called Safety 360. It is a health and safety tool that also allows us to track quality of delivery outputs from the operational teams we have on projects. The important thing to note about this tool is that it is endorsed and used by several of our clients*." Participant 9

Thus, SMEs are forced to upgrade the safety systems by digitising to ensure compliance with their clients' requirements. The participants showed that safety compliance is an important gatekeeper that can hinder any SME participation within the telecommunications industry.

Strategic alignment with industry changes

The telecommunication industry is very dynamic and a lot of changes have a bearing on the products and services being offered. For instance, a lot of mergers and acquisitions have been taking place and SMEs need to keep track of such changes and align their business with such changes. Participant 3 alluded to industry changes due to technological advancement which can be good, bad or disruptive to SME operations in the value chain:

"*As technology advances, sometimes it's good and bad at the same time for SMEs. So, the best way to minimize the impact that the advancements in technology may have in the business, we diversify. We're diversifying our business, to look at things outside of just the mobile network operator space. So, and, maybe what informed that decision, if you look at for instance, you look at a company like MTN, they've sold their entire infrastructure to IHS Vodacom possibly could be looking at also having their own tower company telecom as gyro. So, you don't know what type of impact this is going to have. Because as much as you may have superior technologies, businesses or also about relationships. So, when those acquisitions and mergers take place, you don't know how it may affect your business. So, the best way to pushing yourself is by diversifying and engaging with the new companies that are getting formed*." Participant 3

SMEs are thus strategically aligning their business activities in the GVC through diversification to keep track with the industry changes and remain in business.

Participant 9 explained how their business changed from provision of installation services to OEMs, to offering infrastructure business to lead firms operating in the telecommunication value chain to realign the business strategic position in the value chain.

"*we started this digital services company providing installation services to OEMs to network operators, that's within the telecoms' domain. First on the road, that which, which is more like*

your project management element of the business, then through that, there was of course, that exposure gave us to see the growth diverting to the infrastructure business" Participant 9

The business subsequently moved from being a network service provider to becoming a network infrastructure provider, management services provider and communication service provider. In this way, the business was participating more to a wide range of clients. However, the business continued to offer its traditional services within the ambit of new technologies. Participant 9 further illustrated that the company was providing new services in the following comment:

"*so, in 2017, particularly through our director and he has created a brand called a company called ah, digital. Digital focusses on software development, DevOps, web development and UI and UX testing activity. So that was really the stepping-stone to moving into a digital-ready organized organization. In 2019, two new brands and businesses were created a brand called spectrum one, which focusses on many services in fibre and IP networking technology. And then we also created a third brand, which was, which is called fifth-generation networks and through fifth-generation networks, we drive through a lot of our digital services and digital technology partnering*." Participant 9

These participants alluded to the need to reposition their businesses by changing the business model to remain active in the telecommunication market. In this way, the business had more opportunities within the value chain and participated more by offering new services or products not previously offered.

Most of the SMEs started business in the telecommunications industry being subcontracted by bigger firms and as the business grew, they began to spread their business to being independently engaged by lead firms. One such SME that had been strategically reorganised from being subcontracted to offering more services to other value chain players was described by Participant 11 in the following statement:

"*this is how we started, we started working with a company called info solution. We were doing vandalism and vandalized sites and we were subcontracted by them. What we were doing, was making sites to become acceptable. Again, when the sites have been broken into like vandalised, we will rebuild the containers. Then we'll also redo the whole alarms and redo the defence and, we were doing electrical work. Because these guys are stealing cables, they are also stealing circuit breakers. So, we would supply circuit breakers. So that's where we started off. And then we then started doing RF work to other value chain players, but it will reach we're out of work from the background where I'm coming from' I've been doing that work for a long*

time. So instead of getting the guys that are knowledgeable, I had to train my own people to learn how to do the RF work." Participant 11

SMEs have to extend their business offering to participate more in the value chain instead of offering a single line of service. SMEs also consider how profitable the service is and are constantly seeking for viable lines of business. Participant 14 explained how they had to drop off offering Domain Name System (DNS) and Synchronous Digital Hierarchy (SDH) services and to remain offering Discrete Wavelet Transform (DWT) that was more profitable:

"*We used to do the DNS service with the DWT work, and we did SDH those were the three pillars of our company. We always mapped it out in a train. So those are the three policies we've done Radio Access Network (RAN) and Radio Frequency (RF) before. But like I said before RAN and other prices have become so messy, that it's no longer lucrative for RAN and RF. So, we dropped that link so we more DWT and more transmission backbone transmission and infrastructure*." Participants 14

Thus, to remain profitable, SMEs are occasionally looking at which segments are not attractive to drop and which segments are more attractive and brought on board.

Sub-contracting elimination

The SMEs also started by outsourcing some services they were not knowledgeable about to remain focussed on their specialised function. With time, the participants alluded to embarking on strategies to eliminate the outsourced functions. Participant 10 and Participant 13 explained how they eliminated outsourcing in their business in the following statements:

"*we used to outsource certain specialized services like abseiling, for example. What we've now done is we've trained our staff; we've got them certified. And we now have multiple, I think, of the 10 teams where we have about four that are now fully certified to do rope access work. So, the app Sadly, no longer gets outsourced. And because it's now in house, we get more value because we bill for those services, those additional services, and instead of now, you know, outsourcing it and making 10% on the cost that that 100% of that fee comes to us in our cost of minimal because it's the same stuff*." Participant 13

"*we were doing provisioning services, you know, transmission services, right up to the point where, not only in just purchase discussions, but when we're having regular meetings and some of our teams, we realize that some of the guys that we have, have got training within the technical space in terms of installations which were outsourcing. So, when we decided to go*

into the, you know, the infrastructure services, when we started with a pool of about eight technicians at the time, ……." Participant 10

Thus, SMEs were increasing their participation in the value chain by eliminating subcontracting of some of the services and doing them inhouse. In most cases, the SMEs were optimising with their current human resources skills and competences not previously utilised. Participants 10 further explained their upgrading processes in the following statement:.

"…. Once our teams from the managed services side have identified certain problems, we can then have teams that they deploy and then report back, you know, on that and resolve that problem, instead of waiting for weeks or even months sometimes to untangle. untangle those problems and that's how we created the infrastructure business. And we now have a pool of about just over 100 in terms of infrastructure in the infrastructure business and that really developed from having seen a need and we once we identify them, we then came up with a solution with whom, with which we then discussed with a client to say, this is what we can offer. Participant 10

This elimination of subcontractors is a way of upgrading that increases participation in the telecommunications global value chain. This is because the telecommunication GVC is characterised by a lot of functionalities and players often sub-contract the functions in which they lack specialisation. Hence, it is a choice of each firm to decide which work to sub-contract and which work to do inhouse. Participant 1 explained how they had managed to create a sustainable business in the value chain in the following statement:

"*there's a lot of functionality in this game, that under normal circumstances, a contractor would subcontract that out. We don't do a lot of subcontracting. We are subcontracting and it is about creating capacity, in addition to what we have as and when projects call for it. So that's about how we are adding value in terms of, of the functioning of the business. So, whilst other contractors may say, Okay, I'm going to subcontract my electrical work, and I'm going to subcontract my working at heights, we're not saying that we're saying we'll have our own in-house teams, in the event of us needing to create capacity for a project environment, then we will subcontract what work we can't keep in house, and what is not sustainable*" Participant 1

Through upgrading, SMEs can make their business sustainable. In addition, added value is created for clients as a single firm handles a variety of functions to a single job.

5.3.2.2 How and why SMEs have been improving and updating old services and products for new ones that capture high unit value in the telecommunication GVC

The main themes emerging from the participants' responses on how and why SMEs had been improving and updating old services and products to capture high unit value in telecommunication GVCs are as follows:

Innovation in products and services

The participants showed consensus that innovating is key and part of an SME's core value in the telecommunications value chain. Without innovation, a business is unsustainable as the industry is very dynamic and products and services are constantly changing. Therefore, small businesses need to continuously develop new products and services. Participant 5 showed how their business had tapped into software, fibre and IP network technology product and services.

"*moving into this particular technology allows us to have a good understanding of our ecosystem. With the data, we work with, We want to bring into play a lot of the newer digital technology like machine learning, artificial intelligence, digital twins and blockchain technology, so having the data that links both the telecom service providers as well as the telecoms OEMs with an organization like fact being an intermediary in the delivery process, we are able to basically augment our services, drive performance improvement on various elements of how we deliver the service*." Participant 5

Thus, the SMEs can capture more value from the global value chain by understanding the changes in their environment and making use of new technologies to develop new products and services. The SME businesses can augment their services or products with more profitable market segments. Innovation improves the offering to the customer as alluded by Participant 1 and Participant 4 in the following statements:

"*Some of the successes we've enjoyed through innovation, we have a patented gantry system, that is a high security gantry system that we patented. And we've sold that extensively within the operator space*." Participant 1

"*I would say the new thing that we had to do in house was, microwave installations and build fibre installation and build where to do power work. Installation and bolt also grew to do full turnkey single size and then network optimization.*" Participant 4

SMEs are thus using innovations to upgrade products, processes and services in order to remain relevant and competitive. Old products and services are being improved into new products and services to suit client requirements.

Innovation in technologies

The participants showed that SMEs had resilience in delivering innovative products and services to remain relevant to the telecommunication industry. As the communication generations continues to change, SMEs are using technologies to offer new products and services. Participant 9 explained how and why their firm was leveraging on technology to bring new services:

"*most important strategic directions we take is to be digital-ready in a digital service provider of choice, we currently deliver a lot of professional services and managed services that are very people and resource-intensive in our journey, for transformation, we basically are looking to adopt and adapt. With a lot of digital systems. We currently have a suite of Microsoft applications such as Power BI and power apps that both create digital workflows for our business. And through Power BI, we are also able to pull out operational data, business data and financial data, which keeps us agile, in terms of making sound decisions for the business, it also helps us to drive continuous improvement*" Participant 9

Thus, new technologies are being put to use to remain relevant in the telecommunication industry that has a rapid change of generations. The SMEs have a form of agility to drive business processes with continuous improvement to keep pace with new generations such as the current 5G. Participant 9 further expressed their strategic focus towards even newer technologies that were not yet fully implemented in the South African environment:

"*we want to bring into play a lot of the newer digital technology like machine learning, artificial intelligence, digital twins, blockchain technology, so having the data that links both the telecom service providers as well as the telecoms OEMs with an organization like fact being an intermediary in the delivery process, we are able to basically augment our services, drive performance improvement on various elements of how we deliver the service*" Participant 9

Therefore, some SMEs are making use of IoT technologies to do data analytics offsite which previously required a physical site visit to diagnose. Employees of SMEs are no longer fixed to desktop but are now using laptops, with internet connection through WIFI to work from remote sites and are not restricted to the office or site.

Innovation in security systems

The participants were able to show that SMEs were coming up with innovative security systems that secured sites from vandalism since vandalism is major challenge within the telecommunications industry. Participant 1 explained how technology was being used to create security systems against vandalism.

"*We're innovative about security and how we secure sites because vandalism is a space that we have been in for quite some time. Now. Vandalism, reinstatement. So, the reinstatement of sites after vandalism is incurred, or occurred. And so, we've learned that there are certain shortfalls on a site. So, we've taken those learnings and we've translated it into a product offering that the customer benefits from in that there is no repeated vandalism on those sites. So, we go in, we harden it, and we move on*" Participant 1

In this way, SMEs are able to offer value to clients by creating innovative security systems that secure clients assets against vandalism. Consequently, the SMEs have attained a form of upgrading and are participating more in the telecommunications GVC.

Asset ownership

Some participants explained how they had moved their businesses from building sites for clients and transferred them in build-operate-transfer (BOT) contracts, to building and owning the assets and then renting them out. In this way, more participation and value are being realised for the business. Participant 7 explained how their business was evolving from being a contractor that buildt for a client to owning and renting out sites.

"*the biggest benefit for us for being able to start owning the asset that we used to transfer before but now we are the owners and now we're learning the challenges and the benefits of owning those assets as well*." Participant 7

The SME balance sheet is improved vastly when sites are being owned and major telecommunication operators can use these sites to bring considerable income. However, the SMEs continue building sites or towers and doing other work to meet OEM or operator needs. Their participation is thus increased from their previous positions when they joined the value chain to providing services and products whilst also owning assets within the telecommunication space.

Full turnkey solutions

The participants showed that SMEs were focussed on offering a wide range of services and products to clients in the form of full turnkey solutions. Instead of being a specialist at one product or one service to an OEM or operator; an SME can give fully flexed services or products that eliminate involving other SMEs or sub-contractors for each project or a specific job. Statements from Participant 9, Participant 13 and Participant 5 below show how SMEs were developing their businesses in the telecommunications value chains from single to many offerings:

"*Previously you would do, you will not be given too much of the installation package, you will just be given one item, if I were to give you an example, initially, you will just be given a cable to install. And then now, the new technology comes in and now you have been given a cable plus the equipment. And eventually, you are given to the program. And then that brings a good vision to my business. Because now you're not doing just a cable alone, you have to install and commission program and make sure that you eventually hand over something that is much better*." Participant 9

"*we started purely with installations, we'd get, you know, you get issued the equipment and installed from that going into a point where we can do a full turnkey solution for you rocking, build, design, install commission whole works. That's where your value chain comes in, in that you can now provide the full turnkey solution in one entity*." Participant 13

"*you putting pulling fibre, those are just cables, and they are not services attached to it. And then you then get to be given more than means you need to install the equipment that supports the cables, and then eventually, your permission that means to look at the equipment, configure the equipment, and eventually, ultimately, you'll be given an opportunity to maintain that same equipment. Then you grow from the cable point of view, equipment commissioning is now maintenance*." Participant 5

In this way, SMEs are participating much more than when they started the business with a focus on one product or service. The services and products are now a wide range that include but are not limited to microwave installations, fibre installations, network optimisation, managing the performance of client's technologies, maintenance, management of sites energy efficient methods, cybersecurity, internet service providers, high security and vandalism solutions, broadband network services, radio equipment installations and patented gantry systems. Failure to upgrade means an SME business can quickly become redundant since technology is advancing and can be very disruptive. That is why most of the SMEs have

innovation as one of their core values to help them retain customers and tap into other clients within the value chain.

5.3.2.3 New functions SMEs not previously done to improve participation in telecommunication GVC

The main themes emerging from the participants' responses on new functions not previously done by SA SMEs to improve their participation in the telecommunication GVCs are as follows:

Internet based communication tools

In contrast with companies that started business five years ago, the participants from the SMEs that started over 10 years ago started business when internet products were not well defined. The SMEs with longer operational periods went through the phase of migrating from traditional communication media to using internet-based communication media as explained by Participant 13.

"*All we have at the office is one fibre line that comes in and switch in there the all the telephones are basically internet-based IP phones just plug in and off it goes. So from that point of view, we've you know, we've used technology to enhance our operations in that we now don't have somebody manually changing tapes all the time*" Participant 13

Security improvement tools

Technology has enabled SMEs to move from manual methods of dealing with vandalism to upgrade to more computerised systems such as the Raptor system. This is enabling SMEs to participate more in the global value chain as they offer relevant services to operators and OEMs as expressed by Participant 3.

"*as a result of doing things or evolution and also expanding on the same scope that we had in terms of some of the proposed solutions like vandalism. Remember back then, when this whole thing of vandalism started? We just used to go and just patch a hole. So now what I'll do instead of just saying we will fully clear the container, we install security doors, and also upgrading of the systems that like previously in the past that then you use some units. And then now they're using the Raptor systems. So as, as Vodacom acquires telecom acquires new technology, we add the implementers of the technology. So, a result of high vandalism has also resulted in our revenue growth*" Participant 3

Other SMEs found the use of car tracking systems such as Geotab very effective and efficient in securing assets and to manage their operations and teams. With Geotab, the company is able to control and manage the site works, employee labour and vehicle usage. Participant 7 highlighted the new functions of Geotab in their business.

"*car tracking the company that we use Geotab those guys, we were able to run reports for ourselves. And then we're able to notice, and I'm just using a simple example, if somebody decided to use the car over the weekend, this thing will flag it in the question that we asked What were you doing? You got caught on it over the weekend. And you need to explain who gave you permission to do all of it. So, it used to help us with those types of things. Yeah. So, technology has helped us. But in the past, you had to rely on people to tell you that they didn't use the car. But now I don't need you. I just go check the system. And the system will tell me that the car was using me to know why you were travelling Sunday, Saturday*." Participant 7

Cyber-security services to clients

Technology is permitting SMEs to offer cybersecurity services to clients. This function is done remotely and permitting SMEs to include it in their package of services and products to OEMs and operators. Instead of just offering installation services, an SME is expanding the scope of their business by including cybersecurity services to clients.

SME business functions processes improvement

Technologies are being used to improve several business functions of SMEs to be more organised and offer more services and products within the global value chain. Participant 1 and Participant 7 explained how human resources functions and finance functions were improving using new technologies:

"*it has helped us to be able to automate some of the functions, especially functions that are repetitive and also even adjust us HR is a good example, where, because our system is able to flag people, because, in the past, we ended up employing the same person twice, not realizing that that person used to work for you guys,….., so now is able to flag anybody*." Participants 1

"*on the finance side, is also helping us especially the fixed asset register, is becoming a headache. Because as you're getting bigger as you're building more sites, remember now, the type of recording information, remember, whatever is on-site must be reflected by your fixed assets register. So in our view, simple things like we got the container, they got inverters, they*

got batteries, they record. Whatever is we bought separately, we're able to be able to identify it in the system." Participant 7

Payroll, accounting, PBX and other software systems are now being managed and stored on the cloud instead of onsite servers. SMEs are improving from using excel spreadsheets to using software packages such as SAP Business which are more effective in finance and accounting functions. Other SMEs confirmed to using systems such as Synchro to manage teams resource allocations when doing site installations. These systems are integrated with other functions to ensure that they are in sync with production, invoicing, purchasing, accounting and reporting.

Therefore, these SMEs are effectively using technologies to upgrade functions so that they participate more in the telecommunications industry GVC. These SMEs are using new technologies to improve communication, security, cyber-security, human resources and accounting functions.

5.3.2.4 How and why SMEs are using its current competencies to move to other new GVCs

The main themes emerging from the participants' responses on how SMEs were using their current competencies to move to other GVCs are as follows:

Work done in other industry GVCs

Some SMEs have been able to move their business from telecommunications to other industries such as heights functions, civil work, plant maintenance and sugar manufacturing companies using the competencies learned in the telecommunications industry plant maintenance. One participant alluded to their firm providing electrical and plumbing work which is a competency they gained from the telecommunication GVC which is transferrable to the construction industry GVC. Yet another SME was doing civil work, maintenance and repairs in the manufacturing industry using competencies attained in the telecommunication industry. Participant 6 also alluded to doing work in the energy sector through windmill powering projects using skills learned in the telecommunications industry.

Work done in GVCs outside of South Africa

However, Participant 8 alluded to their firm also doing fibre networking and looking at setting up Internet Service Provider (ISP) services in Malawi. Participant 6 also explained how their firm was doing power projects in Australia.

"*We used to do new site installs, but we're not doing the civil work. So recently, then we started doing civil work or civil work pays a bit more, but to be quite honest, it is not it's not really, I don't see as a greater contribution. Yes, it's got more revenue, but it's not really a greater contribution, but outside of South Africa now quite recently was just started another project in Malawi, assisting them with planning, their fibre network in Malawi. So, I see that as a greater contribution because it's not just blue-collar work, but it's skilled, skilled services. In addition, we are looking at becoming the ISP in Malawi. We're busy were busy setting up and setting that up now to seek advice on how we can play a role as an ISP. We tried in South Africa that didn't work."* Participant 8

"*The windmills for power. Yes. Yeah. So, that is where, like, you pointed out loud working at heights ability then sort of gave us the edge day. That was probably about a year project. And then they moved on to another project in Australia. So, from that perspective, that you know, the competencies required for our, our work within the telecommunication industries afforded us an opportunity to work in that in that space as well*" Participant 6

These two firms are showing evidence of interchain upgrading, were the competencies learnt in the telecommunications industry GVC are being used in other value chains. In this way, the SMEs achieve more participation in value chains.

No work done outside of telecommunication GVC

However, most participants explained how their organisations were not using their competencies in other GVCs which were not into telecommunications. Participant 6 was one of them explaining why their firm preferred to remain in the telecommunications industry GVC.

"*we have taken a position where we sort of focused on specializing in the telecommunication industry. But yeah, so I'm not actively going out looking, you know, to get into the other industries, per se, I'm, I'm sort of looking at maintaining a high standard of work within the telecommunication, sort of in this game, and what amount of work that's the currently, it's sustaining us. So, it's not forcing me to, you know, to go and find working in different fields. So maybe we fortunately, in that way, or maybe I'm just lazy*" Participant 6

The lack of movement from the existing GVC is so that they can remain focussed, participate better and maintain what they have which is what they are already knowledgeable about.

Figure 5.1 summarises the main sub-themes of how economic upgrading is impacting SMEs' participation in the telecommunications global value chain.

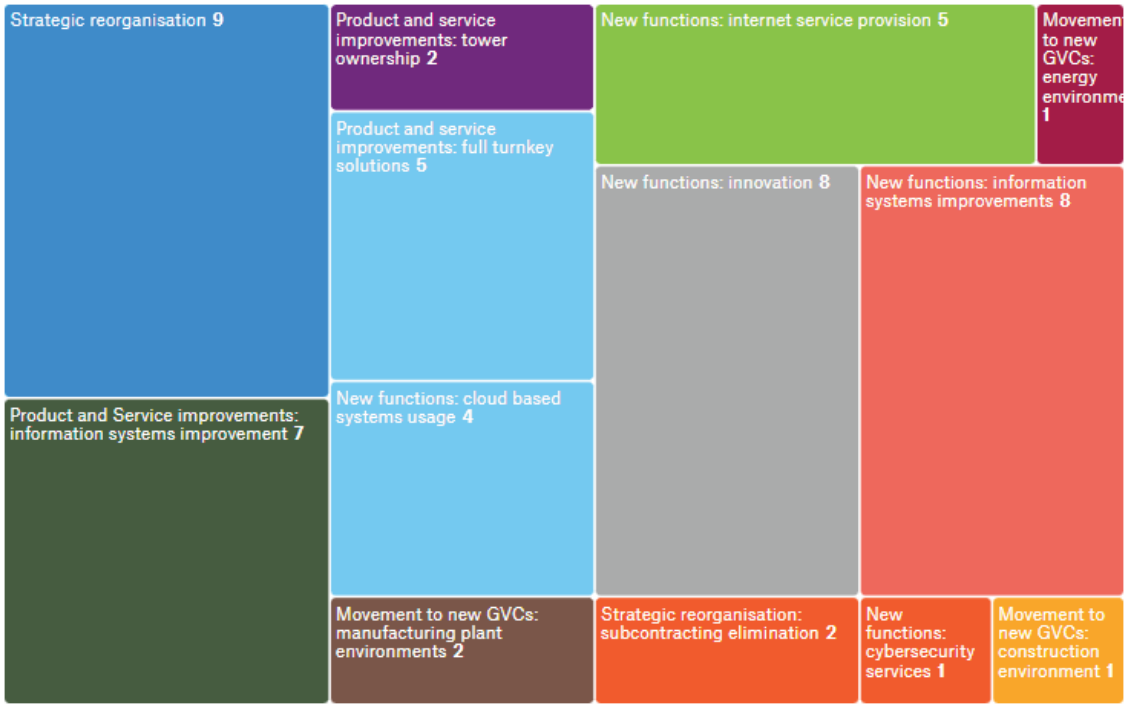

Figure 5:Research Question One Thematic Analysis Report

Source: Atlas.ti output (primary data)

5.3.3 Challenges SMEs experience when economic upgrading within telecommunication GVCs

The main emerging themes on challenges that SMEs are facing when economically upgrading to increase its participation in the telecommunication GVC are summarised in Table 3.

Table 3: Research Question Two Main Themes

Compliance costs	Stiff competition	High operating costs	Pricing challenges	Cashflow challenges	Lack of access to finance/ funding	OEM supply chain management narrow view of SME functionality	Skills gap	Unethical conduct

These themes are presented in detail in the following sections.

Compliance costs

The participants explained how their firms functioned in an area with a lot of health and safety risks and where the environment required one to be compliant working at heights and driving. Without meeting the health and safety prerequisites, a business cannot be engaged by a telecommunications client. However, the cost to comply is very steep for SMEs. Participant 1 and Participant 2 explained how compliance costs were a challenge to SMEs.

"*Compliance costs us, on average in a year, probably for a team of our size, probably around 200 to 300,000 Rand to keep compliance in terms of health and safety. Which is really your first stop, if you don't meet, or if you don't fulfil that, no one wants you on their site, nobody wants you in their factory*." Participant 1

"*And you're already expected to have basics system with a logical maybe make a practical example, their health and safety requirements that you need to meet to the register some of those things when you start, it's not a straightforward thing*." Participant 2

An SME thus cannot get business if they do not comply with the health and safety requirements. The risks when working on heights are very high, hence the need to ensure that the employees and the work area are safe and well secured. In addition, the cost of not complying is regarded to be much higher than complying with the requirements.

Stiff competition

The participants expressed the presence of intense competition in the telecommunication GVC, with a lot of new players operating low-cost models that question their added value to clients. Participant 1 and Participant 9 explained the problem of stiff competition in the following statements:

"*Competition these days is stiff in what we do. there's a lot of fly by nights, there's a lot of Bucky brigades, there's a lot of that, two-man teams, that kind of thing, you know, somebody that works out of their garage, as opposed to having a business premises like we do. So, there's a lot of that*." Participant 1

"*So it will come in the market, as you know, is quite an oversaturated market, you're in South Africa, right? And that when it's oversaturated, there's an oversupply of services, products and technology in the marketplace*." Participant 9

The SME business is forced to streamline their processes to keep costs low and match competition whilst adding value to clients. The telecommunication industry has become

extremely saturated with an oversupply of services, products and technologies. SMEs are thus forced to look for unique value propositions to survive this stiff competition.

Other participants expressed their views on the problem of partnering with the right company in a market that has many players. There is so much competition when bidding or tendering for jobs which makes it important to ensure that, when outsourcing, you engage the right partners enabling the clients to give you the business. Competition thus reduces the SMEs propensity to upgrade and participate more in the telecommunications industry GVC.

High operating costs

The participants explained how businesses in the telecommunication industry experienced a high operational cost. the cost of borrowing from banks is very high, with exorbitant interest rates by banks, making borrowing from the bank to fund operations the biggest disadvantage. One can fail to recover from these high interest rates when they price their services or products. Participant 13 explained why the high costs also affect pricing methods that enable more revenues.

"*I think a lot of it has to do with cost. For an SME, that is a challenge, you know, you when you price for a job, you're pricing to complete that work, but at the same time, you also pricing for the improvements that you need to do and moving your business forward*." Participant 13

The issue of high costs is why pricing is also a problem for SMEs. As businesses try to recoup these high costs, their pricing becomes less competitive.

Pricing challenge

The participants expressed the drop in price over time as a challenge as they embraced new technologies. The disruptive technologies have caused prices to drastically decrease to levels that sometimes make doing the business very unattractive. Participant 14 and Participant 12 explained this challenge when pricing products or services:

"*I was having this discussion with one of the chains, I think it was last week or the week before' I'll give you an example of an RF site and RF sites, when I used to work for Siemens, you would get 250, almost 250,000 Rand for the site. Today, you get 14,000, for the same work. So, in essence, as technology has become better, as operations has become better, the pricing structures have become less. I think the disrupter here that happened here was that when the Chinese came in your hallways and new cities that changed the entire game, what they will do now and we experienced this first-hand, when we were signing up with ZTE, they*

basically lobby, the partners or subcontractors or whatever you want to call them, they lobby them against each other they force the partners pricing down. So, you will find the guy having to do 100 sites to make money that you would have made out of 10 sites 10 years ago, or eight years ago or five years ago.". Participant 14

"*The client is no longer paying you that $100 And the client is paying you like $20. Now, if you compare yourself in 2010. So maybe it's due to the technology has been improved. The other thing, you know, I understand there is there is a CapEx and OpEx cost. But now, I have seen, the client never doesn't notice about it doesn't support the argument of price reduction, not from the tool parts. But overall, you know, so it's like, I understand that tool, price can go down, but the supplier needs to pay the same amount. So, it's something which the which the industry needs to think we pay the same amount of money, the fly, the price always fluctuates*." Participants 12

These SMEs have challenges justifying the prices for their services and products and this negatively affects their appetite to upgrade and participate more in the telecommunications industry GVC. The high operational and also capital expenditure of SMEs' businesses affect most SMEs. The SMEs handling sites is very capital intensive and therefore, their projects require large amounts of capital outlay.

Cashflow challenges

As highlighted in the previous section, the participants explained how SMEs encountered high operational and capital expenditure in the telecommunication GVC. Additionally, for these businesses to always be resourced with competent workers and stay above competitors, there are costs involved. According to Participant 13, cash inflows do not always match the cash outflows of the business.

"*the workflow has been very low which has affected not only revenue but cash flow and you know, because of cash flow and work stoppages and losses and those things we've battled, we've gone basically had to go to banks and get overdraft facilities and extensions and overdraft and try to keep your head above water you know*" Participant 13

When a business has low cash inflow from revenue and high costs, the business has cashflow challenges. Participant 5 explained how their business always experienced difficulties in getting invoices paid and how it negatively impacted the business.

"*if you look at us, we, we run our business based on the finance that we get paid. So the challenge will be how to just maintain your business if you don't have a good cash flow. So*

that is the biggest challenge for SMEs, and then the payment terms are so bad, or when it comes to SMEs. That becomes even a burden. So from either the operators or from the OEMs, the payment terms, we're talking about 60 days." Participant 5

These businesses, when they apply for credit from suppliers and banks, are denied because of the risk that SMEs are generally believed to carry, especially during the first five years of starting the business. Instead, suppliers want cash upfront for purchases. When this happens, the cash problems have a ripple effect on the business and the firms end up unable to employ experienced individuals and recruiting low skilled employees.

Lack of access to finance/ funding

The participants explained how SMEs struggled to raise large amounts to build towers and lenders asked for collateral which most small businesses do not have. The loan requirements are usually as stringent as when a big company requires the same funding. This limits the capacity of SMEs to upgrade as financial resources are important for operational and capital expenditures. Participant 7 and Participant 2 alluded to the problem of lack of funding in the following statements:

"*Access to money, access to capital. We started the business by purely dependent on purchase order and universal nothing and then sometimes it becomes difficult as cash flow metric business is bad, you know, fine, you can wait, manage, optimize, and so forth. But I think when it came to our second phase of owning tower, that's when we saw the reality because it was very capital intensive*." Participant 2

"*Biggest challenge there is funding, funding, funding, I say it so many times. Because you, you, you can come up with all these good things. But if you don't get the right funding, you won't achieve your upgrading goals*" Participant 7

Therefore, it is difficult for SMEs to fund their upgrading initiatives which require huge funding such as building sites. The banks often reject their loan applications because of lack of collateral.

OEM supply chain management narrow view of SME functionality

Whilst SMEs might have capacity to upgrade in various other functions, lead firms who give them the business are sometimes not accommodative. Participant 1 highlighted the challenge they faced with lead firms when the firm was willing to economically upgrade their operations:

"*Another challenge that we come across quite often is that of supply chain management within an entity or what they call procurement, within an entity. Because all too often, procurement and supply chain will look at will look to box you into a specific activity or a specific jobs centre. My approach has always been if we can do it, or if it can be done, then why can't we do it? So, it's about challenging the norms, the norm would be, Okay, we are working at heights company, we're not going to, we're not going to venture out into technology. And a procurement division would want to box you into a category and say, you can operate in this space, but not beyond the space. And I think I'm always challenging that and saying, well, how then do I work in the next space and the next space? Because it really is creating sustainability for my teams, by being able to have them as multi skilled and multi-disciplined teams that can be interchangeable with the different clients that we support*." Participant 1

SMEs fail to function in other areas of the value chain because lead firm supply chain departments box them into specific activities without giving them latitude to also operate within other functions of the value chain.

Skills gap

Since SMEs require highly competent human capital to successfully grow and expand in the telecommunication industry, they often face the challenge of skills gaps when they engage individuals who are coming from universities and colleges. The participants expressed that skills are key to managing the upgrading of product, function or processes. Participant 7 and Participant 3 alluded that these students come with no experience and ability.

"*Another challenge that you will have, you will have where your experience needs to come in. Because when you deal with people that are coming straight from TVET colleges, that they've not been working in their life before. So, there are certain things that they will be doing just because they're following the instruction. Sometimes they don't want to even apply their minds*." Participant 7

"*so for instance, you find that you will have a person who goes and studies as an engineer at some of the top universities, whether UCT, or University of Pretoria in South Africa see as a computer engineer, but once they qualify as that computer engineer, some don't even know what that what a motherboard looks like, even though they're not supposed to be working with that by just from a design perspective, designing a motherboard or designing a RAM*" Participant 3

Other participants expressed the gap between the educational curriculum and the real business world that causes brilliant academic individuals to fail to adapt and solve real business challenges in the workplace. Most adopted technologies originate from Chinese, Europeans and Americans with little to none originating from Africa. In addition, there are fewer qualified people available to take up technical jobs in the telecommunications industry which causes the SMEs to end up employing less skilled individuals. In South Africa, not many companies are involved in mass skills development for technical skills such as technology and engineering. Students thus leave college with theory which does not fully prepare them for practical technical work.

Unethical conduct

SMEs are facing similar challenges than other businesses with unethical conduct when soliciting for new business to enable economic upgrading in the telecommunications GVC. Participants highlighted the problem of bribes and kickbacks when they approached big companies in the global value chain. The statements of Participant 6 and Participant 11 below show the nature of corruption that SMEs face when searching for new business to increase participation in the GVC.

"*I say lack of ethics in terms of a lot of things happening, and I don't think this is limited to the telecommunications industry, especially, I think it's a business thing. Yeah, I think there's a sort of a lack of, and I don't want to say business ethics, I just think I think there's ethics in general. You know, when people aren't doing things, that's not necessarily ethical. And you find yourself battling to infiltrate, you know, these other opportunities or take you to know, take advantage of opportunities, because, you know, certain people are unethical in the way they do things. So, they find it a challenge to break into that areas. But yeah, as I said, I don't think that's limited to the telecommunication industries*" Participant 6

"*to be honest with you, I don't even tender because I don't want to be part of those people that do corruption, because some of these guys, they will approach you and say we want to give you a project for 3 million. But on that 3,000,000; 1 500,000 is for them I mean, come on. Already that thing on its own, it tells you that you are now subject to corruption. So, we believe that we have to get work fairly and honestly. Like others. I don't know how others are getting the work, but we try to be honest and do things appropriately. So, the challenge that we have is that we are living in a country where corruption now it's stronger than being legit. So, when you try to be legit, you might not get the work*." Participant 11

Instead of participating in these corrupt activities, the participants explained how they sometimes end up shelving their plans to upgrade until they get business through honest and transparent means and avoid bribing costs which are sometimes very high amounts that the business cannot afford.

Figure 5.2 summarises the sub-themes of the main challenges that SA SMEs are experiencing when economically upgrading in the telecommunications global value chain.

Figure 6: Research Question Two Thematic Analysis Report

Source: Atlas.ti (primary data)

5.3.4 Benefits that economic upgrading bring to South African SMEs operating in telecommunication GVCs

The main emerging themes on benefits to the SMEs for economic upgrading its functions in the GVC are summarised in Table 4.

Table 4: Research Question Three Main Themes

Operational systems efficiency	SME economic zoning and black empowerment	Response to change and attainment of sustainability	Telecommunication ecosystem interplay	Revenue growth	Green environment creation	Cost effectiveness and efficiencies	Information accessibility improvement

Source: primary data

These themes are presented in detail in the following sections.

Operational systems efficiency

The participants were of the view that the process of upgrading had allowed SMEs to streamline their operations and become more efficient and effective. Participant 1 and Participant 7 shared the following views:

"*I think we just were seeing it in that we were evolving into a much more streamlined operation, we're evolving into an operation that isn't constantly putting out fires. This focus, we brought focus now into operation, because the putting out fires is a distraction that doesn't allow you to move forward, it's almost you take one step forward, and two steps back. So, it's brought a lot of focus into the business, it's a lot of proactive activities, as compared to, to reaction to, to a knee jerk kind of situation. So, I think it's allowing us to grow in an intelligent manner, from a business perspective*" Participant 1

"*On the finance side, is also helping us especially the fixed asset register, is becoming a headache. Because as you're getting bigger as you're building more sites, remember now, the type of recording information, remember, whatever is on site must be reflected by your fixed assets register*" Participant 7

This means the business approach for SMEs has changed from being reactive to being proactive using effective systems. Other participants expressed how quality management systems automation permitted efficiency in compliance procedures. In some SMEs, health and safety inspection is being carried out remotely using technologies instead of physical visits and manual inspections as previously done before upgrading. Other participants spoke of how automation had led to better time management and asset utilisation for effectiveness. Yet, other participants explained how they were managing to handle vandalism and security better due to process and functional upgrading. Managing, storing and retrieving data had become better than before automation and process upgrading. Participant 13 explained how technological improvements allowed the business to recover quick from a cyber-attack.

"*We had an incident where a few years back where we had one of the cyber-attacks you know these ransomware things had a ransomware attack got into one of the machines and it basically locked few systems out. All we did was we switched everything have unplugged everything off the networks on the machine that was infected, took it out, threw it away, put a*

new machine in, took a hard drive to our telco who was our service provider, plugged in, downloaded all our data, plugged it back into our systems. And within it within 24 hours, we were up and running with our loss of data was like something like, I think 12 hours of data that we lost that was it. It improved our security and our efficiency." Participation 13

With these systems in place, SMEs can respond timeously to clients' requests and reduce downtime.

SME economic zoning and black empowerment

The telecommunication GVCs has allowed SMEs to grow and economically upgrade through economic zoning. Participant 8 explained economic zoning and how SMEs were managing to upgrade within the GVC:

"*Technically speaking, you want SME to grow. So you need to give them work that one has got a revenue stream that is semi guaranteed and you need to upskill them and not keep them on the ground it just doesn't work. I've made an example in where I said Vuma is entering the locations now and then putting the infrastructure there so that they can get revenues from that allows them to also grow the economy by directly benefiting from it in a long-term view*." Participant 8

This means fibre installation companies are now being permitted to also participate in the telecommunication industry and offer Internet Service Provision (ISP) if they have the capacity and interest to do it. Instead of focussing on managing fibre infrastructure as decals, they are now being given the room to upgrade their business to also provide ISP and compete with everyone else.

SMEs are able to get business from large operators such as Vodacom because of their policies that promote black businesses in South Africa. The participants alluded that these big businesses are very strict and float tenders only for black businesses. Participant 7 and Participant 12 explained this benefit that had enabled them to participate more in the telecommunication industry in South Africa in the following extract:

"*Talked about Vodacom because they always remind us of that. Yeah. Because they're very big on supporting Black SMEs. Yeah. So, I think something that we never realized until I think we just had a meeting two weeks ago. And then somebody just made a comment that whatever comments did, now they're seeing the benefits of having that RFQ where they were requesting only black SMEs to be the ones participating. So now we're seeing the benefits*

where now we've got entities now that are growing, and we are supporting them." Participant 7

"*Telecom has been focussing on empowering local people, that we have added as a value to the global value chain in South Africa. So, we prefer the local people to be empowered*" Participant 12

Thus, economic zoning ensures that the most marginalised businesses are given the opportunity to participate in the telecommunication GVC. This is a market that has big economic players with resources to literarily do most of the work in the value chain. Instead, these large firms or lead firms give priority to SMEs to participate and grow their businesses.

Response to change and attainment of sustainability

Some participants alluded to achieving responses to the changing telecommunications environment and attaining sustainability as a business when they upgraded. Since the telecommunications industry continues to be highly dynamic, change is still a must to remain sustainable, as for most businesses. Resistance to change leads to failure and SMEs seek great improvement as their reaction to changes in the telecommunications value chain to ensure ongoing participation and business success. Therefore, upgrading allows SMEs to respond to change as explained by Participant 12 and Participant 14 below:

"*the main goal is to adopt to the change. And, you know, it's for each of us, for any organization or for any on any person, individual person, if you don't adopt to the change, and you would be resistant to the change, you won't sustain to that organization or you don't, you won't sustain for that role. We all need to adopt, you know, that what the telecoms are done, has been has done well, by adopting to the change and, and learning and growing and, and, you know, it's a continuous improvement, we focus on that continuous improvement thing*" Participants 12

"*we have achieved in terms of sustaining into the market. And as this growth is demanding, and the technology is demanding, and it has forced for us to adopt to it and to be a sustained market, it's all about sustaining in the market. You know, it's, it's a high it's a very volatile and fluctuating market, because the technology is growing very fast.*" Participant 14

SMEs are thus adopting change to survive and continue to participate in the GVCs. Upgrading is the tool which assists them to adapt to the changing telecommunication environment. In this

way, SMEs are able to keep their businesses sustainable offering improved products and services that are relevant to clients in the new environment.

Telecommunication ecosystem interplay

SMEs can upgrade to services or products that lead firms ordinarily allow them to sell. Participant 9 and Participant 8 explained how SMEs benefitted and upgraded to other services not originally provided within the value chain through ecosystem interplay between clients and SMEs.

"*Ecosystem interplay is what my client wants to be sold, I can now sell what my OEM wants to be sold into the marketplace, I can now sell into the marketplace, I can buy and sell to the same ecosystem on the top and I can buy and sell to the same ecosystem at the bottom*." Participant 9

"*Those type of partnerships, we also have service provider engagements with liquid, so we resell liquid technology into the marketplace, we have a service provider engagement with salsa, we resell CellC services in the marketplace*." Participant 8

An SME thus benefits from belonging to the telecommunications ecosystem. The relationship between an SME and lead firms allows for social exchange and interplay, where the SME has leeway to provide more services and products for the lead firms. In this way, most SMEs can easily upgrade by utilising current relationships with clients in the value chain.

Revenue growth

When SMEs upgrade, more revenue is earned in the business. Participant 8, Participant 13 and Participant 3 explained that SMEs were making profits with economic upgrading by boosting revenues.

"*Growth is a bit more the revenue growth is a bit more and if we can get the ISP right like we are trying to set it up now, we know what it is more of a long-term revenue stream that we can rely on.*" Participant 8

"*Increased our revenue on this financial year, in 2022, we've closed on a profit as opposed to a loss that we've seen in the three consecutive years prior to this. So, I think, you know, that alone stands out and shows you those changes. I mean, just looking at the bottom figures, on your annual financials, just shows you the changes you've made for the better because it's, it's gone from negative to positive*" Participant 13

"*Our revenue grew. We're making more money. And looks like we might even actually double up our revenue because we're looking at industries that we never looked at before. So yeah, so we more determined we worked on knowing our vision and objectives as an organization last year, so we'll have to do those*" Participant 3

SMEs are thus experiencing revenue growth with upgrading and more participation in the telecommunications industry GVC. This also translates into better profits for the business.

Green environment creation

The participants acknowledged achievement of a green environment through a paperless office due to upgrading when processes had been automated. Participant 9 and Participant 2 had the following view on green environment:

"*let's talk to start with our ambition to be a green environment. So, we trying to reduce the usage of paper, and ink toner, we want to try and reduce as much of the traditional paper trail and paper-related work workflows in our delivery. So, therefore, we digitalize a lot of those, those forms of documents that we will typically need to print. For us to validate and report on data, we now use a lot of electronic tools to do. So that gives us a benefit from a green environment perspective*." Participants 9

"*How do you manage them cheap from those processes, that talk to your green energy going forward on environmental issues? So we know that you might not have them, but they give you time with the cane, you address these processes for the near future, then you start engaging and creating such so basically, the more you get involved with these operators, the good thing about is they allow you or they give you opportunities to address policies and processes that you might not entirely have mechanization at that particular time*" Participant 2

When SMEs upgrade, they consequently achieve a green environment by using new technologies and electronic tools that eliminate the paper trail and paper-related workflows.

Cost effectiveness and efficiencies

When SMEs enjoy a lot of business in the value chain, it helps them improve their efficiencies and effectiveness to lower costs. That is why activities such as drive tests reduced in cost from $12 000 in 2010 to $2000 in 2022. The reduction was because of growing use of technologies

by players in the telecommunications industry. Participant 9 expressed the following view on how cost effectiveness achieved through upgrading brought value proposition for clients:

"*we are able to bring certain value propositions like the quality of delivery, cost savings for them, potential to upsell and cross sell into their ecosystem as well*." Participant 9

The SMEs have improved their profitability levels because of improved cost efficiencies using systems that manage assets and employees. Participant 10 also explained how upgrading improved effectiveness to lower costs.

"What *it also does, I think, for us is that it has incentivized the teams, because what we normally do is rank the team's productivity. They know when they go out, that they are also being monitored in terms of their effectiveness. So' we've got sliding scale incentives for the number of sites completed without every three works, but also on time, completion of sites, but also the volumes because sometimes we know that clients get a lot of work that they assigned to us. And so, the incentive for the teams is that it is not how many sites you can, you can do. Bu' it's how many sites you can do well, without any rework. But that also becomes part of the incentives for the teams to go out there and make sure that they apply themselves in the work that they do*." Participants 10

Productivity is also enhanced with cost effectiveness and efficiencies when SMEs are engaged in economic upgrading. Consequently, there is more value propositions passed onto the clients.

Information accessibility improvement

Through upgrading internal systems, SMEs have accessibility 24/7 and can maintain business continuity without disruptions to their operations. The SMEs face disruptions such as riots, floods and recently the COVID-19 outbreak which disrupt the consistent and continuous business operations in telecommunications functions.

Figure 7 summarises the sub-themes of the main benefits SA SMEs realise when economically upgrading in the telecommunications global value chain.

Figure 7: Research Question Three Thematic Analysis Report

Source: Atlas.ti (primary data)

5.3.5 Critical success factors affecting the economic upgrading of South African SMEs operating in telecommunication GVCs

The main emerging themes on the critical success factors to the SMEs' economic upgrading that effectively increase participation in the telecommunication GVCs are summarised in Table 5.

Table 5: Research Question Four Main Themes

Employees continuous skills development	Awareness of environmental changes	Good relationship with clients and suppliers	Employment of competent employees	SME leaders' entrepreneurial spirit	Compliance

These themes are presented in detail in the following sections:

Employees continuous skills development

The participants alluded to the need for employees' continuous skills improvement for both leadership and workers to ensure highly competent human capital to manage rapid changes occurring in the telecommunications industry. Participant 3, Participant 14 and Participant 15 explained the need for employees' continuous skills development for successful upgrading within the telecommunications GVC:

"*as the CEO of the company, going back to school, did help unlock those opportunities and also, maybe attending a lot of trade fairs of Daniel Landon tech, Daniel Africa, calm Daniel Govtech. So, by going there and seeing what other companies are doing, you actually learn and then sometimes you kind of copy what they're doing. And then but you just make it look a bit different*." Participant 3

"*By putting ourselves out there firstly, by going to the right type of seminars came to attending things like AFRICOM attending platforms, like the Global Business Forum in Dubai, this is how we've allowed ourselves to be a solar cell research front runner, with respect to that. We've also managed to count to terminate deals with our OEMs, where we get training and a lot of training and a lot of system changes that they'll have we get for free, we broker these things as part of our deals with a lot of our OEMs. So, this has enabled us to stay ahead, as we've needed to adapt, and also to make sure that our staff complement actually gets trained and up to date with changes within the entire value chain, from a services point of view from dealing with clients*" Participant 14

"*in our business, I can employ an IT guy, I can employ a computer science guy, I can employ a telecommunications engineer, I can even employ, for example, a chemical engineer, for example, and bring them in, I will still get the same effect out in terms of my service delivery. So and with that being said, like we've always known with it for an example, if you're going to be a Cisco engineer, your qualifications only last as long as you updated refresh. If you don't do that, you lose your credentials, you lose your qualifications. So what's the ever changing thing and with us, because technology changes, like, for example, 10-15 years ago, when I was still working from CDs for Siemens, equipment, end of life close could have been at a lifetime span of about 10 years. Today, your networks are being upgraded every five years. So you can see technologically, it's ever changing, and ever changing and ever changing and ever changing*." Participant 15

Employees, especially the technical staff, thus need to be adaptive and continue learning new technologies and products and must be able to deliver better services to clients as the

environment changes. Some participants, though highly qualified, alluded to receiving more courses and seminars to upskill and multi-skill in order to understand the new technologies that keep erupting in the telecommunications market. Some participants also confirmed to having in-house training centres with technical experts to train new employees on both new and old technologies and how to improve technologies.

Awareness of environmental changes

Most of the participants alluded to the critical need for awareness of the rapid changes in the telecommunication environment. Within the environmental changes, opportunities and threats to businesses exist. It is those who understand the changes who succeed in upgrading their businesses. Participant 10 highlighted the importance of environmental changes awareness in the telecommunication GVC:

"*Being aware of your environment, always looking out for new technologies and making sure that you know as much about them as possible, the very same technologies, knowing how and where to deploy them within the space within which you operate*." Participant 10

When an SME has awareness of the environment, it is easier to implement upgrading as a response to the changing environment by applying technologies to processes, products, or functions.

Good relationship with clients and suppliers

The participants expressed the importance of SMEs having a good relationship with the lead firms to forge good business partnership to successfully upgrade. Good relationships open doors to successful upgrading from good rapport with clients. Participant 15 and Participant 1 explained the incentives they enjoyed in the GVC through their good relationship with a lead firm.

"*Assistance from OEMs, like Nokia at the time, and at the time. So that was very, very helpful for us. And further down the line, I think there was a year when they've had an overflow of interns. And they approached us and say, look, we've got about three extra interns that we don't have positions for now*" Participant 15

"*But it all comes back to, can we build that rapport with the client and have that relationship that then translates into bottom line? So, for me, that will always be critical*." Participant 1

Good relations with suppliers are also important to achieve better terms and conditions of doing business.

"*Even with your suppliers, the type of relationship that you have with supplier, some of them, they can be difficult. And just say to you, now, I want cash up front. Otherwise, I'm not going to do this. But because of the relationship that you build with those guys, then they can say no, we'll give you terms or give you today's term*" Participant 7

These are important stakeholders to SMEs as they should forge good business partnership to upgrade with success.

Employment of competent employees

The participants alluded to the need for a high technical skillset to succeed in the GVC. Participant 3 highlighted the importance of hiring talented and skilled employees to achieve a competitive advantage:

"*focus more on hiring talented engineers, as that tends to give you a competitive edge in the industry. And we've managed to penetrate and open new avenues for our business because of having talented guys*." Participant 3

Competence also includes competence of the leaders to direct the business in the right strategic path and growth. There is a need for good business acumen through the right leadership skills set. Participant 3 explained the importance of competent leadership to upgrade and grow the business with success:

"*So our competency as directors of the business ultimately determines how far the business goes and alpha, how big we can grow the company. So why I'm saying so is I've learned in the last couple of years, I mean, in 2014-15, I couldn't read financial statements. Then I went back to school to go to an undergrad in marketing management, and one of my majors there was accounting, statistics and marketing. So by going back to school actually learned a lot, and actually started identifying some of the things we're doing wrong as a business. And then in 2020, I went back to school again, to do a postgraduate in it, which I finished last year. So that also exposed me to new opportunities that I don't think I would have looked at in an era not taking time to sit in a class, and actually start reading and learning new things. And also from a training and development perspective, one thing as well enrolled for a cause in think is business management, and also did some health and safety management courses, we have our project manager who enrolled for planes through training, and some of them are actually*

enrolled for, for those that have minimal qualifications, we enrolling them for four causes activate colleges to do some electrical and mechanical work." Participant 3

SMEs therefore should ensure that employees are trained and developed in the main functions of the business and regarding technological innovation. Both leaders and other employees must be exposed to adequate training and development on an ongoing basis to keep pace with telecommunications industry changes.

SME leaders' entrepreneurial spirit

The participants explained why SMEs owners and leaders must have an entrepreneurial spirit to take the risk to upgrade and increase their participation in the global value chain. Without an entrepreneurial spirit, SME leaders are afraid to take the risk that comes with economic upgrading activities.

Compliance

The participants clearly explained how compliance is a critical business function for successful upgrading processes in the GVC. Compliance is regarded as a gatekeeper and without complying to requirements, a business cannot operate successfully in the value chain. The clients are very clear and strict about compliance. Participant 2 and Participant 7 highlighted the importance of complying to ISO certifications for quality, health and safety standards:

"*One of the requirements, they require you to comply with ISO 14,000. All these idle systems, one of the major things now that operators are not just operators and the amount I was asking for the future, how are you preparing your organization to act to make sure they meet the requirements*" Participant 2"*it's helping us because of these compliance issues. So especially these telcos, tend to be very rigid about Health and safety compliance. And for you, if you don't have, your house in order in terms of documenting all of this thing, then you end up being excluded in the participation of this*." Participant 7

Most OEMs and operators will not engage an SME into business without meeting health and safety requirements as, alluded by Participant 10.

"*health and safety are very paramount. So, you've got to make sure that your teams are well equipped with all the training that they require to go to site and perform things in accordance with all the health and safety standards, as per the various organizations like NASA is requirements*." Participant 10

Figure 5.4 summarises the sub-themes of the main critical success factors for SA SMEs' economic upgrading in telecommunications global value chain.

Figure 8: Research Question Three Thematic Analysis Report

Source: Atlas.ti (primary data)

5.4 Summary

In this chapter, the main themes were presented to address the research questions of the study. The demographics and the main findings were presented according to the main themes as analysed using Atlas.ti. SA SMEs are involved in the strategic reorganisation of processes, products, services, functions to upgrade and increase participation. However, the upgrading processes come with the challenges of compliance and operating costs, stiff competition, pricing challenges, cashflow challenges, lack of access to finance, lead firms SCM challenges, skills gaps and unethical conduct. Nevertheless, the process of economic upgrading comes with the benefits of operational efficiency, cost effectiveness, economic zoning, black empowerment, response to change, attainment of sustainability, ecosystem interplay, revenue growth, green environment creation and information accessibility improvement. The critical success factors influencing economic upgrading of SA SMEs are the employment of highly competent and skilled employees, staff continuous skills improvement, awareness and

response to telecommunications environmental changes and good relations with lead firms. The next chapter presents the discussion of the results.

Chapter 6: Discussion of results

6.1 Introduction

This chapter includes the discussion and analysis of the results and findings. The discussion is guided by the main research questions with reference to the literature review. The research questions are: How and why does economic upgrading affect South African SMEs participation within the telecommunication GVCs? What challenges do South African SMEs experience when economic upgrading within telecommunication GVCs? What benefits does economic upgrading bring to South African SMEs operating in telecommunication GVCs? What are the critical success factors affecting the economic upgrading of South African SMEs operating in telecommunication GVCs? Each discussion topic ends with a conclusion. The chapter ends with a summary of the discussions.

6.2 How and why economic upgrading impacts SA SME's participation in telecommunication GVCs

6.2.1 Process upgrading

The results show that SMEs in the telecommunications industry GVC are modernising their internal systems to improve accessibility with information technologies. Firms that deal with physical products or services use their capabilities to achieve a higher efficiency in process tasks with lesser defect/rejection rates (Kano et al., 2020). According to Marcato et al. (2019), process upgrading takes place when companies are developing their value-added portion in their current GVC activities by having a better organisation of internal systems than competitors. The SMEs are upgrading their systems from being server based to cloud-based systems. Most of the functions that include payroll, finance and accounting, health and safety have been automated to most recent versions. According to Lee et al. (2017), new processes that improve supply chain communication facilities such as mobile phone usage in transport and production planning can be introduced. This in turn can permit the processing of more complex tasks, leading to the reduction of per unit costs and efficiency gains (Lee et al., 2017). The goal is to ensure that there is business continuity to participate in the telecommunications value chain effectively without disruption. In addition, absolute advantage is the main key for increasing participation when a firm increases access to technology and knowledge to compete and increases productivity, thereby reducing cost (Bamber et al., 2017). However, not all process upgrading will be accepted by stakeholders in the value chain (Bamber et al., 2017).

SMEs are creating automated health and safety processes to ensure compliance with OEM and operator requirements. In this way, these firms can participate more in the value chain with safe and secure systems. SMEs must comply with international standards in the GVC and ensure that their technologies are inextricably linked to and dependent on this (Kano, et al., 2020). According to De Marchi and Alford (2022), process and product upgrading must meet quality and compliance regulatory requirements. Because the product does not need to meet rigorous testing standards, validation of product compliance is possible by conducting tests on the product. Process compliance, however, necessitates regular factory audits and is often connected to process certification such as ISO 9001:2015 (Sampath & Vallejo, 2018).

SMEs wishing to align strategically in the value chain are resorting to changing their business model to ensure more participation. According to Banga (2022), firms need to carefully select their inputs and a well-functioning value chain to facilitate process upgrading in the GVC. Marcato and Baltar (2020) argue that economic upgrading is a strategic move and such economic upgrading is not easy to accomplish and does not happen automatically within companies. Therefore, the quality and occurrence of economic upgrading depends on various firm choices that relate to the business strategy that it follows.

SMEs mostly enter the telecommunication GVC through subcontracting work and upgrading assists them to grow the business and become independent suppliers of owned services and products to lead firms. Profitability of the upgrading is important for sustainable growth of the business. Experience in the value chain allows SMEs to learn which functions to adopt besides their initial competencies. The result is similar to a study in China by Kowalski et al. (2015) who found that more productivity improvement through process upgrading increased profits and sales of local firms.

6.2.2 Product upgrading

The results show that SMEs are using innovation to improve their products and services offered in the global value chain. According to Armando et al. (2016), product upgrading is when a company obtains capabilities to supply high value-added goods and services as compared to its competitors. The dynamic and rapid environment of the telecommunications industry makes product and service upgrading imminent for survival. Continuous product and service development for vital for the sustainability of the business as rapid technological advancement occurs. Horizontal and vertical innovation, research and development investment and cutting-edge technology adoption lead to product upgrading (Lee et al., 2017). In product upgrading, old products are improved and updated through process upgrading that shifts production towards sophisticated products that capture higher unit value (Bamber et al.,

2017). SMEs are investing in technological innovations to improve services and products as they integrate their business in the GVC. SMEs are utilising IoT technological innovation, security system technological innovation and health and safety technological innovations to upgrade products and innovation. SMEs end up with a full scale of products and services associated with their line business to participate more in the GVC. However, De March and Alford (2022) argue that some firms use process and product upgrading at the same time to achieve better integration and participation in the GVCs. In addition, Kowalski et al. (2015) argue that GVCs permit SMEs specific segment product specialisation; therefore, for comparative advantage, there is no need for SMEs to know all processes to produce all product lines in the global production chain. Production growth and differentiated products help to increase value within the value chain (Choksy et al., 2017). However, the value created by a company within a GVC is dependent on competitors' difficulty to produce similar products or services. Replicable products that can be copied easily such as those not protected by intellectual property rights (IPRs) can easily be developed into substitute products or services in a GVC (Choksy et al., 2017). Consequently, product upgrading requires greater capability on the part of local firms to change into new product manufacturing (Gerrefi, 2019). These companies produce new services or products in current value chains or improve old products or services quicker than their competitors and products or services aligning to lead firms' requirements.

6.2.3 Functional upgrading

The results show that SMEs are improving their health and safety, security, communication and operations functions using technology to increase their participation. The business is also realising new functionality such as cyber-security functions. Business functions such as human resources, finance and procurement are also being upgraded to improve SMEs' efficiency and effectiveness in the GVC. In this way, SMEs are attaining full functionality and eliminating subcontracting some activities. According to Gerrefi (2019), within firms, functional upgrading occurs when more sophisticated technologies bring capabilities to function in GVC segments with higher value-added production (Gerrefi, 2019). This means that SA SMEs are functionally upgrading.

In this study, SMEs carrying out functional upgrading were carrying out technological improvements to bring new functions to the organisation. This agrees with Gerrefi and Fernandez-Stark's (2016) argument that functional upgrading can result in movement from low value functions to high value functions. This means that, with technological improvements, SMEs are able to abandon low value-added functions and primarily focus on new high value-

added functions to generate more revenue. As such, SMEs are able to access and seek high level value creation in upstream activities as well as downstream activities (Bamber et al., 2017). The firms are thus able to move their central activities to other GVC segments such as ISP, electrical work, cybersecurity and site installation. This also gives the SMEs the capacity to backward or forward integrate their business within the value chain (Mehta, 2021). In this way, SMEs are able to eliminate outsourcing or subcontracting some functions but instead handle them in-house. Similarly, intermediaries' market power is eliminated permitting market signals to flow directly to lead firms and clients. Additionally, SMEs cannot afford to rely on product and process upgrading as it limits its potential to widen or increase its customer base. Thus, functional upgrading is necessary to prevent overreliance on a few clients obtained with process and product upgrading (Gerrefi, 2019). Functional upgrading therefore unlocks the potential to target new clients with new functionality, though this movement comes with the involvement of new vertical relationship establishment that may need SMEs dealing with varying business types and interacting with new cross class boundaries or social groups (Gamble, 2020).

However, competent and highly skilled employees are required to be able to handle advanced technologies that bring in new value-added functions (Gerrefi, 2019). This is because most of these activities involve non-codified and tacit knowledge in areas of complex systems, cutting-edge technology and original design (Gamble, 2020). A company ought to have the necessary skills set or know-how to create and manage the new functions. This means that, with functional upgrading, SMEs' employees regularly need to learn complex and new skills associated with product design, product development, marketing and branding (Gereffi et al., 2021). Hence the need for SMEs to invest more in knowledge-based capital (Lee et al., 2017). In addition, besides the bigger skill set demand, according to Marcato and Baltar (2020), there can be greater barriers to entry into the new activities that SMEs have to deal with. Greater capabilities and competencies are called for the firms to upgrade its functions in the GVC; therefore the argument by Gerrefi et al. (2021) is that developing economies SMEs should start with product or process upgrading which might be easier to undertake with less obstacles and then execute functional upgrading when they have more economic upgrading experience. Some of the SMEs still outsource other functions due limited internal human capital to handle new functions. Therefore, for SMEs to functionally upgrade with success, they need a high-skilled and knowledgeable human capital to handle the change in functions and be able to handle relationships in the new level of the value chain.

6.2.4 Interchain upgrading

The results show that a few SA SMEs are also moving to other GVCs using the competencies learned in the telecommunication GVC. In this way, the firms are able to achieve sustainability and increased business participation in GVC, even though having to do it outside the South African telecommunications value chain. In this way, firms are able to capture higher value add with interchain upgrading (Armando et al., 2016). The other GVCs that SA SMEs have been able to exploit and capture high value add include construction, energy, and manufacturing GVC where SMEs are using their competencies in electrical work, plant maintenance, heights functions and civil work. This type of upgrading is a strategic option that can be effectively used by utilising value chain knowledge acquired, continuously searching for excellence in production and embarking on market diversification (Armando et al., 2016). This makes sense when faced with oversupply of products and services, competition, and difficulties to differentiate products in existing markets (Choksy et al., 2021). In this way, increased participation is attained that boosts volumes in a multi-linear manner (Sampath & Vallejo, 2018). In a nutshell, this interchain upgrading brings economic upgrading success by looking for markets that offer opportunities for increased value add and permit value to be extracted by different stakeholders in the value chain (Zakic et al., 2018). However, studies by Choksy et al. (2017) found that SMEs can fail with interchain upgrading due to a lack of power asymmetries in the network and their degree of explicit coordination. This upgrading is very risky since the movement to a new value chain level leads to risks related with changing power balances, shifting relationships and the desire for new skills and knowledge segments (Mehta, 2021). It may lead to losses if moving to unfamiliar or new market segments (Armando et al., 2016).

That is why a few participants in this study confirmed that their companies were not moving to other GVC but rather remaining in the current telecommunication GVC and using other types of economic upgrading to increase their participation. In addition, Armando et al. (2016) argue that SMEs can either be held hostage by lead firms who have assisted them to acquire capabilities not to explore other GVCs and from the lead firm perspective, they have interest in allowing an SME to benefit from its investment. This brings the issue of governance. According to Bamber et al. (2017), governance affects the degree of power asymmetries and explicit coordination in the global value chain where a firm is held hostage because of the value chain relationships especially where the lead firm has invested capabilities into a small firm. Altering governance patterns and power relations by SMEs is not easy within global value chains that have powerful lead firms (Elteto et al., 2015). This means interchain upgrading can be very difficult for SMEs but instead they should resort to process, functional or product

upgrading. This is similar to Armando et al.'s (2016) arguments that product and process upgrading are common in developing nations' value chains partnership other than inter-chain upgrading. Not many SMEs are keen to enter GVCs that they are not familiar with which might affect their current relationships with lead firms in the telecommunications GVCs. Additionally, interchain upgrading also exposes a firm to new forms of competition in the new value chain which might turn unprofitable going after other clients or market segments (Cattaneo et al., 2013). This is therefore an outright diversification strategic move that comes with various new risks.

6.2.5 Conclusion

SA SMEs are engaging more in process, product and functional upgrading and less in interchain upgrading to participate more in the global value chain, though equally influenced by governance and competition dynamics. The nature of the telecommunication industry is characterised by rapid changes and the dynamic technological advancement makes SMEs agile in their approach to remain relevant and meet clients' requirements by upgrading their processes, functions, products and services. The oversupply of products and services gives leeway for other SMEs to explore other GVCs using competencies learned in the telecommunications industry. However, the need for highly skilled and competent employees and other challenges limits the level at which SMEs are upgrading to increase their participation within the global value chain.

6.3 Challenges SA SMEs experience when economic upgrading within telecommunication GVCs

6.3.1 Stiff competition

SMEs face a lot of competition and this competition is so intense to impact how they should price products and the operating costs that makes the business viable. The telecommunication industry is saturated with oversupply of similar products and services. According to Lwesya (2021), intensified competition is one factor that influence SMEs to upgrade. Similarly, Petrobelli et al. (2021) argue that firms must be wary of product and process shocks that counterattack their process and product upgrading efforts. These shocks threaten the success of the upgrading. As such emerging competitors could produce more efficient products or services before an SME rolls out their product or process upgrade (Gereffi & Fernandez-Stark, 2016). The demand for the new product or service is grossly affected by competitor movement and with intense competition the chances to experience this is high due to information asymmetry in the value chain.

6.3.2 Costs and cashflow challenges

The operational costs are very high and this creates a pricing problem as clients resist high prices when SMEs are trying to recoup costs. This is similar to Bamber et al. (2017), contention that SMEs struggles to upgrade because of amongst other things, higher infrastructure and operational costs. The results also show that SMEs have challenges to stay compliant because of the costs involved. Without complying, they cannot participate in the telecommunication GVC since most of the work is very risky and capital intensive and clients require compliance to health, safety and quality standards. Cashflow problems especially during early years of business arise because of high operational and capital expenditures involved in telecommunication activities. The business requires competent staff and to retain competent staff attractive rewards and compensation must be maintained that also increase costs. The SMEs face more cashflow challenges as receipts fail to match expenditures when suppliers are insisting on cash upfront payments whilst credit and bank loans are not accessible to SMEs in their early years of starting business. The SMEs mostly face a lack of funding to improve and fund the business and this affects the level of upgrading and ultimately the level of participation in the GVC. This is similar to Bamber et al. (2017), argument that SMEs struggles to upgrade because of amongst other things, limited finance. Similarly, Lwesya (2021) argue that SMEs have challenges to finance their economic upgrading initiatives. SMEs lack access to sufficient and sustained finance. When SMEs fail to obtain funding, it incapacitates them to upgrade (Marcato & Baltar, 2020). Process upgrading for instance could entail investment in heavy equipment and powerful machinery that requires a huge capital outlay (Bamber et al., 2017).

6.3.3 Lead firm restrictions

Product and service upgrading is difficult when the lead firm is restrictive. This is common because SMEs fail to function in other areas of the value chain because supply chain managers, box them into specific activities without giving them latitude to also operate within other disciplines. Thus, Chen et al. (2021) found that upgrading success was limited to whether buyers or lead firms accept the new processes, functions, products or services. A study in Brazil by Sampath and Vallejo (2018) found that clients and lead firms were not interested in better distribution channels, branding and quality designs. SME process upgrades that were done in terms of SMEs can effectively benefit from upgrading when they engage in commercial liaison with clients and lead firms when upgrading to obtain higher gains from their efforts (Sampath & Vallejo, 2018). It means when there is resistance from clients or

lead firms, SMEs must abandon upgrades that slow down any efforts aimed at increasing participation in the value chain.

6.3.4 Skills gap

Since SMEs require highly competent human capital to successfully grow and expand in the telecommunication industry, they often face the challenge of skills gap when they engage individuals less skilled who are coming from universities and colleges to manage costs. In addition, the gap between educational curriculum in South Africa and real business setting remain big, characterized with theory and less practical knowledge. Similarly, Bamber et al. (2017), argue that SMEs struggles to upgrade because of amongst other things, skilled workers' shortage. Lwesya (2021) also contends that managerial skills is a major factor influencing SMEs to upgrade. Gamble (2020) found that SMEs lack skills and knowledge to respond to contracts. Similarly, Mehta (2021) found that SMEs have managers that lack skills on new techniques and strategies to position new designs and productions. SME owners lack skills to permit time and manpower to obtain new skills, e-commerce usage, hire appropriate talented and qualified individuals and to stop anti-competitive practice (Gereffi, 2019). However, in this study several SME leaders showed appreciation for upskilling but still regarded it as a challenge to their organization to be adequately resourced with competent and skilled workers and leaders.

6.3.5 Unethical conduct

SMEs have the challenge of unethical conduct which affect their participation when clients solicit for bribes to give them work. According to Choksy et al. (2017), SMEs lack an enabling environment that create favourable conditions to upgrade. A study by Loewe et al. (2013) showed corruption as an important inhibitor to SME business activities and a key part of the business environment. Corruption and bribes create an unfavourable environment for SMEs to grow and integrate (Bamber et al., 2017). The SMEs are unable to fully upgrade within the telecommunications GVC because of these barriers to fair and transparent business conduct.

6.3.6 Conclusion

SA SMEs' level of economic upgrading that increases participation in the telecommunications GVC is slowed down by stiff competition, cost challenges, cashflow challenges, lead firm restrains, skills gap and unethical conduct. The telecommunications market is capital intensive and very dynamic and therefore require highly competent and skilled employees whom SMEs lack financial capacity to adequately remunerate. Consequently, skills gap arising because of

this, limits SMEs with the capabilities and capacity to upgrade and increase participation. Some lead firms can be restrictive to allow SMEs to upgrade and increase participation if the benefits do not directly accrue to the lead firms. Lastly, SMEs in South Africa are being challenged by unethical conduct to explore more upgrading as clients supply chain personnel request for bribes to facilitate new work.

6.4 Benefits that economic upgrading bring to South African SMEs operating in telecommunication GVCs

6.4.1 Operational efficiency and effectiveness

The results show that SMEs upgrade lead to operational efficiency and effectiveness improvement. This means by economic upgrading, a firm earns more profits and benefits more from integrating and participating in the GVC (Choksy et al., 2017). Upgrading increases efficiencies and effectiveness that reduce costs in the business. This subsequently increases profitability as revenues increases and costs come down. Kano et al. (2020) contends that process upgrading is led by cost-cutting requirements and output improvement needs to respond to competitors in the GVC. Competition come in the form of low-cost alternatives to put pressure on the pricing (Sima et al., 2020). Therefore, upgrading is one way to respond to competition through production and process efficiency.

6.4.2 Economic zoning and black empowerment

Economic upgrading is permitting economic zoning and black empowerment of SME businesses in the telecommunication GVC. Lead firms are giving SMEs a chance to grow and participate in value chain activities when they upgrade. Chen et al. (2022), in a study of Italian firms also argue that clusters or agglomeration of SMEs raise their competitiveness and help them to upgrade. Clusters divide labour amongst members and specialise and share costs of innovation crucial for economic upgrading (De Marchi & Alford, 2022). Clusters are reported to positively influence spread and application of knowledge (Elteto, et al., 2015). These clusters can be formed through formalised business networks that facilitate collective efficiencies, access to markets, access to resources and providing knowledge. Additionally, trade associations business members can select to risk sharing to improve bargaining power. The probability of affecting policymaking is increased with greater bargaining power and encouraging a favourable economic upgrading environment (Bamber et al., 2017). However, this is peculiar to South Africa which has black economic empowerment regulations which guides how large firms should conduct business with marginalized businesses.

6.4.3 Telecommunication economic interplay

Telecommunication ecosystem interplay facilitates SMEs to upgrade within the confines of lead firms' approvals. In studies of Brazilian firms by Armando et al. (2016), it was found that firms obtain high gains through process upgrading by embarking on commercial liaisons. According to Su et al. (2020), SMEs are likely to upgrade due to the existence of vertical and horizontal interfirm linkages. Such linkages provide owners of SME with access to collective action, resources and knowledge (Lwesya, 2021). Providing goods or services in large quantities to global buyers can create occasional demand to produce sufficient cashflows for local firms. However, economic upgrading probability grossly rely on the value chain power relations and governance (De Marchi & Alford, 2022). A study by Lwesya (2021) found that SME benefit less from integrating with big firms if there is power asymmetry. However, De Marchi and Alford (2022) argue that economic upgrading is not a straightforward process when one considers the diverse GVC stakeholders' interests, fragmented supplier bases and power asymmetries. According to Brazinskasa and Beinoravičius (2014), partnership between SMEs and lead firms is one of the most efficient strategies for integrating domestic suppliers into GVCs.

6.4.4 SME learning from lead firm synergies

SMEs achieve synergies with lead firms when upgrading and participating in the telecommunication GVC. Such small firms learning from demanding clients and lead firms is key to functional upgrading success (Armando et al., 2016). Competencies come from the knowledge learnt when being outsourced by lead firms (Edvardsson & Durst, 2019). SMEs working with GVC lead firms is a great advantage which facilitates learning and enhances its developmental potential (Gereffi, 2019). For the SME, economic upgrading enables them to learn to be economically competitive since profits, employment and skills are poised to increase with increased business.

6.4.5 Revenue growth

Upgrading and more participants means SMEs easily achieve revenue growth. This means by economic upgrading, a firm earns more profits and benefits more from integrating and participating in the GVC (Choksy et al., 2017). According to Slany (2019), economic upgrading is a stepping-stone for more participation in GVCs which ensures a higher and better trade integration with others on the global markets. SMEs become more exposed to opportunities they can exploit with speed and flexibility permitting a niche within the global market (De Marchi & Alford, 2022). Armando et al. (2016) contends that economic upgrading results in

greater specialisation that enable the generation of more income, productivity gains, employment opportunities and reducing poverty. However, researchers such as (Antros, 2020) found that firms that upgrade do not always yield better competitive positions. In some cases, short lived benefits were found which deteriorated over time leaving the small firms deteriorated and compromised over time.

6.4.6 Attainment of green environment

Through process and product upgrading, a green environment is attained with less paper in the offices and better accessibility to systems and records. This can be true only in the telecommunication industry as literature reflected product and process upgrading failure and ineffective amongst SMEs in the shoe industry global value chain (Armandi et al., 2016). A study by Loewe et al. (2020) showed that compliance to the green environment requirements within the business environment are key to SME upgrading success. SMEs are able to replace traditional systems to paperless technologies.

6.4.7 Compliance advantages

SMEs must comply with testing, safety, health and quality standards and obtain certification to upgrade products, processes and functions; and participate without limitations. According to Kano et al. (2020), SMEs must comply with international standards in the GVC and ensure its technologies are inextricably linked to and dependent on this. According to De Marchi and Alford (2022), process and product upgrading must ensure quality and compliance regulatory requirements. Because the product does not need to meet rigorous testing standards, validation of product compliance is possible by conducting tests on the product. Process compliance, however, necessitates regular factory audits and is often connected to process certification such as ISO 9001:2015 (Sampath & Vallejo, 2018). However, due to high costs of compliance, most SMEs struggle to obtain certifications and licenses. When SMEs comply, they have access to lead firms enabling them to participate more.

6.4.8 Conclusion

When SA SMEs upgrade and participate in telecommunication GVC, it triggers revenue growth, operational efficiency and effectiveness, compliance advantages, learning from lead firms, attainment of green environment, economic interplay with SME economic zoning coupled with black small business empowerment. Thus, upgrading is one way to respond to competition through production and process efficiency that reduces cost, improve revenue,

profitability and sustainability. This market segment permits SMEs to participate and integrate through economic zoning and black empowerment to learn from lead firms in the value chain.

6.5 Critical success factors affecting the economic upgrading of South African SMEs operating in telecommunication GVCs

6.5.1 Competent and highly skilled employees

High competence and skills of employee is critical for SME to upgrade and participate in telecommunication GVC with success. Human capital is an important resource that gives SMEs a competitive advantage. This is because an SME's innovation and knowledge management affects the upgrading likelihood (Loewe et al., 2013). Knowledge and skills are attained by persons who invest in work experiences, on the job training and schooling (Antros, 2020). The more knowledge and skill, the owner has, the more the capability to access opportunities and take risks, develop a growth strategy and learn about new processes (Bamber, et al., 2017). Therefore, continuous skills development of staff is therefore critical in a highly volatile changing market. Upskilling helps to give employees competencies to be able to lead in upgrading processes.

6.5.2 Adaption to environmental changes

An SME should stay on high alert to environmental changes to adopt and upgrade in line with new opportunities arising in the market and continue to meet the needs of clients. According to Mallinguh et al. (2020), SMEs must keep up with both global and industry standards for technological advancement. Such primary drive towards innovation by SMEs is from the lead firm in the GVC which occasionally provide details of the methods and types of product development and innovation. Firms involve themselves in market research which are critical for idea generation, market niche identification and bringing entrepreneurs awareness of the need of top-quality services or products (Antros, 2020). In this way, the SMEs are able to keep aligning their business models to the changing market conditions.

6.5.3 SME leaders' entrepreneurial spirit

SME owners and leadership must have an entrepreneurial spirit to take the risk to upgrade and increase their participation in the global value chain. Accordingly, Gerrefi et al. (2021) argue also that SME development thrive when driven by entrepreneur and a dynamic entrepreneurial environment. This spirit ignites SMEs to continuously upgrade by doing something new or different with calculated risk-taking behaviour for future gains and to add

value (Bamber et al., 2017). However, Antros (2020) argue that entrepreneur success comes from internal entrepreneur traits, solid business plan, adequate resources, favourable external environment, wider political, social and cultural contexts. When SMEs leaders lack the entrepreneurial spirit, they fail to upgrade due to fear of failure (Lee et al. (2017). Therefore, Kano et al. (2020) argues that the entrepreneur characteristics are critical to a small business's economic upgrading potential. However, Su et al. (2020) argue that the human capital of small business owners based on quality vocational education and basic education, global exposure and quality work experience is important to impact how an SME conduct market research, quality product and process, creativity and innovation necessary to upgrade.

6.5.4 Good relations with leader firms

Good relations and reputation with lead firms is paramount for upgrading success and more participation. Ultimately the clients must approve upgrading and give the SMEs the opportunity to participate in telecommunication activities. Establishing rapport assist an SME to forge good partnership with clients and obtain better terms and conditions of conducting the business. According to Bamber et al. (2017), vertical and horizontal linkages are vital as an information source and technical help for process upgrading. The technical help constantly originate from embedded services as part of product packages. Horizontal linkage is the source of learning and information for process upgrading (Sampath & Vallejo, 2018). The creation of SME networks occasionally assists small firms to gain access to advice, information, finance and training from other companies within the GVC. Additionally, horizontal linkages whether informal or formal are vital to SMEs in sharing important information and experiences on processes that enhance productivity (Lee et al., 2017).

6.5.5 Compliance

Compliance is a must for an SME to succeed in upgrading and participating more in the telecommunications industry. Relevant licencing and certification in health, safety and quality standards is essential. According to Armandi et al. (2016), the economic upgrading must also meet standards consistently as defined by the market. GVCs are governed by standards that can offer value-added production opportunities (Elteto et al., 2015). However, adherence to GVC standards only to gain a specific portion of market access, does not essentially mean economic upgrading if the efforts do not yield value-add.

6.5.6 Conclusion

What is critical for SA SMEs to upgrade and participate more within the telecommunications industry GVC is to have competent and highly skilled employees, continuous employee skills development, adaption to environmental changes, leaders that have an entrepreneurial spirit, good relations with lead firms and compliance. These factors give an SME competitive advantage, agility, resistance to change, cost effectiveness and efficiency, better products and services, improved processes and new functionalities.

6.6 Summary

This chapter discussed and analysed the results in line with the research questions to permit conclusions to be made. The way South African SMEs upgrade and how it impacts participation in the telecommunication GVC was discussed including the challenges, benefits and critical success factors of upgrading processes to increase participants. It was found that SA SMEs are more involved in process, product and functional upgrading than interchain upgrading within the GVCs. However, the pace of upgrading is being slowed down by stiff competition, cost and cashflow challenges, lead firm challenges, skills gaps and bribes conduct. The upgrading and increased participation comes with operational efficiency and effectiveness, economic zoning and black empowerment, telecommunications economic interplay, learning from lead firms, revenue growth, compliance advantages and attainment of green environment. To ensure economic upgrading success, it is critical for SMEs to have competent and highly skilled employees, continuously develop employee skills, adapt to telecommunication environmental changes, leaders with entrepreneurial spirit, good relations with lead firms and ensure compliance. The following chapter presents the conclusions and recommendations of the study.

Chapter 7: Conclusion and recommendations

7.1 Introduction

This chapter presents the conclusions and recommendations of the study. In addition, the research contributions, recommendations for management and other stakeholders, limitations of the research and suggestions for further studies are proposed. The conclusions are presented as guided by the research questions aforementioned in Chapter 1, which are: How and why does economic upgrading affect South African SMEs participation within the telecommunication GVCs? What challenges do South African SMEs experience when economic upgrading within telecommunication GVCs? What benefits does economic upgrading bring to South African SMEs operating in telecommunication GVCs? What are the critical success factors affecting the economic upgrading of South African SMEs operating in telecommunication GVCs?

7.2 Principal theoretical conclusions

The principal theoretical conclusions based on the main findings discussed in Chapter 5 are as follows:

7.2.1 How and why economic upgrading impacts SA SME's participation in telecommunication GVCs

SA SMEs are engaged more in process, product and functional upgrading and less in interchain upgrading, though equally influenced by governance and competition dynamics. Thus, according to Kano et al. (2020), firms that deal with physical products or services use their capabilities to achieve a higher efficiency in process, product and functional tasks. It has been found that economic upgrading is necessary because the telecommunications market is very dynamic and prone to rapid technological changes. This permits the processing of more complex tasks that lead to reduction of per unit costs and efficiency gains (Lee et al., 2017). That is why SMEs apply an agile approach to remain relevant and meet clients' needs by upgrading. In this way, SMEs accomplish economic upgrading through digitising their internal systems, functions, products, services, processes to improve accessibility, efficiency, effectiveness, compliance, competitiveness, value add and sustainability. In addition, SMEs upgrade in response to disruptive technologies and ensure business continuity within the GVCs. Absolute advantage is the main key for increasing participation when a firm increases access to technology and knowledge to compete and increase productivity, thereby reducing cost (Bamber et al., 2017). Experience in the value chain allows SMEs to learn which functions

to adopt besides their core competencies when they start the business. However, most SMEs are not moving to other GVCs but are rather remaining in the current telecommunication GVC and use other type of economic upgrading to increase their participation.

7.2.2 Challenges SA SMEs experience when economic upgrading within telecommunication GVCs

The study found that SA SMEs' economic upgrading that increases participation in the telecommunications GVC is being slowed down by stiff competition, cost and cashflow challenges, lead firm restrains, skills gaps and unethical conduct. According to Lwesya (2021), intensified competition is one factor that influence SMEs to upgrade. The competition faced by SMEs affect their pricing and costing model making the business unviable when upgrading. In addition, since the telecommunications market is capital intensive, it attracts high operational and capital expenditure that SMEs struggle to raise. Moreover, whilst compliance is a big gatekeeper in the telecommunications industry, the cost of complying is considered very high by SMEs. That is why SMEs experience cashflow challenges as they lack external funding to finance the upgrading initiatives. This is similar to Bamber et al.'s (2017) contention that SMEs struggle to upgrade because of higher infrastructure and operational costs, amongst other things. Additionally, upgrading requires highly competent and skilled employees and the SMEs lack financial capital to attract and retain highly competent and skilled employees. However, due to a shortage of skilled and competent employees, skills gaps then limit SMEs with the capabilities and capacity to upgrade and increase participation. Similarly, Bamber et al. (2017) argue that SMEs struggle to upgrade because of skilled workers' shortage and skills gaps, amongst other things. Additionally, lead firms can be restrictive to allow SMEs to upgrade and increase participation if the benefits do not directly accrue to the lead firms. Lastly, SMEs in South Africa are challenged by unethical conduct to explore more upgrading as clients request bribes to facilitate new work. According to Bamber et al. (2017), corruption and bribes create an unfavourable environment for SMEs to grow and integrate.

7.2.3 Benefits that economic upgrading bring to South African SMEs operating in telecommunication GVCs

When SA SMEs economically upgrade, they achieve the benefit of revenue growth, operational efficiency and effectiveness, compliance advantages, learning from lead firms, attainment of green environment, economic interplay with SME economic zoning and black small business empowerment. More benefits such as improved profitability, sustainability and competitive advantage are attained with upgrading revenue growth and low-cost efficiencies.

Kano et al. (2020) contend that process upgrading is led by cost-cutting requirements and output improvement needs to respond to competitors in the GVC. Economic upgrading that facilitates more participation increases the synergy between SMEs and lead firms and SMEs can learn more from lead firms' knowledge of new technologies. SMEs working with GVC lead firms are at a great advantage with facilitated learning and developmental potential (Gereffi, 2019). Through these lead firm relationships, SMEs remain compliant, giving them more access to opportunities to participate more in the telecommunications GVCs.

7.2.4 Critical success factors affecting the economic upgrading of South African SMEs operating in telecommunication GVCs

The critical success factors affecting SA SMEs to upgrade and participate more within the telecommunications industry GVC are having competent and highly skilled employees, continuous skills development, adaption to environmental changes, leaders that have an entrepreneurial spirit, good relations with lead firms and consistent compliance. These factors enable an SME competitive advantage, agility, resistance to change, cost effectiveness and efficiency, better products and services, improved processes and new functionalities. According to Mallinguh et al. (2020), SMEs must keep up with both global and industry standards for technological advancement. This gives rise to the need for human capital as a critical resource for SMEs operating in the telecommunication GVC that is upgrading and participating more as the business adapts to the industry changes. This is because the way in which an SME innovates and manages knowledge, affects the upgrading likelihood (Loewe et al., 2013). That is why SMEs also require risk taking leaders who are not afraid to upgrade to new processes, functions, products or services. Additionally, SMEs must keep good relationships with lead firms and remain compliant to successfully upgrade and get approvals from lead firms. Hence, according to Bamber et al. (2017), vertical and horizontal linkages are vital as an information source and technical help for successful upgrading.

7.3 Research contributions

This study was able to show that SMEs operating in the telecommunications industry in South Africa have to economically upgrade to remain relevant to lead firms and continue operating, since the industry is very dynamic and subject to rapid technological changes. SMEs in the telecommunications GVC upgrade to achieve business continuity, compliance with gatekeeping requirements, strategic alignment, access to profitable segments, sub-contracting elimination and sustainability. SMEs in South Africa mostly undergo process, product or functional upgrade and seldom use interchain upgrading to increase their participation. The research also found that, whilst economic upgrading assists SMEs to

participate more in the value chain, SMEs experience more revenue, operational efficiency and effectiveness, compliance advantages, learning from lead firms, attainment of green environment and economic interplay. This research revealed that the level of SME economic upgrading is affected by stiff competition, pricing difficulties, high operational costs, lack of funding access, cashflow challenges, skills gap, restrictive lead firms and unethical conduct. Economic upgrading initiatives are put on hold when firms cannot meet the costs and restrictions involved. The research showed that, for SMEs to economically upgrade with success and increase participation, they must have competent and highly skilled employees, continuous employee skills development, adaption to environmental changes, leaders who have an entrepreneurial spirit, good relations with lead firms and they must maintain a high level of compliance. In this way, the SMEs are well resourced to be able to have a competitive advantage, resist change, become effective and more efficient, produce better services and products, improve processes and create new functions.

The findings allow policymakers with base information to review policies that can improve SMEs' status in the telecommunications GVC. The research established a base for further studies on economic upgrading and related studies can further the qualitative approach. According to Saunders et al. (2016), exploratory studies give a better understanding to unresearched subject areas and acts as a precursor to bring new issues to light for further researchers. This research therefore brings to light the benefits, challenges and critical success factors of SA SME economic upgrading in telecommunications GVC. This information is also vital to SME leaders and other players operating in the telecommunications GVC.

7.4 Recommendations for management and other stakeholders

7.4.1 Recommendation to management

The following are recommendations to management:

Workplace mentoring and coaching

SME managers can introduce workplace mentors and coaches for employees recruited to excel in their role, develop skillsets and advance in their career. The workplace coach or mentor teaches new employees about their responsibilities and duties. Such a person acting as a mentor can be an experienced worker who is willing to give instructions and directions to workers, help them complete tasks, assign projects, monitor their work and improvement and give feedback. In this environment, an employee is permitted to discuss their career development with the mentor and report back to management so that necessary training and

developmental programs for the employee can be put in place as aligned to the organisation's plan. In this way, both the firm and the employee benefit as the individual develops in their skills and competences necessary in the telecommunication industry to perform and be productive.

Prioritisation of ongoing employees' skills development

The rapid change of technological advancements within the telecommunications industry means SMEs must prioritise employee skills development on an ongoing basis. The managers must regularly assess the skills level by having one-on-one meetings with key employees and providing specific training that focusses on any identified skills gap. With an ongoing skills development, productivity and performance are enhanced through continuous improvement. New talent can also be discovered as employees perform in new positions. Employees can maintain a high level of engagement in the workplace necessary to retain and motivate them. SMEs can train both leaders and workers in new technologies and compliance issues such as quality, health and safety standards.

Cross departmental training

As SMEs continue to upgrade their processes, functions, products and services, managers must ensure that their employees are multi-skilled to be able to carry out more than one task. In this way, employees do not quickly become redundant as the organisation specialises in other areas. Cross departmental training can be achieved through job rotation, role sharing or shadowing so that not only one person is proficient to a specific role. This can help the firm to optimise its workforce. In turn, employees become more competent with multiple skills.

Team building

SMEs must encourage employee development through team building to create a diverse and collaborative work environment necessary for the dynamic telecommunication industry. In this way, they can build strong teams, motivate employees and allow them to work on their weaknesses and develop strengths. Better coordination and collaboration as well as improved interpersonal relationships are built. Productivity is enhanced when workers get to know each other better through fostered interpersonal communication and team interaction. Employees are allowed to ask questions, participate in work activities without hesitation through sharing of ideas and making suggestions. Efficiency is improved as employees become more involved in the workplace and more aware of the work environment as the leader provides them with feedback, evaluate their progress and address shortcomings. In this way, employee turnover

challenges can be reduced as workers become more committed to their work and organisation.

More usage of SMEs' expertise in other value chains

SMEs can aggressively use the competencies they learned in the telecommunication industry in other value chains, such as working at heights to use their existing skills in billboard erection, cleaning businesses, the mining sector or the energy sector. In this way, SMEs are upgrading the interchain and participating more in value chains. More revenue is generated and more profitability can be achieved.

7.4.2 Recommendation to other stakeholders

The following are recommendation to other stakeholders:

Lead firms' promotion of SME economic upgrading

Lead firms need to unlock SME potential by removing restrictions that limit them to economically upgrade and participate more in the telecommunications GVC. SMEs should be allowed to get new clients and move to other GVCs as they perform and keep their contract performance terms and conditions. In addressing skills gap challenges in SMEs, lead firms can help train SME employees so that their upgraded work is of the right quality. In addressing cashflow challenges in SMEs, lead firms can offer favourable payment terms to improve SMEs' cashflow. Lead firms can also fund SME upgrading initiatives since they directly benefit from their output. In return, the partnerships of small and large businesses permit large firms to enjoy economies of scale. The dynamic environment of the telecommunication industry requires more agility that small businesses handle better with fast decision making and the ability to test and apply new technologies and innovation at a faster pace. In this way, synergies can be built between a small business and a lead firm to deliver unique value offerings to clients by providing solutions to specific needs.

Change in educational curriculum to match industry needs

Technical colleges and universities must take into cognisance the technological and industry changes and incorporate them into the curricula and syllabuses. Technical programs must not only be theoretically structured but should allow students to gain a practical perspective of the work discipline in the telecommunication industry. Colleges and universities can partner with telecommunications lead firms and provide students with internship opportunities, innovation programs and apprenticeship programs.

SME fund pooling clusters

SMEs within the telecommunications industry can formulate clusters or common groups to help put funds together and assist each other to economically upgrade. In this way, funding for upgrading an SMEs becomes available and accessible at a lower cost than market rates. In addition, if an SME contributes towards the fund, a return can be realised for interest earned in the common fund. Clusters can be formed through formalised SME business networks that facilitate collective efficiencies, access to markets, access to resources and providing knowledge. Additionally, trade associations' business members can select risk sharing to improve their bargaining power in the telecommunication GVC. The probability of affecting policymaking is increased with greater bargaining power and encouraging a favourable economic upgrading environment from lead firms that dominate the industry.

Industrywide anti-corruption collective action

Players in the telecommunications industry should unite to fight corruption within the supply chain by forming anti-corruption agreements between themselves. In this way, SMEs have a fair and transparent environment to upgrade and participate more in the global value chain. These anti-corruption industry wide initiatives can include whistleblowing mechanisms that ensure that culprits are reprimanded for any attempt to solicit for bribes or kickbacks. Additionally, lead firms and SMEs can also unite against corruption and hold employees accountable by making them sign ethical conduct agreements that are against corrupt behaviours in the workplace.

Government funding initiatives for SMEs

Government can introduce targeted funding for SMEs' upgrades in the telecommunication sector. Government can offer such finance at concessionary rates and favourable terms that SMEs are able to comply with, for example unsecured funding that do not require collateral. The motivation is that SMEs are part of systemic and generational change in Africa that are major drivers of employment and economic growth (Marcato & Baltar, 2020). Government intervention is thus important to ensure that SMEs remain key participants in global value chains.

7.5 Limitations of the research

This study was limited to 15 participants' viewpoints based on their judgement, perceptions and experience of the subject matter; hence the restrictiveness of generalising the results to

other SMEs that belong to the telecommunications value chain. Upgrading in global value chains is a broad subject area and not all the aspects of upgrading can be included such as social upgrading or environmental upgrading that could be part of further studies.

7.6 Suggestions for further studies

Further studies are recommended using a quantitative method and a large sample to enable results and findings to be generalised as follows:

- To establish the relationship between economic upgrading and the participation of SMEs in the telecommunications industry GVC.
- To examine the impact of process upgrading and the participation of SMEs in the telecommunications industry GVC.
- To examine the impact of product upgrading and the participation of SMEs in the telecommunications industry GVC
- To examine the impact of functional upgrading and the participation of SMEs in the telecommunications industry GVC`
- To examine the governance structure that exists within the telecommunication global value chain in context to the developing markets.
- To investigate the influence of social and environmental upgrading on SA SMEs participation in telecommunications value chain.

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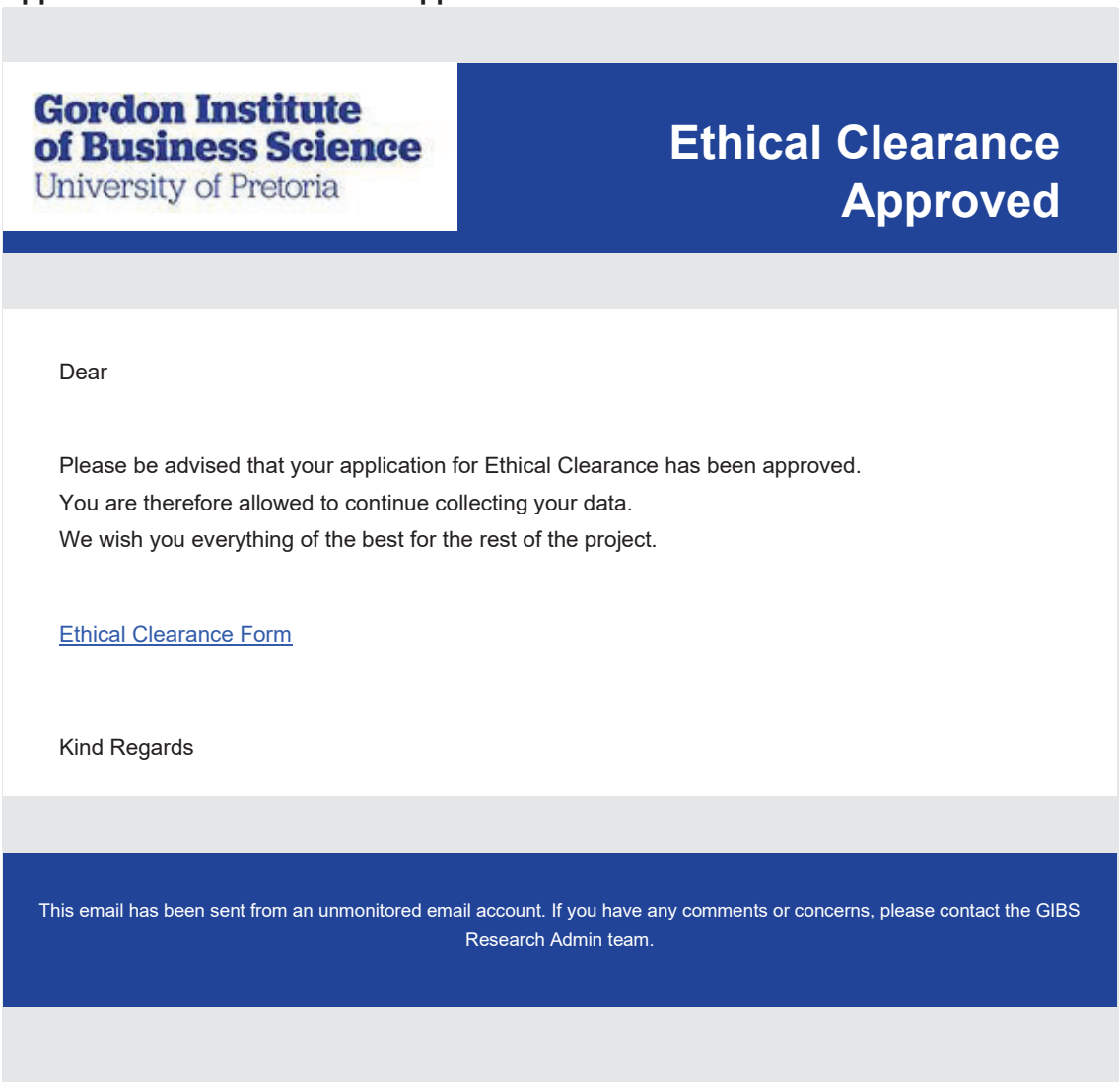
APPENDICES

Appendix 1: Ethical Clearance Approval



Gordon Institute of Business Science
University of Pretoria

Ethical Clearance Approved

Dear

Please be advised that your application for Ethical Clearance has been approved.
You are therefore allowed to continue collecting your data.
We wish you everything of the best for the rest of the project.

Ethical Clearance Form

Kind Regards

This email has been sent from an unmonitored email account. If you have any comments or concerns, please contact the GIBS Research Admin team.

Masters Research

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Appendix 2: Consent Form

To whom it may concern:

I am conducting research on influence of upgrading on South African small-to-medium enterprises participation in telecommunication global value chain. Our interview is expected to last for an hour and will help us understand how upgrading affects South African SMEs participation within the telecommunication Global Value Chains. Your participation is voluntary and you can withdraw at any time without penalty. By signing this letter, you are indicating that you have given permission for:

- The interview to be recorded;
- The recording to be transcribed by a third-party transcriber, who will be subject to a standard non-disclosure agreement;
- Verbatim quotations from the interview may be used in the report, provided they are not identified with your name or that of your organisation;
- The data to be used as part of a report that will be publicly available once the examination process has been completed; and
- All data to be reported and stored without identifiers.

If you have any concerns, please contact my supervisor or me. Our details are provided below.

Email: 14434212@mygibs.co.za
Phone: 082 998 9449

Email: bev.waugh1@gmail.com
Phone: 082 880 9303

Signature of participant: _____

Date: _____

Signature of researcher: _____

Date: _____

Appendix 3: Interview guide

Demographic data of participants

1. Age	❑ Below 20 years ❑ 20-30 years ❑ 31-40 years ❑ Above 40 years
2. Gender	❑ Male ❑ Female
3. SME Years in telecommunication GVC Operation	❑ Below 5 years ❑ 5-10 years ❑ 11-15 years ❑ Above 15 years
4. SME Size by Employees	❑ Below 20 ❑ 20-50 ❑ 51-100 ❑ 101-200 ❑ Above 200
5. Position of Respondent in the SME	❑ Chief Executive Officer ❑ Managing Director ❑ Other Executive Director
6. Which OEM have you worked with	❑ Huawei ❑ Nokia ❑ Ericson ❑ ZTE

	❑ Other_____
7. Which telecommunication operator have you worked with	❑ Vodacom ❑ MTN ❑ Telkom ❑ CellC ❑ Other_____

1.Explain how has your business been strategically re-organising production systems with superior technologies to participate more in the telecommunication GVC?

2.Explain how and why has your business been involved in improving and updating old services and products for new ones that capture high unit value in the telecommunication GVC?

3.Describe which new functions and why your business been started doing not previously done that lead to improved participation in telecommunication GVC?

4.Explain how and why your business has been using its current competencies to move to other new GVCs?

5.Explain what challenges has your business met when economic upgrading to increase its participation in the telecommunication GVC?

6.Explain what has been the benefits to the firm for economic upgrading its functions in the GVC?

7.What do you consider as critical success factors to economic upgrading that effectively increase participation in the telecommunication GVC?

Appendix 4: List of codes

Code name	Code group
Awareness of environmental changes	Critical Success Factors
Black empowerment	Benefits
Cashflow challenges	Challenges
Compliance	Critical Success Factors
Compliance costs	Challenges
Cost effectiveness and efficiency	Benefits
Economic zoning	Benefits
Employment of competent employees	Critical Success Factors
Good client relationship	Critical Success Factors
Green environment	Benefits
High operating costs	Challenges
Information accessibility improvement	Benefits
Information systems improvement	Benefits
Lack of funding access	Challenges
Movement to new GVCs: construction environment	Movements to New GVCs
Movement to new GVCs: energy environments	Movements to New GVCs
Movement to new GVCs: manufacturing plant environments	Movements to New GVCs
New functions: cloud-based systems usage	New Functions
New functions: cybersecurity services	New Functions
New functions: information systems improvements	New Functions
New functions: innovation	New Functions
New functions: internet service provision	New Functions
OEM supply chain management narrow functionality	Challenges
Operational system efficiency	Benefits
Pricing challenges	Challenges
Product and service improvements: full turnkey solutions	Product and Service Improvements
Product and Service improvements: information systems improvement	Product and Service Improvements
Product and service improvements: tower ownership	Product and Service Improvements
Revenue growth	Benefits
Skills gap	Challenges
Staff continuous development	Critical Success Factors
Stiff competition	Challenges
Strategic reorganisation	Strategic Reorganisation
Strategic reorganisation: subcontracting elimination	Strategic Reorganisation
Sustainability	Benefits
Telecommunications ecosystem interplay	Benefits
Unethical conduct	Challenges