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THE IMPACT OF DIGITALISATION OF CLEARING AND FORWARDING PROCESSES ON THE WORKFORCE

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A dissertation submitted in partial fulfilment of the requirements for the degree of Master of Commerce in Maritime Studies

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Corrections and suggested improvements have been made in terms of:

- General grammar - syntax, concord and general sentence structure
- Spelling – with special reference to English UK spellings of specific words
- Language in terms of academic tone, clarity and vocabulary
- Punctuation
- General advice in terms of layout in terms of consistency in style of numbering, bullet lists, headings and sub-headings
- Checking the Reference List for errors in spelling and general punctuation.

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I am a qualified English First Language teacher of 15 years' experience. Since leaving the teaching profession, I have offered proofreading services to Honours, Masters and Doctoral level students at various tertiary institutions. I pride myself on being able to identify errors and make improvements to the dissertations submitted by these students for their degree requirements.

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DECLARATION

I, Emmanuel Nyouweke JIN ..... declare that

(i) The research reported in this dissertation, except where otherwise indicated, is my original research.

(ii) This dissertation has not been submitted for any degree or examination at any other university.

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ABSTRACT

Globalisation has brought about many changes. There has been substantial innovation in the value creation approach to the supply chain and the application of digital enabling technologies. This has been necessary to meet the ever-increasing demand for goods in the global markets. At the centre of this approach are the activities of customs clearing and forwarding. Trade liberalisation and the standardisation of global customs procedures mean that customs clearing and forwarding agents must deal with greater volumes of goods within a short timeframe. This has necessitated the digitalisation of these processes to perform these tasks quicker and with more accuracy and, often requiring little or no human intervention in some instances. Literature in developed economies indicates a negative impact of this on the workforce in terms of job losses. However, the situation may be felt more in a country like South Africa which is already facing the triple threat of inequality, record-high unemployment, and poverty. This study investigates the impacts of the digitalisation of customs clearing and forwarding processes on workforce and productivity. The research adopted a qualitative approach, using snowball non-probability and purposive sampling techniques. Interviews were conducted with ten selected individuals who each had over 20 years of industry experience in clearing and forwarding. Their experience provided insight which spanned the timeframe under consideration.

Data collected through interviews and secondary sources were analysed using open, axial, and selective coding techniques. The analysis was divided into three main themes, namely i) customs clearing and forwarding processes pre-digitalisation (2000-2005); ii) Early digitalisation (2005-2010); and iii) digitalisation 2010 to present, and its impact on workforce and productivity. Findings showed a negative impact on the workforce in the pre-digitalisation period, with race and gender bias. In the early digitalisation phase, findings showed a negative impact on the workforce, with older workforces reluctant to adapt and going on early retirement or being retrenched. The low productivity in the early inception phase is primarily due to adaptation challenges. In the final phase, digitalisation has positively impacted the workforce and productivity. Companies have embraced technology and can clear more goods within a shorter time, giving them exposure to more international markets, and better growth. They have employed more staff who are young and more technologically inclined. The research informs training policies for those affected by digitalisation, helps training providers align with industry changes, and enables companies to hire adaptable employees for growth and global expansion. A recommendation would be to still tap into the experience of less technically skilled personnel and pair them with young digitally minded youth to bridge the divide in skills transfer.

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ACRONYMS

AI:	ARTIFICIAL INTELLIGENCE,
AIS:	AUTOMATIC IDENTIFICATION SYSTEM,
BDA:	BIG DATA ANALYTICS,

BOE: BILL OF ENTRY,

CB: CUSTOMS BROKER/CLEARING AND FORWARDING,

CUSDEC: CUSTOMS DECLARATION FOR THE IMPORTED GOODS,

DPS: DECLARATION PROCESSING SYSTEM,

ECDIS: ELECTRONIC CHART DISPLAY AND INFORMATION SYSTEM,

EDI: ELECTRONIC DATA INTERCHANGE,

GPS: GLOBAL POSITIONING SYSTEM,

ICT: INFORMATION AND COMMUNICATION TECHNOLOGIES,

IOT: INTERNET OF THINGS,

IT: INFORMATION TECHNOLOGY,

QA: QUALITY ASSURANCE,

RCCG: REPORTING OF CONVEYANCES AND GOODS,

RFID: RADIO-FREQUENCY IDENTIFICATION,

RSA: REPUBLIC OF SOUTH AFRICA,

SA: SOUTH AFRICA,

SAD500: SINGLE ADMINISTRATIVE DOCUMENT 500,

SARS: SOUTH AFRICAN REVENUE SERVICE,

SARS-COV-2: SEVERE ACUTE RESPIRATORY SYNDROME CORONAVIRUS 2,

SCM: SUPPLY CHAIN MANAGEMENT,

SMDG: SHIP MESSAGE DESIGN GROUP,

TNPA: TRANSNET PORT AUTHORITY,

UCR: UNIQUE CONSIGNMENT REFERENCE,

US: UNITED STATES,

VOC: VOUCHER OF CORRECTION,

WCO: WORLD CUSTOMS ORGANISATION,

WEF: WORLD ECONOMIC FORUM,

CHAPTER ONE - INTRODUCTION

1.1 Introduction

The developments in the 21st century has given rise to globalisation, which brings the emergence of many new phenomena, which affect daily human life (Kasparova, 2017). Some of the changes brought about by globalisation include "substantial innovation to the value creation approach through the supply chain and the application of digital enabling technologies like the Internet of Things (IoT), Big Data Analytics (BDA) and cloud computing" (Aiello,Giallanzaand Mascarella 2020: 24). Today, almost every aspect of our social, business, and economic life as human beings has been digitised (Kasparova, 2017). The current trend is witnessed through automation and data sharing, electronic documentation, advanced analytics, blockchain and traceability, IoT and sensors, customs risk management, digital platform and marketplaces, predictive analytics, contactless processes as well as remote inspection (Aiello, Giallanza and Mascarella 2020). Digitalisation has been implemented in three ways, namely:

i) digitisation which refers to the conversion of analogue information to coding to enable computers to store, process and transmit such information (Bloomberg, 2018);
ii) digitalisation which refers to digitising a complete process, and roles, that make up the operation of a business (Bloomberg, 2018); and
iii) digital transformation which refers to a digitalised business strategy which is customer centric (Bloomberg, 2018).

In the past decade, digitalisation has gained the attention of both professionals and academics while investors are increasingly considering information on firm digitalisation in their decision making (Salvi et al, 2021). This consideration is closely linked to the need to control supply chain processes and logistics services. Clearing and forwarding play a critical role in this space by seamlessly organising the movement of materials and finished products in the supply chain (Wang & Sarkis, 2021). These two processes are a vital link between the exporter (seller of goods), the carrier (owner of the transport), the importer (the buyer of the goods) and other bodies such as the Department of Customs, South African Revenue Service (SARS), Port Authorities, Shipping Agents, and Consignee. (Edward, 2013). Like many other industries, the logistics industry is experiencing a wave of digitalisation (Wang & Sarkis, 2021). The nature of the shipping and logistics industry, with an international flavour, means that this wave is not limited to certain countries or regions but is also present and being felt in South Africa. "Digitalisation refers to the

use of digital technologies to support the existing and innovative provisions and the management of freight transport and logistics" (Wang and Sarkis, 2021: 1). The 'digital dream' will transform economies into a digitally connected society that enables seamless access to and use of information resources that help create a competitive, innovative, and knowledge-based society. The challenge being faced by economies is to define the successive paths they need to take to realise the dream (Paul et al, 2020). This is a challenge because digitalisation often involves significant changes such as:

1) within the organisation which could be change in business model and processes;
2) between organisations, such as governance, relational, technical and process configuration; and
3) at the level of ecosystem and industry which could be disruptions to the status quo and emergence of new product or service providers (Wang & Sarkis, 2021).

While these technological advances are indeed important and challenging, there is little research available on the effects of this transition on the social and economic elements such as vocational competencies and skill sets and how task and job descriptions will evolve (Bjork, 2021). The aim of this research, therefore, is to investigate the processes that have been digitalised and establish how the workforce associated with such digitalised processes in the clearing and forwarding agents is impacted. Furthermore, the study will also investigate if, indeed, these digitised processes are beneficial to the clearing and forwarding companies.

1.2 Problem Statement

Digitalisation is defined as the act of converting processes to incorporate technological advancement, including automated processes and machineries (Bjork, 2021). Digitalisation has been around for some time now. However, the recent events of the covid-19 pandemic added a new dimension and scale to it. According to Woolman, (2021), the state's decision to open the economy, while the transmission rate of SARS-Cov-2 continued to climb, created the incentive for businesses to increase their use of automation, Artificial Intelligence (AI) and other disruptive technologies. These were brought into play to remain solvent and continue doing business under difficult circumstances. An increase in the use of technology results in permanent technological unemployment. According to Katz et al. (2020), to bridge the digital supply chain gap, the workforce must be trained to acquire digital skills. However, these considerations are for the long term. In the immediate term, South Africa has a record high unemployment rate which has been exacerbated by the effects of the severe acute respiratory syndrome coronavirus 2 (SARS-Cov-2). According to Woolman (2021), if the situation is not carefully managed, it will lead to permanent

technological unemployment. Should this happen, most of the jobs that could be lost would be lower- and middle-class jobs, which unfortunately, is the stratum in which many poor black South Africans find themselves. To avoid such a situation, research on the impacts of such a digitalised process is necessary, if not vital. The findings of such research could assist in policy formulation, which could effectively deal with the training and transitioning of such staff. This research will therefore seek to answer the question of to what extent, and at what pace, have the clearing and forwarding processes been digitalised since early 2000?

1.3 Motivation for the Study

The motivation for this research has been primarily because of to the absence of scientific research in the sector, despite rapid growth and a general acceptance of digitalisation among stakeholders. According to research conducted by Kapidani, Bauk and Davidson (2021), on Developing Countries' Concerns Regarding Blockchain Adoption in Maritime, focused on South Africa and Montenegro. The study noted limited literature and reliance on expert opinions as a drawback. This research will contribute towards laying a foundation or basis for scientific data which can then be used by industry captains to meaningfully advance the transformation agenda through training and realigning the skills of their workforce. The outcome of the research could also inform policy makers around training policies that will cater for those that might be negatively affected by digitalisation. The outcome of the research could also benefit industry training providers to adapt their training offerings to the changing needs of the industry to facilitate quicker and smoother adaptability for employees. Finally, the outcome of the research could also assist clearing and forwarding companies to source the right employees with flexible skills which can catapult the companies' growth as they take advantage of the more diverse multinational customer base to expand their operations and employ more staff.

1.4 Focus of the Study

1.4.1 In Scope

This research will limit itself to clearing and forwarding companies and will specifically be looking at the various software packages that have been put in place to perform clearing and forwarding duties. The year 2000 has been used as the baseline because South Africa witnessed the expansion of broadband internet services which allow faster and more reliable online access, making ideal time to capture reasonable digitalisation activities (Levin, 2018).

Employees who are directly linked to those processes that have been digitalised, will form part of the study. The research will primarily target industry senior managers with more than 20 years of

work experience in the clearing and forwarding field. The geographical location of the research will be limited to South Africa. The focus of this research with respect to timeframe, will limit itself from the year 2000 to 2022. This period will be able to capture the digital evolution effectively.

1.4.2 Out of Scope

This research will not focus on any company that is not involved in clearing and forwarding, nor will it investigate any digitalised processes that are not linked to clearing and forwarding activities. The research will not focus on any digitalisation before the year 2000. Research will consider any data outside of the Republic of South Africa (RSA) to be out of scope. The limitation of scope is to make sure that the research is manageable, deliverable within the timeframe and within the constraint of the financial resources available.

1.5 Research Question

This research will seek to answer the following questions:

- To what extent, and at what pace, have the clearing and forwarding processes been digitalised since 2000?
- What happened to employees whose job activity has been digitalised and they were no longer required?
- What are the alternatives, in terms of options, for such employees in the company**?**
- To what extent has digitalisation improved employee productivity?

1.6 Research Aim/Objectives

This research's aims and objective are:

- To investigate the processes that have been digitalised in the clearing and forwarding agencies.
- To explore how these processes have impacted on the workforce.
- To explore how these processes have impacted on the productivity of the workforce**.**

1.7 Proposed Research Methodology

The aim of this research is to find out how digitalisation has affected both the workforce and the productivity in the customs clearing and forwarding agencies sector. An established scientific approach such as research philosophy, research type, research strategy, time horizon, sampling strategy, data collection methods, and data analysis and techniques will be employed. This study will make use of the positivism and interpretivism research philosophies. The research strategy will be a survey, making use of interviews to collect data. The research will make use of a longitudinal time horizon. The study will also employ a snowball non-probability sampling technique, while using a qualitative data collection method. To analyse data collected, the study will make use of thematic data analyses. The methodology will be discussed in detail in Chapter Three.

1.8 Chapter outline

Chapter One: This is the overview of the study and describes how the study will be conducted. It outlines the problem statement, the research question/s, the objectives, and the beneficiaries of the study.

Chapter Two: This chapter is a literature review which provides a theoretical background of the study. The literature review will explain how other countries experienced digitalisation, the challenges faced with regards to the workforce and the impact on productivity. The chapter will also identify the gap in research and also the rationale for this study.

Chapter Three: This chapter outlines the research methodology adopted for this study. The chapter explain the reasons for adopting the chosen research methodology. It will explain, how this methodology is best suited for the study to achieve the stated aims and objectives of the study. Certain of the limitations to the methodology will be discussed and the measures used to deal with these, will be dealt with.

Chapter Four: This chapter will cover the collection, presentation and discussion of the data. There will be a brief discussion on how data was collected, the

number of interviews conducted, the interview timeframe, and how data was recorded for further analysis. Interviews will be analysed using a an open, axial, and selective coding technique to achieve qualitative rigour and structure in dealing with large unstructured data from interviews.

Chapter Five: This chapter will cover the presentation and discussion of findings of the research. The limitations of the study and the recommendations for further study will be followed by a conclusion

CHAPTER TWO - REVIEW OF LITERATURE

2.1 Introduction

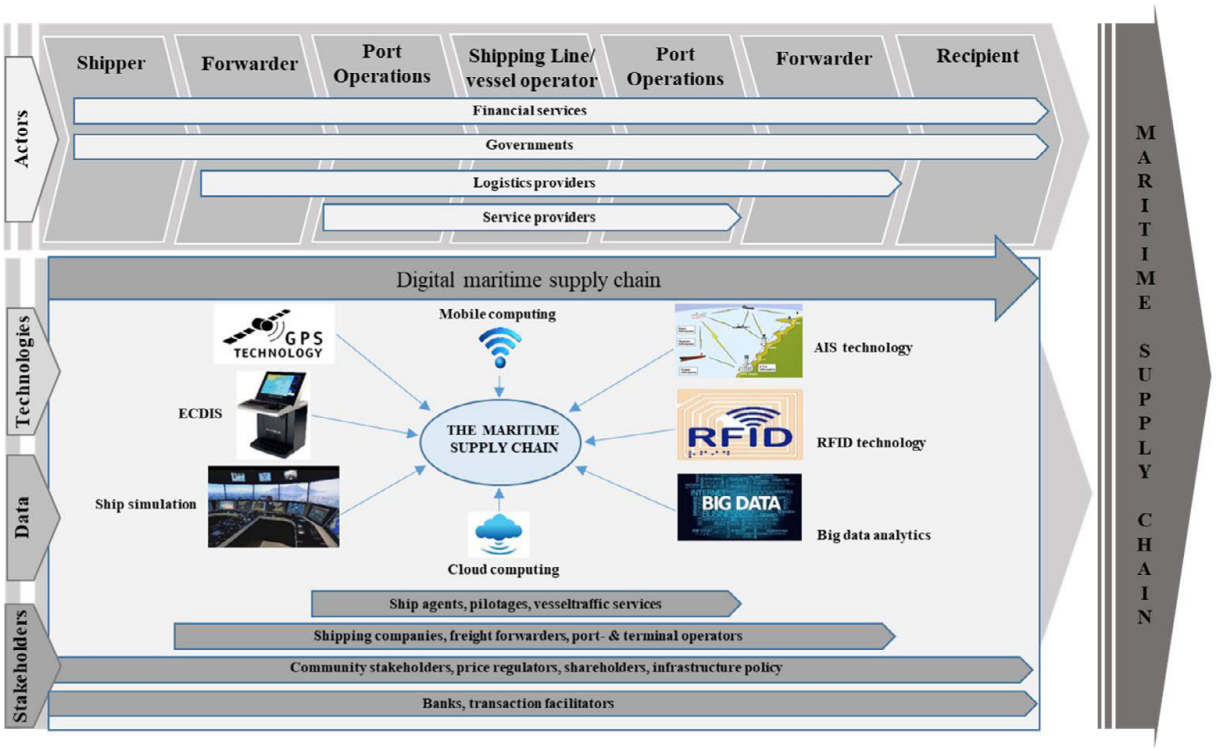
In the last decade, digitalisation has taken centre stage in human activities, be it business, social, political, environmental, or otherwise. Its growth has been felt in wave after wave of digital innovation which has ensured the diffusion of digital technologies into nearly every business and workplace and pocket (Muro et al, 2017). While the environmental, political, and socio-economic landscape has been changing, "digitalisation has enabled businesses to find the sustainability sweet spot between these economic, social, and environmental goals, offering many of the solutions to overcome technical challenges, accelerate processes, improve productivity, and become more sustainable" (Kandpal, 2022 :44).

Increased access to digital platforms has created a more transparent world, especially in terms of businesses. It has bridged physical, cultural, and social barriers. There is enormous visual access to productive resources as well as finished goods which a decade ago was not possible. This exposure to the world's resources, has led to the development of a huge appetite amongst all populations in the world for foreign goods, creating an increased demand for these. Whilst international trade transactions are concluded on these digital platforms through e-commerce, these goods can only be delivered physically. This has in turn put pressure on the transport system to keep up with the demand, and this can only be achieved by providing efficient service. Today, more than 60% of world merchandise, measured in value, is transported by sea trade, and more than 90% of goods measured in tonnage, goes by sea (Fruth and Teuteberg, 2017). "Compared with the world gross domestic product and the world trade, sea trade has shown twice as fast growth in recent years" (Fruth and Teuteberg, 2017 : 2). Maritime logistics is therefore one of the main industries under pressure to introduce digital transformation in order to meet this rapidly increasing demand for sea trade. (Fruth and Teuteberg, 2017 : 2). This has led to digital innovation, which is shaping the architecture of the maritime supply chain (Parola et al., 2021:2). Benefits including operational effectiveness, cost savings, and strengthened stakeholder relationship management are the strategic possibilities for modernising logistics chains and boosting the competitiveness of diverse cargo logistics facilities (Parola et al., 2021:1and 2). The marine supply chain has multiple actors, including customs

clearing and forwarding, and requires digital innovation due to the direct engagement with cargo procedures. (Parola et al., 2021:2).

The interactions between digitalisation and all the participants in the maritime supply chain, as well as the order in which relevant processes take place, are illustrated in Figure 1 below.

Figure 1:Interplay of actors of the maritime supply chain



Source: (Fruth and Teuteberg, 2017:2).

The forwarder (Clearing and Forwarding agent) is the vital link between the shipper and the recipient of the goods at the other end of the supply chain. They play a critical role in organising the movement of these goods by liaising with the rest of the parties illustrated in Figure 1 above. The digitalisation of their processes is important to enable them to deal with the tasks of organising and clearing and forwarding. The different digital platforms at the heart of the maritime supply chain are also shown in Figure 1 above. These include The Electronic Chart Display and Information System (ECDIS), Automatic Identification System (AIS), Radio-frequency Identification (RFID), big data analysis, Global Positioning System (GPS), mobile computing, and cloud computing. These systems are implemented first through the customs department of a country to facilitate trade and also to protect its country by managing imports and export. The Customs department will also require this for statistical reasons. The role of customs department

in digitalisation is reviewed below.

This section will review the available literature on the subject of the impact of digitalisation on the workforce in clearing and forwarding agencies, with the purpose of analysing, and identifying the gap in research.

2.3 Customs and Digitalisation

This section will review literature and provide a basis for customs digitalisation. By first examining the function of customs and digitalisation as the custodians of these changes, a better understanding can be gained about the impact of digitalisation of the clearing and forwarding procedures on the workforce. Research conducted by Lebid et al. (2021:49), while commenting on the "present uncertainty about the development of export-import operations, noted that the main task of each state is not only the development of foreign trade, but also the possibility of timely receipt of goods in domestic markets without significant delays and cost". Each state's customs departments have been given this duty, which is why they have embraced digitalisation in order to execute this task. Lebid et al. (2021:49), believe that "a significant increase in the conclusion of foreign trade contracts within the framework of the implementation of export-import operations can be achieved by applying the principles of the Kyoto Agreement on the simplification and harmonization of customs procedures." To do this, Amankwah et al. (2018), viewed the primary tasks of customs to facilitate the legitimate clearance of goods at seaport, to implement government policies, to assist with revenue collection from import tariffs and taxes, to protect against terrorist activities and, to enforce restrictions on the import of particular commodities. Strong relationships between the port, actor groups (public and private), and customs are therefore necessary for the digitalisation of import clearance. In reality, digitalisation expedites the flow of information from these stakeholders through each phase, from the preparations made for the arrival of the goods to the last procedures involved in transferring them out of the port.

Customs have been able to transform from historically being the most inflexible, bureaucratic agencies using antiquated methods and being technology-averse, to those employing and embracing cutting-edge technologies thanks to the paperless port. The use of the paperless concept and destination inspection services by Customs, along with their dedication to providing high-quality services, have significantly improved cargo clearing times. In the same line, Lebid et al. (2021), argued that effective and efficient customs inspection, clearance of imports and export operations, increase the competitiveness of transport companies in the transport and logistics supply chain. Such benefits reduce the cost of doing business, and thus can be considered as trade

facilitation which is one of the ultimate objectives of modern customs as articulated in the SAFE Framework of Standard 2017. The WEF (2022:16), produced a research project titled Growing Intra-African Trade through Digital Transformation of Border and Customs Services, and found that "South Africa (SA)'s ports and borders play significant role in trade in Southern Africa. In addition, there has been growing demand for cross-border regional integration. To cope with increasing demand, several issues needed to be addressed, including reliance on paper-based processes, manual processes, and non-value-adding customs activities". This is the basis on which, as early as 2009, the South African Revenue Services (SARS), embarked on a review of its legacy customs systems. Between 2009 and 2013, interventions were introduced such as the use of electronic supporting documents; the introduction of a mobile application tool to support inspections that allows inspection result to be captured and which include pictures of cargo; and most importantly, a new web-based platform for end-to-end processing of customs clearance (WEF, 2022). To ensure compliance and that all stakeholders are on the same platform, SARS has issued policy directives to ensure compliance. SARS Customs External Policy document on Registration, Licensing and Designation (SC-CF-19), chapter 2.3.8(a)(i) and (ii), (A) states that "all customs clearing agents or registered agents must register with Customs as an Electronic Data Interchange (EDI) user for electronic submissions". The only exception under chapter (b) which refers to importers and exporters, customs clearing and forwarding agents, who are not required to register with Customs as an EDI user, are those who submit less than 10 declarations per calendar month and such declarations do not exceed 10 lines. This therefore means that clearing and forwarding companies have been obliged to become digitalised to be able to conduct their business. Their compliance has had an unintentional impact on the workforce. This is what this research aims to investigate. The next section will review literature on customs clearing and forwarding processes.

2.4 Customs Clearing and Forwarding Processes

"Globalisation is resulting in an increasingly complex world with expanded flow of goods, people, capital, information and technology" (Gordon, 2007:49). Customs clearing and forwarding agencies must process these increases in international commercial transactions, and this processing takes time (Martincus et al., 2015:1). Time is money in international trade and at the centre of the international trade are customs which oversee the compliance of all shipments with trade regulations through clearing and forwarding agencies (Martincus et al., 2015). Customs are therefore refer to as gatekeepers of international trade, since all transactions leaving or entering

countries must be processed by their customs agencies, and such processing take time (Martincus et al., 2015). It has become necessary to digitalise these processes in order to keep up with trade expectations due to shifting traditional trade patterns, growing participation, and the needs of modern business (Gordon, 2007). These factors have put pressure on customs administration (agencies) to process goods effectively and efficiently and to minimise delays (Gordon, 2007). Unnecessary delays increase the cost of international trade and reduce the traders' ability to compete (Gordon, 2007). In order to make efficient and risk-based decisions, customs has worked to digitalise processes for gathering information as far in advance of the arrival of the goods as possible. As a result, this has led to the introduction of cutting-edge information technology that allows the secure, real-time exchange and receipt of information, risk assessment and declaration processing (Gordon, 2007). The unanswered question is how contemporary pressures on international trade, customer expectations, and the digitisation of business operations (customs clearing and forwarding processes) have affected labour. Through a sequence of exploratory interviews, this study will attempt to provide an answer to this query.

2.5 Digitalisation and Impact on Workforce (Labour)

Digitalisation is a rapidly expanding aspect of business. However, little data exists to track the spread of digital adoption and consequently its impact. (Muro et al., 2017). In the absence of such information, the digitalisation trend, as prominent as it is, remains diffuse and hard to pin down. Research by Jandrić and Ranđelović (2018:757), found that "digital technologies have a significant impact on the labour market, primarily by complementing or by substituting workers". The findings also indicate that the set of skills that were required from workers included "putting a stronger focus on problem-solving skills, creativity, socio-emotional skills, functional literacy, and technical skills related to the use of digital technology" (Jandrić and Ranđelović, 2018: 757), while Androniceanu et al. (2020),found that amongst the challenges associated with the digitalisation and the workforce, 25% of 1200 Information Technology (IT) personnel sampled in 13 countries, reported weak skills in each sector, and 60% reported a moderate to major deficit. Jandrić and Ranđelović (2018) on the other hand, found that the effect of digitalisation on the labour market and economic performance of a particular country's future, depends on the workforce's adaptability, the industrial and occupational structure, the skills mix, the organisation of work and the current state of digitalisation. Despite the importance of these studies, these findings might not be applicable in the context of South Africa. Both studies were conducted in Europe with different socio-economic conditions. Even in Europe, the studies found a declining rate of adaptability

within the three main regions, with the most advanced region scoring a high adaptability rate compared to the poorer regions. South Africa is a developing country with pronounced socio-economic inequalities. Although the findings above were not limited to the clearing and forwarding industry, they do indicate a slow rate of adaptability to digitalisation within poorer European countries. The assumption therefore would be that such studies in South Africa, might indicate a much slower adaptability to digitalisation. This can only be established based on factual empirical research in South Africa.

Another study by Collington (2022) found that the implementation of digitalisation in the public sector in Denmark between 2002-2019, which was done to bring reforms and fiscal stability, paradoxically, produced retrenchment of critical assets and capabilities. The study further suggested that future research should be conducted on how the state can harness technological progress in the interest of the citizens without retrenching in the process (Collington, 2022). Though this study was conducted in the public sector, its findings could equally be applicable in the private sector. The study highlights the fact that digitalisation, as good as it may be, if not implemented after careful study of the environment, may have a negative impact such as retrenchment of some critical skills. Thus, the need to close that gap with this research, whose findings could assist in policy formulation to enable both public and private sector to maximise the benefits of digitalisation while minimising any negative impact.

According to Frey and Osborne (2017), 47 per cent of United States (US) labour force were in jobs that were highly likely to be replaced by machines within the next two decades. While these studies provided aggregate estimates of the risk of digitalisation at a macro level, Fossen and Sorgner (2018), conducted a similar study at a micro level by focusing on workers' response to the risks of automation of their jobs by studying their switching behaviours in the labour market. Their findings indicated that the worker replacement effects of digitalisation were already evident with workers changing jobs much more rapidly or becoming entrepreneurs. Despite the relevance of these studies and the media attention they received, especially in US, both studies neglected the maritime and logistics industry and the clearing and forwarding agencies. The gap in research is even more obvious because these studies were conducted in a developed country, not a developing country. Additionally, South Africa is a country with the triple threat of inequality, unemployment, and poverty.

There is currently a new requirement in the labour market with new terminology coming up as digital competences due to digitalisation. A study conducted by Murawski and Bick (2017), concluded that a critical and honest evaluation of today's working environment and how current

jobs will be re-designed in the next 20 years is necessary to determine if some of the current jobs still exist. The study also indicates that there is a need for radical transformation of the way of thinking about the way of working and the respective working requirements. The importance of this study is the subtle highlight of the fact that digitalisation is having a negative impact on the workforce, especially those that are not digitally competent. Digital competence is defined as "encompassing instrumental knowledge and the skills for tool and media usage; advanced skills and knowledge for communication and collaboration, information management, learning and problem solving and meaningful participation; and attitude towards strategic skills usage in intercultural, critical, creative, responsible and autonomous way" (Murawski and Bick, 2017: 5). Research in South Africa on digital competences would be useful if one had already established the impact of digitalisation on workforce, and in this case in line with clearing and forwarding.

Another study conducted by Szabó-Szentgróti et al. (2021), on the impact of industry 4.0 and digitalisation on labour markets for 2030, found that, given the recent innovations from the technological point of view, it is possible to replace half of the human workforce in the next 20 years with digitalised technology. The findings further indicate that the faster technology advances, the harder it will be for the workforce to adapt to change. The study further predicts this situation may lead to technological unemployment (Szabó-Szentgróti et al., 2021) If the findings of this research were to be applied in South Africa, it could yield similar findings and provide a proper foundation for policy formulation and management of a redundant workforce. Despite the importance of this study, it has been conducted at a macro level in the US and it has thus neglected to address the specific focus of this research which is the impact of digitalisation on clearing and forwarding.

Another study by Muro et al. (2017) commented on how rapidly the digital landscape is growing and noted that academic research in recent decades has indicated that the spread of digital technology is having a significant impact on workers, firms, industry, labour markets and a whole region (Muro et al., 2017). This study also notes that the nature of work and rewards changes rapidly thanks to digitalisation. It further notes that, while digitalisation has created hundreds of new jobs, it is also believed to have contributed to the "hallowing out" of the occupational distribution. This study differs in previous studies reviewed above in that, it looks at the impact of digitalisation on race and sex and age. The study also notes that digitalisation amplifies both opportunity and inequality, this means that getting a clear picture on its working is an urgent priority for workers, businesspeople, and policy makers (Muro et al., 2017). This study further notes that digitalisation is not static. It is rapidly changing, driven by the wide adoption of digital

devices and processes, with significant implication for workers, firms, and the labour market. The dynamic and fast growth rate of digitalisation requires continuous academic research to better understand its impact on society for better appropriate policy formulation. Some of the significant findings of Muro et al. (2017), included establishing that in the United States 32 million workers are employed in highly digital jobs, with a higher percentage of white race, 66 million others hold moderately digital positions, while just 41 million jobs required only low digital skills. This last category was also dominated mainly by the black race and women (Muro et al., 2017). These statistics indicate that the lower segment of society is more vulnerable to the negative impact of digitalisation. The study also found that while digitalisation presents significant opportunities for less educated or historically marginalised workers or groups to move up the employment ladder, too few of them appear to be making that progress. This study has made some very important and significant findings on the impact of digitalisation. However, this study was conducted in the US with different demographic, social and economic status participants. While the study included findings in the transport and warehousing industry, it was again conducted at a macro level, only focussing on the US. This current research is focused on South Africa with a particular focus on the impact of digitalisation on clearing and forwarding.

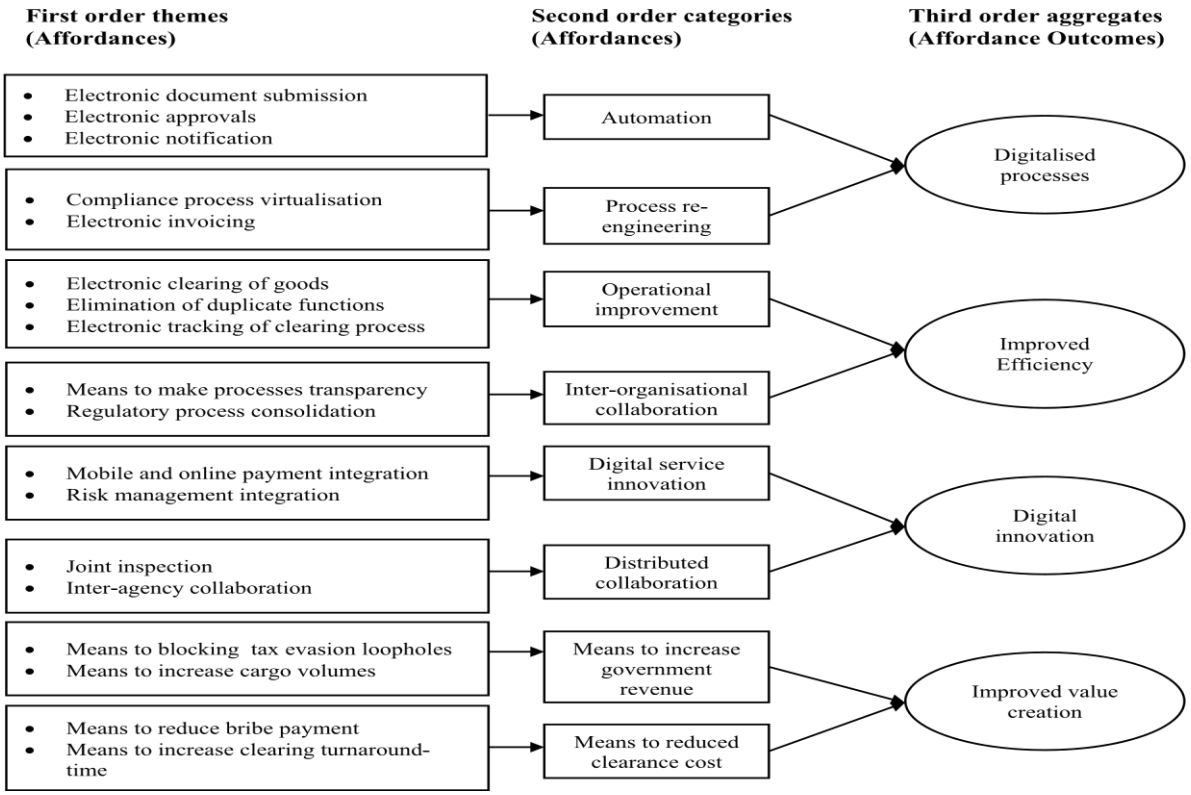
2.6 Digitalisation in Clearing and Forwarding (Logistics Sector)

This section will review literature on digitalisation on the logistics sector and narrow down to clearing and forwarding, highlighting why it was necessary to choose the clearing and forwarding operations for this research.

Before reviewing literature on digitalisation on clearing and forwarding business, it is necessary to define digitalisation in the context of clearing and forwarding. The focus on digitalisation in clearing and forwarding, is a process in which manual documents are moved into an online process enabling a seamless working environment with an online platform client service on a 24/7 basis. This results in decreased time, cost, and increased efficiency (Desk, 2019:3).

The figure below illustrate the different stages which digitalisation has been implemented in the clearing and forwarding industry, adapted from a research conducted (Senyo et al., 2021) in the Port of Tema in Ghana. The details and findings might vary with regards to some specific objective of this research, however, they still provide a broad guidelines for specific sections targeted on this research.

Figure 2: Digitalisation implementation in clearing and forwarding.



Source: (Senyo et al., 2021:6)

Figure 2 above shows that the adoption of digitalized processes has resulted in enhanced efficiency and increased value creation, with positive outcomes for both importers and exporters. For exporters, this means quicker access to capital and higher profit margins. Exporters benefit from expanded market opportunities. Additionally, digitalisation brings transparency that curbs corruption and foster a favourable business environment, leading to higher revenue collection for Customs and the government. However, there is potential downside for the workforce, as some employees might face job cuts due to increased automation and efficiency.

"The role of customs administration has undergone a major paradigm shift in modern times with a greater emphasis on protecting socio-economic interest from fiscal and non-fiscal threats especially given the increased flow of goods internationally" (Maree, 2020: ii). This increase in the flow of goods internationally in the present period of "uncertainty about the development of export-import operations, the main task of each state is not only the development of foreign trade, but also the possibility of timely receipt of goods in domestic markets without significant delays and costs" (Lebid et al., 2021: 49). The majority of these imports often constitute productive inputs for local

industries. The prompt delivery of these inputs will cut down on inventory cost for these locals' industries, and significantly contributing to their export competitiveness. Customs is therefore required to play an important role in simplifying these processes through the application of the principles of the Kyoto Agreement on the simplification and harmonisation of Customs procedures. The problem often lies with the customs in familiar areas such as the existence of different customs formalities, duplication of stages of customs control, additional supporting documents for customs values, payments etc. (Lebid et al., 2021). The simplification and harmonisation of customs procedures required seamlessly streamlining and digitalising the customs processes. This will lead to effective customs services in inspections and customs clearance of export-import operations which will increase the competitiveness of transport companies in the transport and logistics transport chain (Lebid et al., 2021). The practical aspect of simplifying the customs procedures requires bringing the private sector onboard to perform some of these processes on behalf of customs. Such private sectors include the freight forwarder, usually referred to as the clearing and forwarding agent. Freight forwarding or shipping and forwarding as it was formerly known, is recognised worldwide as a branch of International Trade. "The forwarder is the vital link between the exporter, the carrier, the department of customs and excise, Port Authority, shipping agents and consignee" (Edward, 2013: 1). This definition of the role of the clearing and forwarding agent, places it at the centre of all international trade transactions as the lubricants for international trade logistics and supply chain processes. If one is therefore wanting to measure the impact of digitalisation in the transport and logistics sector, clearing and forwarding is the ideal segment to investigate, thus the rationale for this research.

Maree's (2020), study on the impact analysis of customs risks management processes in South Africa, only mentioned digitalisation for custom modernisation in passing, thus, the findings of that study fall outside the scope of this research. Edward's (2013) study on investigating the management of e-commerce in clearing and forwarding at the Tanzania Port Authority, did not explore the aspects of digitalisation and thus its findings also fall outside the scope of this research.

The study of Lebid et al. (2021), on the efficiency of simplification of customs formalities on the digitalisation basis, note that e-commerce was a progressive and innovative approach to international interaction. Highlighting the fact that automation of customs processes was inevitable, and in justifying this, the study notes that, the whole world lives in a market economy and strive for globalisation and economic integration. This can be accomplished through uniform, harmonised and simplified digital platforms; amplifying the urgency of digitalisation as a priority for today (Lebid et al., 2021). Among others, its findings revealed that the most significant short comings in

the implementation of customs formalities is the lack of automation of individual customs processes. Although this study was conducted in Ukraine, its findings are very important as its lays a good foundation for further studies such as this research. South African Customs have digitalised many of their processes and have also, through Customs and Excise Act (Act No 91 of 1964), Part 6: 64E.19(1), given accreditation to private individuals to act on their behalf, including clearing and forwarding companies.

2.7 Digitalisation and Productivity (Clearing and Forwarding Sector of the Logistics Industry)

This section will review literature on digitalisation and productivity in the logistics sector with particular attention to the customs clearing and forwarding agents, highlighting the gap in research.

Productivity can be viewed as a multidimensional term, the meaning of which can vary depending on the context within which it is used (Syverson, 2011). Generally, a more suited definition which seems to embrace all aspects, defines productivity as "how much and how well we produce from the resources used. If we produce more or better goods from the same resources, we increase productivity, or if we produce the same goods from lesser resources, we also increase productivity" (Syverson, 2011:35 and 36). At the centre of this definition, is the facts that productivity is closely linked to resources and that productivity also leads to the creation of value. It also indicates that, removing wastage will result in higher productivity and creating more value. (Syverson, 2011) This therefore means that removing processes that which eliminate wastage can be seen as aspects of productivity.

As mentioned earlier, productivity in the context of clearing and fowarding, the use of "softwares with higher efficiency in coordinating processes and information by automating functions, leading to a better and more organised way, eliminating paperwork and managing shipments more efficiently and accurately, thus reducing operational costs. (Anon., 2019:3).

Ahimbisibwe et al. (2016 :16), conducted a study in Uganda which was prompted by the delays in customs clearance; bureaucratic systems and lengthy cargo forwarding processes, all of which were attributed to a lack of IT capability, low IT adoption and poor logistics service quality. In other words, this study implies that a good IT technological adoption in the customs clearing and forwarding sector, will improve quality services and productivity as demonstrated in their findings. The finding of this study, "indicate significant positive relationships between IT capability, IT adoption, logistics service quality and performance of third party logistics firms" (Ahimbisibwe et al., 2016 :16). In line with this finding, the study further recommends that clearing and forwarding

firms in Uganda need to adopt IT quicker and increase logistics service quality in order to improve on the performances of their clearing and forwarding operations especially in the areas of documentation, cargo tracking , warehousing and shipment operations (Ahimbisibwe, et al., 2016). Although this study was conducted in Uganda, it could have produced similar findings if it had been conducted in South Africa in the same timeframe. This assertion is very specualtive, and there are many variables that affects digitalisation such as the fact that the study was conducted in 2016 and how digitalisation has changed since then. The two countries, although both considered to be developing countries, they have different and unique economic statuses. This necessitates that proper research needs to be conducted in South Africa. Similar findings could neccessitate further recommendations in terms of the specific type of training required and adoption of IT capabilities.

A study conducted in South Africa by Magwentshu et al. (2019),notes that, while advanced technology could be disruptive, it primarily represents a significant opportunity which can be harnesed to reignite productivity, and improve growth and job creation. A significant observation made by this study is where it has gone beyond indicating that technological development will lead to productivity, but it also identified areas where more concerted effort is required. These areas include at government level, business level, individual level and within educational institutions. Commenting on educational level, the study recommended that schools should focus on digital skills, and life skills such as adaptability, and entrepreneuship. On the national level, the study recommends that the government embraces digitilisation, invests in human capital, mitigates the impact of automation on jobs and fosters a step-up in job creation. On the business level, it recommends a need to rethink its strategy, upgrade workforce planning and reskilling, and embrace new ways of working. Meanwhile, on the individual level it reiterated the focus on skills, not just certification, a focus on lifelong learning, and targetting high-growth sectors and roles to find opportunities for entrepreneurship (Magwentshu et al., 2019). The study also proposes that digitalisation could provide a major economic boost with a productivity growth of 21 percent in 2020, resulting in a net gain of more than 1 million jobs by 2030. (Magwentshu et al., 2019). While this study is relatively current and was conducted in South Africa, as relevant as its findings are, its research scope was conducted at a macro level within three sectors, namely mining, retail and banking. This means that the particualar focus of this research (clearing and forwarding agent sector) was not addressed and thus there is a need to conduct this research.

Another study conducted on the customs sector in Kenya by Omosa (2020) established that customs revenue performance in Kenya increased significantly after the implementation of digital technology. The study also revealed that regional trade activities were intensified and greater

border control was achieved (Omosa, 2020). The study among other things, also found that implementation of digital technology was important in achieving revenue growth and operational efficiences while increasing regional integration. It also noted that further growth was required in terms of information and communication technologies (ICT) infrastructure, synchronisation, training and security enhancements (Omosa, 2020).

2.8 The Implication of Literature Review

According to reviewed literature above, digitalisation is beneficial to society and the rate at which it is rapidly growing is testimony of the buy-in from society. We are now living in a global world where our lives and activities are so interlinked. Any business that might still be hesitant to digitalise its processes to become competitive, might just be left out of the global supply chain. Digitalisation of the clearing and forwarding processes, cannot be seen as incidental, but intentional as it plays a major role in the global supply chain. However, the major concern remains the impact of digitalisation on the workforce. While many are battling with the sudden wave of digitalisation and how to adapt, little attention has been given to its real impact. Studies conducted so far have largely been on a macro level. There is a need to conduct more studies especially at the micro level to identify and manage some of the unintended negative consequences of digitalisation, especially on the clearing and forwarding workforce.

CHAPTER THREE - RESEARCH METHODOLOGY

3.1 Introduction

According to Goundar, (2012: 3) “Research methodology is a way to systematically solve the research problem”. This is like a roadmap on how the research problem will be solved. It is in research methodology that “we study the various steps that are generally adopted by the researcher in studying his research problem along with the logic behind them.” (Kothari, 2004: 20). In this chapter, the methodology (methods and techniques) that will be adopted to answer the research questions, will be discussed, justifying the choice thereof.

The aim of this research is to find out how digitalisation has affected the workforce and the productivity in the customs clearing and forwarding agencies sector. An established scientific approach such as research philosophy, research type, research strategy, time horizon, sampling strategy, data collection methods, and data analysis and techniques will be followed. These steps are discussed below.

3.2 Research Design

According to De Vaus (2001: 1), “a research design refers to the overall strategy that one chooses to integrate the different components of the study in a coherent and logical way, thereby, ensuring you will effectively address the research problem; it constitutes the blueprint for the collection, measurement, and analysis of data.”. The intention of this research is to arrive at a logical, valid, dependable conclusion; therefore, it will be making use of a research design. Data for the study will be collected from semi-structured interviews and secondary sources. The time under consideration for this research is from the year 2000 to present. The interview respondents will be identified and purposively selected based on their knowledge and experience of working as clearing and forwarding agents for a period exceeding twenty years to cover the period selected. The selection will focus on respondents who have occupied and/or may currently occupy senior positions in the clearing and forwarding agencies and have acquired in-depth knowledge and experience of their sector. Such a person must have experienced pre-digitalisation, early digitalisation, and present digitalisation operations in the customs clearing and forwarding industry.

3.2.1 Research Philosophy

This research will make use of positivism and interpretivism research philosophy.

The research philosophy will be qualitative. Because of the lack of literature and limited research currently available, certain aspects of the research question can only be adequately addressed through an interview. It will make use of existing literature as a secondary data source. Since there is relatively very little literature existing on this research problem, primary data sources will be significant, thus the choice of research philosophy.

3.2.2 Research Type

The research type will be inductive.

The current literature review did not find any similar work which has been conducted locally, although; similar research has been conducted in other countries. As a deductive research type, it will make use of existing theories and be confirmatory. As an inductive research type, theory will be generated from the data upward and will be exploratory. The impact of digitalisation on the workforce will take an inductive approach due to interviews and will be exploratory due to lack of or scarce prior research in this sector.

3.2.3 Research Strategy

The research strategy to be adopted here would be focused on interviews.

Interviews will be used to collect data that will be analysed making use of axial coding methods. As already mentioned in 3.2.2 above, there is not much literature in this research field, so the findings will largely depend on primary data obtained through interviews. 10 executive or a senior member of the clearing and forwarding companies with more than 20 years' experience in the industry were interviewed to collect data.

3.2.4 Time Horizon

This research will make use of a cross sectional time horizon.

Data will be collected on clearing and forwarding processes and productivity levels before digitalisation and those measured after companies have implemented digitalisation. Digitalisation is dynamic and is progressive and constantly changing. To arrive at a reliable conclusion on its impact of workforce, it will be best to collect data from the companies by means of an interview

with their senior staff members. Interviews were conducted with 10 top managers of selected clearing and forwarding companies with an experience of more than 20 years in the industry.

3.2.5 Sampling Strategy

This research will make use of snowball non-probability and purposive sampling technique.
This method will be practical for this study in terms of administering the interviews, for data collection. The initial sample will consist of companies or persons the researcher is exposed to. They will then be asked to refer other companies or people to the researcher for further interviews. This strategy is convenient and practical due to budgetary and time constraints.

3.2.6 Data Collection Method

The data collection will make use of a qualitative method.
The study collected data from interviews and secondary sources, spanning the years 2000 to present. Interviews involved experienced clearing and forwarding agents, purposively chosen for their extensive knowledge over 20+ years, using non-random, snowball purposive sampling. The selection targeted those in senior roles with expertise across pre-digitalisation, early digitalisation and current digitalisation phases. Ten interviews, averaging 45 minutes each, centred on digitalisation labour and productivity effects, and implementation methods were recorded, transcribed, and coded for analysis.

3.2.7 Data Analysis and Techniques

Since this is a qualitative study, the research made use of discourse analyses as well thematic analyses. The data collected from interviews were analysed using thematic analysis while making reference to axial coding technique. Data collected was group into themes, which was further broken down into smaller themes and timeframes for coding.

3.3 Methodological Limitations

The major challenge will be sampling methods. A random probability sample would have been preferable, however, due to budgetary and time constraints, the study will adopt a non-probability, purposive method. As a mitigating factor to still have high quality research, 10 interviews were conducted with persons with more than 20 years' experience in the industry to gain deeper insight. The selection was of 10 experienced senior executives also ensured that quality data, in dept data

was collected to compensate for scarcity of literature. Another limitation is the lack of literature or prior work in this topic in South Africa. However, this also creates an opportunity to produce quality research that can lay the foundation for further research in this direction. The challenge and concerns of having 100% responses was dealt with by obtaining a gatekeeper letter from SAAF and also obtaining an Ethical clearance letter which assured them the data was going to use for the research without affecting them or their business.

CHAPTER FOUR - PRESENTATION OF RESULTS AND DISCUSSION

4.1 Introduction

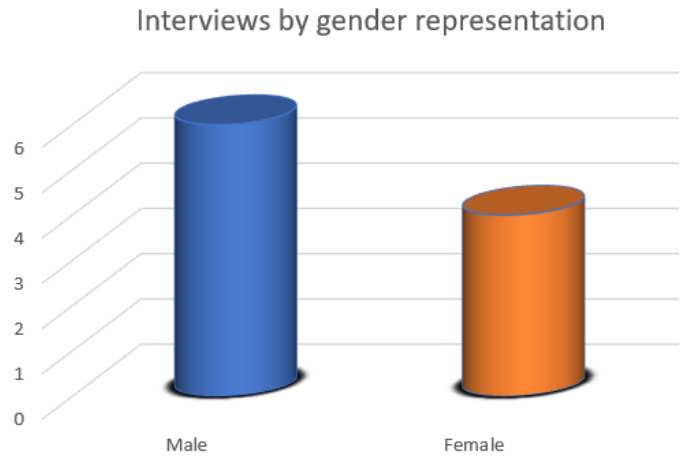
In this chapter, there is a brief description of how data was collected and coded before presentation.

Data for the study was collected from semi-structured interviews and secondary sources. The time under consideration for this research is from the year 2000 to present. The interview respondents were identified and purposively selected based on their knowledge and experience of working as clearing and forwarding agents for a period exceeding twenty years to cover the period selected. A non- random probability, snowball, and purposive sampling approach was thus employed with the focus on respondents who have occupied and/or may currently occupy senior positions in the clearing and forwarding agencies and have acquired in-depth knowledge and experience of their sector. Such a person must have experienced pre-digitalisation, early digitalisation, and present digitalisation operations in the customs clearing and forwarding industry. This was the basis for this choice. A total of 10 interviews were conducted with an average of 45 minutes per interview. The interviews focused on the impact of digitalisation on labour and productivity and how it was implemented. These interviews were audio recorded and later transcribed and coded for analysis. Data was also collected from secondary sources such as such as SARS documents, World Economic Forum (WEF), World Customs Organisation (WCO). See table 2 below for details on the demographics of the interview participants.

Table 1:Interviews data collection Demographic

Number of Interviews	SEX	RACE	MGMNT LEVEL	JOB TITLE	YEARS IN THE INDUSTRY	COMPANY TYPE	INTERVIEW TIME (minutes)	NUMBER OF EMPLOYEES
1	M	White	Senior	Director	45	Multinational	60	100+
2	F	Indian	Senior	General Manager	33	National	38	30-50
3	F	Indian	Senior	Operations Manager	35	National	30	30-50
4	M	Indian	Senior	Operations Manager	34	National	40	50-70
5	M	Indian	Senior	Regional Manager	35	Multinational	35	100+
6	F	Indian	Senior	Operations Manager	20	National	30	30-50
7	F	Indian	senior	Regional Manager	39	Multinational	35	100+
8	M	White	Senior	Director	53	National	30	30-50
9	M	White	Senior	Operations Manager	32	National	42	30-50
10	M	White	Senior	Operations Manager	36	National	45	30-50

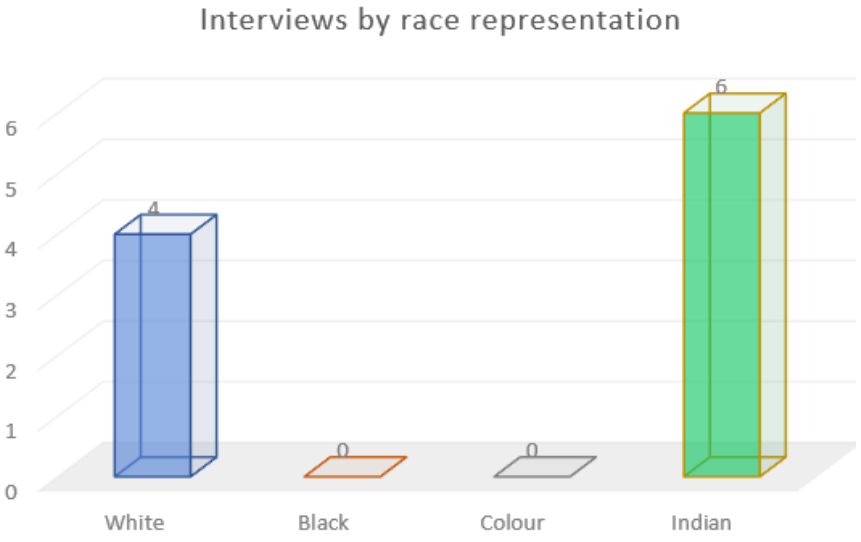
Figure 3:Interviews by gender representation



Source: Compiled by the author.

Figure 3 above indicates that 60 % of the participantswere male while 40 % were female. Though the sampling was not random, this still indicates the subtle gender imbalance that exists in the industry, especially in the position of leadership. This assertion was also confirmed by all interviewees. This is important to highlight as it's legacy continues today which filter down to the impact on digitalisation.

Figure 4: Interviews by race representation

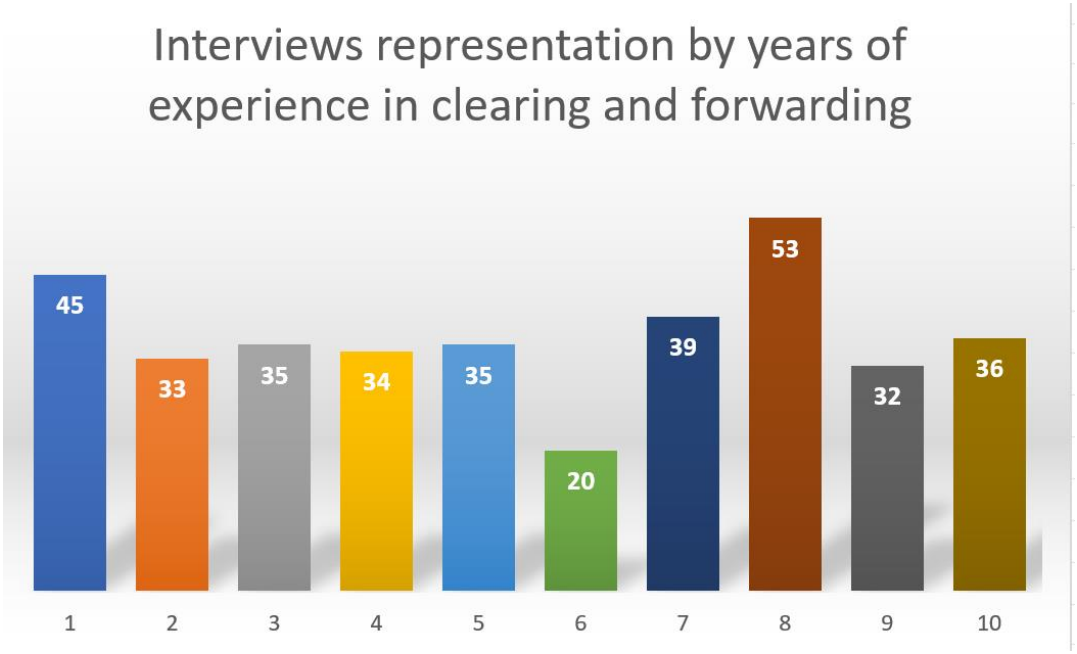


Source: Compiled by the author.

Figure 4 indicates the race representation of the participants with 60% being Indian and 40% being white. There were no black or coloured participants. Similar to figure 3 above, though this was a snowball purposive sampling technique, this spread indicates the racial

imbalance that has existed in the industry which has contributed to the skills shortages in the present exacerbated the low skills transfers due to the impact of digitalisation. This assertion was confirmed by the interviewees who stated that a decade prior to this study timeframe, clearing and forwarding was dominated by white and a few Indians.

Figure 5: Interviewee representation by years of experience in clearing and forwarding.



Source: Compiled by the author.

Figure 5 shows the work experience levels of the interviewees ranging from 20 to 53 years. All of them were still very actively involved in clearing and forwarding. They have experienced pre-digitalisation era and current digitalisation. Their present responsibilities range from general managers and regional managers to directors. Their wealth of knowledge and experience made it easy to collect data on the impact of digitalisation on the workforce and productivity.

Data that has been gathered and coded is presented in three main themes covering:

i) pre-digitalisation in the industry (covering the period from the year 2000-2005)

ii) initial or inception stage digitalisation, (covering period 2005-2010)

iii) current digitalisation (covering period 2010 to present). See annex 1.

Data has also been gathered on the various levels of clearing and forwarding agents and required digitalisation which will give some understanding of the impact of digitalisation of customs clearing and forwarding processes on the workforce. This is presented in table 4 below.

4.2 Digitalisation (period from 2000 to 2005)

Pre-digitalisation customs clearing and forwarding processes were largely characterised by manual processes. Commenting on this, Interviewee 1 said, “this process was time consuming, framing an entry manually using carbon paper, often led to inaccuracies”. Interviewee 10 described the process then as ,“we used a bended machine, put some ink, some liquid, carbon paper, the liquid is then pumped on the paper, using a foot paddle to print the document”. All the interviews conducted agreed the process was labour intensive. Staff were often required to move from one customs office to another as well as make several trips to the port for joint inspections. Interviewee 4 described the process at SARS in his words as follows, “there were 15 data capturers at Durban SARS office alone. There were also registration officers who received the files and stamped them with an assessment date stamp. The file was then taken by a lift system and received by a clerk who split them in to different colour codings. The data would be captured and then sent to the checkers section for quality assurance (QA) checks. After the QA checks, numbers were then affixed to each file, which was done by another group of 8 people. The document was then ready for payment to be processed”. It is important to note that, in the early 2000, the manual process meant that the bulk of the work was also concentrated at SARS customs offices. From these descriptions, it can be deduced that this process was not only labour intensive, but also expensive with low productivity levels. Some of the processes that were manually conducted by Clearing and Fowarding Companies included the following:

- Maual processing of Single Administrative Document 500 (SAD500)
- Manual submission of Bills of Entry (BOE)
- Manual processing of Cargo Dues
- Manual processing of Landing Order
- Manual communication of delayed shipments
- Manual Request for Vessel Pre-Berth
- Manual request for Vessel Pre-Arrival Notification
- Manual release

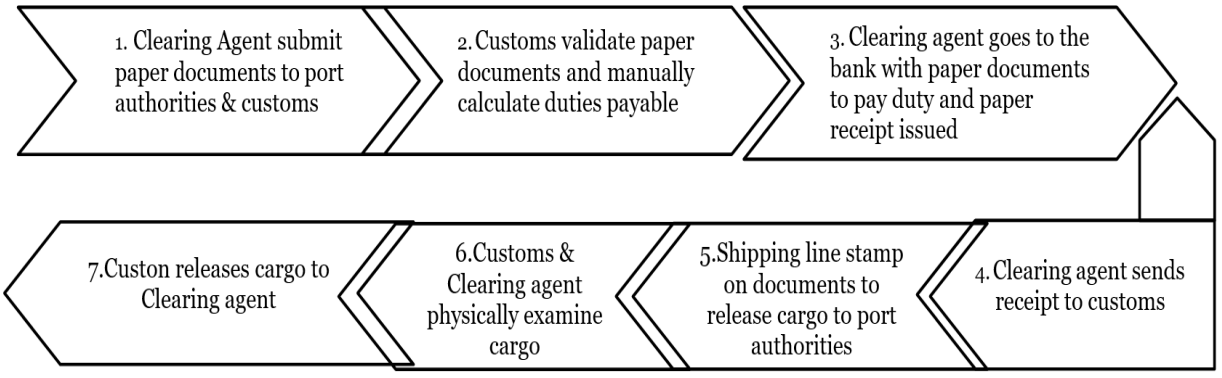
During this time, when Customs queried a shipment, manual packs of documentation had to be printed and manually taken to Customs. Document packs included SAD500, clearing instructions, commercial documents, packing lists, bills of lading and arrival notifications. Another interviewee

indicated that, “previously Customs had DA310 stop note slips which was a manual process. If the stop slip was lost, Clearing and Forwarding companies had to do the entire examination again”. This emphasises the aspect of the process being very time consuming and resulting in low productivity levels. While agreeing with the rest of the interviewees, Interviewee 5 stated that, “previously Voucher of Correction (VOC’s) were done manually and printed on a yellow page and placed in a folder which was submitted to Customs and then data capturers would capture the data and release your VOC at the customs offices.” A VOC is processed if an error is made on a customs entry. This evidence implies that while the manual system was inherently prone to errors, rectifying the mistakes was also time consuming.

As already indicated above, during this time, original clearing documentation together with any proof of the goods being exported had to be submitted by printing documents and taking them to Customs in a pack. Each custom agent was allocated a box where such packs were submitted. The clearing agent would then return to Customs and check for feedback in the same box, usually after a week or more.

Figure 3 below summarises the process employed for customs clearing and forwarding pre-digitalisation. This process was time consuming, labour intensive, prone to errors and costly and consequently, resulted in low productivity outputs.

Figure 6: Customs clearing and forwarding processes pre-digitalisation.



Source: Compiled from research and interviews

Figure 6 above is a summarised version of the processes which a clearing and forwarding agent would go through before the release of cargo.

4.2.1 Digitalisation (2000-2005) Impact on Workforce in Clearing and Forwarding

According to Interviewee 5, when computers were first introduced, there were restrictions on who could use them. Only top management were allocated and allowed to use or operate a computer. Fax machines were even protected and only one person was allowed to operate the machine. The use of computers was strictly controlled, meaning that only very few people were exposed to the digitalised information at the level of Clearing and Forwarding. Due to this limited exposure, the impact on the workforce was non-existent at the beginning. The impact was only felt when computers became more widely issued and used. One interviewee remarked, "I don't think it was the case that the minute computers came about, people's jobs were threatened, it was more about exposure to it, their learning experience, and learning how to use the equipment. As the prices of computers became more competitive, Clearing and Forwarding companies started investing in more computers, scanners, and photocopy machines. However, they kept their workforce because they were very highly skilled in their work, though it was still manual and time consuming". The transition and impact on workforce were felt more keenly in the second phase of digitalisation period 2005-2010 which will be discussed below.

4.2.2 Digitalisation (2000-2005) Impact on Productivity in Clearing and Forwarding

The impact of digitalisation on productivity can only be measured or commented on reasonably when the timeframe is taken into consideration. This is one of the reasons that this study has decided to follow a theme with a timeframe structure. One of the interviewees stated that, according to him, productivity was stable in that environment because the volumes were small. However, many of the interviewees indicated that productivity was very low around this period as the industry was only being introduced to digitalisation and almost 80% of work conducted during this time was being done manually. The size of the workforce required to complete a "simple" task was therefore bigger. Even though there were a lot of staff completing the same task, it still took longer period to complete the task. In many cases, there were mistakes which resulted in reworks which further added to an already lengthy processing time. Though volume of goods were small, it still took two to three weeks to clear goods through customs. The goods that were cleared at this time was also largely breakbulk which made it even more difficult to process speedily, especially when it was necessary to conduct joint physical inspections. The customs officials had to capture the manual submission which increased the risk of mistakes not only from the clearing and forwarding personnel who framed the entry, but also the customs staff who were capturing the data. It is not surprising that the level of rejections was quite high as indicated by the interviewees. The rejections

due to these errors meant that the submission had to be restarted. This took more time and resources. According to Syverson (2011) productivity looks at how much and how well we produce from the resources used or employed. Going by this definition, the volume of goods that was available for service, the amount of time taken to clear the goods, and the number of people (workforce) involved in the process, confirms that productivity was low during this period of low digitalisation compared to current rates. This assertion is confirmed by data from the interview which indicate that it was taking up to two weeks to process a single declaration and clear the goods compared to the present where an average of 20 declarations can be processed per day.

4.3 Initial Stages of Digitalisation (2005-2010)

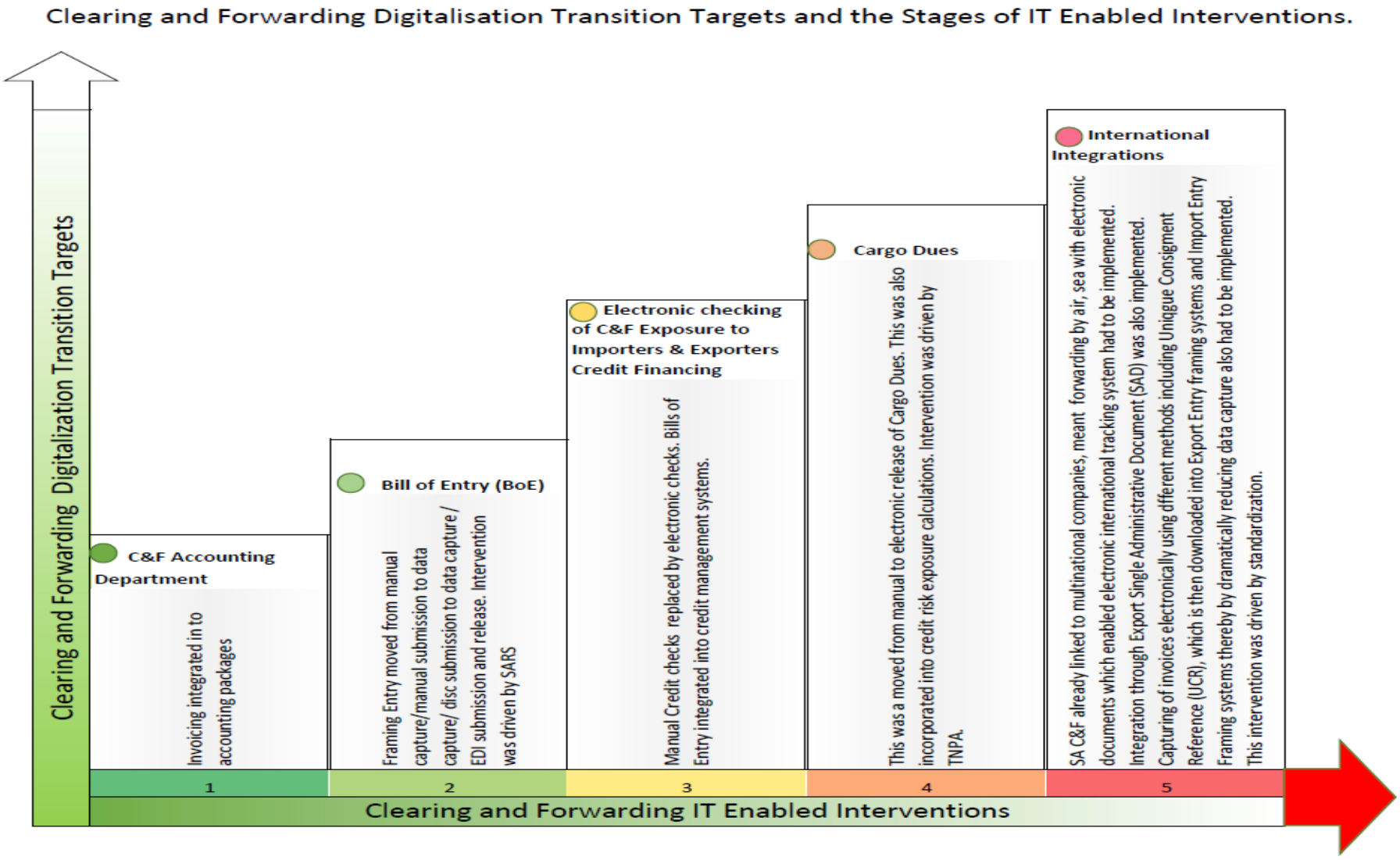
This section will deal with digitalisation at its early inceptions. It covers the period between 2005 and 2010. This period is characterised by a slow emergence of digital tools as triggered by globalisation, an increase in trade volumes and a drive for standardisation in global customs processes (WEF, 2022). During this time, clearing and forwarding companies were also experiencing growth and were all competing for a share of the business which resulted from the sudden increase in volumes of goods imported and exported. Digitalisation was seen as the solution to deliver a faster service to the customers as indicated by the interviewees. As indicated by Interviewee 5, at this period, the prices of computers became more competitive, and companies started investing more in computers. In some clearing and forwarding companies, Information Technology (IT) departments were set up to ensure a smooth transition to this new way of processing information.

4.3.1 Clearing and Forwarding Digitalisation Transition Targets and the Stages of IT Enabled Interventions

As already mentioned above, evidence from the interviews indicated that the scale of digital incorporation or transition was different depending on the size of the clearing and forwarding company. According to data collected during interviews, five distinct stages were identified with specific targets that were implemented to achieve digitalisation in clearing and forwarding. These stages overlap the timeframe under consideration in this segment, however, it was important to construct these stages in figure 7 below, for the flow and understanding of the process. Reference will be made of this figure in the next or final segment of the timeframe under consideration. The importance of figure 7 as its emerged from the interviews, give credence to the different impact on workforce which this research is set out to determine throughout the timeframe under

consideration. Each of the targets identified in the figure 7 below, generated a different impact of clearing and forwarding on the workforce. Because this impact occurred at different stages this means that the impact on the workforce was also spread throughout the timeframe and the stages

Figure 7: Clearing and Forwarding Digitalisation Transition Targets and the Stages of IT Enabled Intervention



Source: Compiled by the Author.

4.3.1.1 Clearing and Forwarding Accounting Departments (Stage One)

The first IT enabled interventions occurred in the accounting department. This included invoicing which was later integrated to the accounting packages. Before this time, invoices were still manually completed, which was a challenge, not only to consolidate for declarations purposes, but when clients were remotely located, and documents had to be sent to them via the postal services. Digitalising the accounting departments of the clearing and forwarding company did not have a negative effect of the workforce. It was more a case of training the accountants on the new system which assisted the process of framing the correct entries with the correct value, reducing rejects due to discrepancies usually associated with errors from manual calculations. The impact on workforce would have been on the courier services which is considered out scope for this study.

4.3.1.2 Clearing and Forwarding Bill of Entry (Stage Two)

The second intervention was Bill of Entry (BoE) Framing which moved from manual capture/manual submission to data capture/disk (floppy disk) submission, to data capture/EDI submission and release. The challenges identified in section 4.2 above clearly indicate how labour intensive the process of framing and submitting entries was at the time. It was manageable at the time but with an increase in the volume of goods (export and import) that accompanied growing globalisation, it was necessary to digitalise this process. As earlier presented in section 4.2, the bulk of framing entries were processed by the Customs Department (SARS). The pressure of the increase in the volume of imports and exports and the need for quicker turnaround time could no longer be attainable with manual processes. These factors prompted the intervention of digitalising the Bill of Entry and was driven by SARS (Customs). This intervention had an impact on workforce with the clearing and forwarding agents and at the level of SARS. This will be discussed in the next segment of current digitalisation.

4.3.1.3 Electronic Checking of Clearing and Forwarding Exposure to Importers and Exporters Credit Financing (Stage Three)

The third IT intervention was related to electronically checking the clearing and forwarding agents' exposure to importers and exporters' financing requirements. This replaced the manual credit checking in Finance as the Bill of Entry was integrated into credit management systems. This was critical step for the clearing and forwarding agent since they performed their duties on behalf of importers and exporters. They cleared and forwarded cargo of considerable value on their behalf. Failure to secure payment made on their behalf could mean that clearing and forwarding agents

could potentially lose money and suffer financial damage should this occur. The increase in volume of good and the sudden demand for a quicker turnaround time for clearing and forwarding services, required a quicker checking mechanism of their clients' credit financing. It is for this reason that this intervention was integrated into the Bill of Entry Credit Management System. The impact on the workforce in this area was minimal as this intervention focussed on cutting the time required to get the information, a service which was usually performed by a third-party.

4.3.1.4 Cargo Dues (Stage Four)

The fourth intervention was the move from manual to electronic submission and release of Cargo Dues. This was also incorporated into credit exposure calculations. In the context of South Africa, Cargo Dues as defined by Manaadiar, (2010), is a fee levied by Transnet National Ports Authority (TNPA) to the users (exporters and importers) for using port facilities for movement of cargo through its terminals. This payment is required for TNPA to Release Export Bill of Loading in the case of export and Import Release in the case of import. Delayed payment or non-payment, meant that clearing and forwarding agents are not able to clear goods for export or imports on behalf of their clients (Exporters and Importers). With an increase in the volume of goods moved by sea during the timeframe under consideration in this segment, and the requirements for the goods to be cleared faster, there was a need to digitalise the process. It became clear that TNPA could not cope with the pace at which these documents were required by clearing and forwarding agents. It also had an impact on their activities because if Cargo Dues were not processed fast enough and the goods were not cleared, they would not be released to the owners. This then created a problem of storage for TNPA and, apart from clogging the port, it was not good for the image of SA ports. It is not surprising that this intervention was driven by TNPA. In terms of its impact on the clearing and forwarding workforce, it was minimal since this is considered as a third-party intervention.

4.3.1.5 International Integration (Stage Five)

While these digitalisation changes were taking place in South Africa, multinational companies had already made strides in forwarding. This meant that in the case of clearing and forwarding companies that were linked to multinational companies, forwarding between them had already recorded movement of cargo by air and sea on electronic documentation which enabled electronic international tracking. Clearing between multinational companies also became integrated as Export Single Administrative Documents (SAD) became Import Single Administrative Documents

(SAD). Clearing went even further where multinational companies had service providers capture invoices electronically using various methods including Unique Consignment Reference (UCR). This information is then downloaded into Export entry framing system, the import framing system thereby dramatically reducing data capture. As Globalisation made its presence felt in the realm of Clearing and Forwarding, the need for standardisation became imperative to streamline processes with their international partners' advanced digital systems to be effective and efficient. This intervention was therefore driven by the need for standardisation. This intervention had an impact on the workforce which will be discussed on the next segment of timeframe.

4.3.2 Classification of Customs Clearing and Forwarding Agents and Level of Digitalisation Required

Apart from clearing and forwarding digitalisation transition targets and the stages on IT enabled interventions discussed above, data collected from interviews also presented a theme on the size of the clearing and forwarding agency and the required level of digitalisation. This information has been consolidated in table 4 below and clearing and forwarding has been classified into 7 levels (Size) based on their workforce (approximate staff requirements or number of employees), required activities to be performed at such level, level of digitalisation and digitalisation requirements. The first 3 levels have basic requirements and can get away with using an entry framing app and a stand-alone accounting system. However, from level 4 onwards, more and more integration tools are required to enable the seamless transfer of data across countries and functions while ensuring standardisation. It is important to note that these classifications transcend the segment timeframe under consideration here (2005-2010) to current digitalisation. For the purposes of coherent flow of data, this has been presented in this segment, however, reference will be made to the table in the next segment when presenting and discussing current digitalisation. These levels and classification will be discussed below to eventually assist in identifying digitalisation's impact on the workforce.

Table 2:Classification of Customs Clearing and Forwarding Agents and level of digitalisation required.

Classification	Approximate staff number	Class Name	Must perform Activities	Comments	Level of Digitalization	Digitalization Requirements
Level 1	1-10	Customs Broking	Frame entries only	Some Importers and Exporters frame their own entries	low	An entry Framing app and a standalone accounting system can be used here.
Level 2	10-20	Customs Clearing	Frame entries only	C&F uses Importer or Exporter code to frame B/E	low	An entry Framing app and a standalone accounting system can be used here.
Level 3	20-30	Customs clearing and Landside	Frame Entries, Cargo Dues and deliver	C&F clears as agent	low	An entry Framing app and a standalone accounting system can be used here.
Level 4	30-50	Customs Clearing, land side and forwarding.	International and local transport, Entries and Dues	C&F moves goods internationally clears and delivers	medium	More integration is required to enable seamless transfer of data across countries and functions
Level 5	50-75	Customs Clearing, landside, Forwarding, Purchasing and Financing	Clearing Forwarding Delivery and Financing	C&F moves goods internationally clears delivers and finances	high	More integration is required to enable seamless transfer of data across countries and functions
Level 6	75-100	Customs Clearing, landside, Forwarding, Purchasing, Financing, Storage and Distribution	C&F, delivery, financing, storage &distribution	C&F moves goods internationally clears delivers finances stores	high	More integration is required to enable seamless transfer of data across countries and functions
Level 7	100 +	Customs Clearing, landside, Forwarding, Purchasing, Financing, Storage, Distribution and Shipping	Shipping C&F, delivery, financing, storage & distribution Ships, clears deliver, finances, stores, and distributes	Shipping C&F, delivery, financing, storage &distribution Ships clears delivers finances stores and distributes	high	More integration is required to enable seamless transfer of data across countries and functions

Source: Compiled from interviews by the Author.

4.3.2.1 Clearing and Forwarding Agent Level 1 Classification and Digitalisation Requirements

At Level 1 the clearing and forwarding staff requirement is between 1-10. The class name for this level is Customs Broking. Clearing and forwarding activities required for this level are limited to framing entries only. Some importers and exporters at this level even frame their own entries. The level of digitalisation is therefore low, and digitalisation requirements for this level is an Entry Framing App and a stand-alone accounting system can be sufficient. Even with a low level of digitalisation requirements, the level of digitalisation will still have an impact on the workforce as well as productivity and will be discussed in the next segment.

4.3.2.2 Clearing and Forwarding Agent Level 2 Classification and Digitalisation Requirements

Classification of level 2 clearing and forwarding agent have a staff requirement between 10-20. This level class name is Customs Clearing. Just as in level 1, its main activity is to frame entries only, while in level 1 some importers and exporters can frame their own entries, in level 2, clearing and forwarding agents use the Importers and Exporters code to frame Bill of Entries. The level of digitalisation is still low and for digitalisation requirements, an Entry framing App and a stand-alone Accounting System can be used. Just like in level one above, there is an impact on the workforce which will be discussed in detail in the next segments.

4.3.2.3 Clearing and Forwarding Agent Level 3 Classification and Digitalisation Requirements

Classification level 3 has more staff requirements of between 20-30. Here the functions have been expanded and the class name is Customs Clearing and Landside. The clearing and forwarding agent frames Entries, calculates cargo dues and delivers the cargo to Customs. Unlike the previous two levels, here the clearing and forwarding clears as an agent. Though its functions are more elaborate with more staff requirements, they are still classified under low level of digitalisation and can still operate with just an Entry Framing App and a stand-alone Accounting System. Again, as staff numbers increase, the level of digitalisation also has an increased impact on workforce. This will also be discussed in the next segment.

4.3.2.4 **Clearing and Forwarding Agent Level 4 Classification and Digitalisation Requirements**

The required staff complements under level four classification are between 30-50. The class name is Customs Clearing, Landside and Forwarding. The responsibilities of these agents are significantly more as they are responsible for framing entries as well as cargo dues and they are responsible for local and international transportation. Clearing and forwarding agents at this level, therefore, move goods internationally, clear them through customs and deliver the goods to their clients. The level of digitalisation is classified as medium and digitalisation requirements includes more integrations with their international partners to enable the seamless transfer of data across functions and countries. Tracking systems are a requirement at this level while internationally compatible systems like Cargo Wise becomes the standard level of digitalisation required. At this level, to process the movements of goods effectively and efficiently both locally and internationally while maintaining its customers' expectations, high level of digitalisation is required. Like the previous stages, there is a further increased impact on workforce which will be discussed in the next segment.

4.3.2.5 **Clearing and Forwarding Agent Level 5 Classification and Digitalisation Requirements**

Classification level 5 operate with links to multinational companies. This requires a staff complement of 50-75. In terms of its class name and key functions, it is Customs Clearing, Landside, Forwarding, Purchasing and Financing. It, therefore, moves goods internationally, clears, delivers and finances. Its activities are complex and at a larger scale and, thus its digitalisation level is classified as high. Like level 4 above, more integration is required to enable the seamless transfer of data across countries and functions. It is capital intensive. Clearing and forwarding agents provide financing and purchase for its clients which means that it provides a complete solution to its clients. Digitalised purchasing and credit management systems must be in place to perform such functions, not only at the local level but also internationally. The complexity in its operations and the sheer size of the business means that digitalisation has a much bigger impact on labour. This will be discussed in the next segment.

4.3.2.6 Clearing and Forwarding Agent Level 6 Classification and Digitalisation Requirements

Classification level 6 required a staff complements between 75 -100. With an increase in activities, the class name and responsibilities include Customs Clearing, Landside, Forwarding, Purchasing, Financing, Storage, Distribution. Like level 5 above, Level 5 agents have many operations which are in sync with the complex supply and logistics chain. Such an operation requires a high level of digital services to be implemented to be successful. Goods are moved internationally, cleared through customs, financed, stored and distributed. Clearing and forwarding agents at this level also own and operate warehouses as part of their operations and also have local vehicle fleets for land transportation to final distribution both locally and overseas. The objective is to provide a complete solution for its clients from the manufacturing country to the import country to the client or consumer's premises. Apart from Clearing and Forwarding and framing of entries systems, there is a need for a system that also caters for accounting and financing, purchasing, warehousing and distribution. More integration is required with these systems to enable the seamless transfer of data across countries and functions. Digitalisation at this level, because of its complexity, would have impact on workforce at different levels. Impact on workforce will be discussed in the next segment.

4.3.2.7 Clearing and Forwarding Agent Level 7 Classification and Digitalisation Requirements

Classification level 7 is considered as the top level requiring a workforce of more than 100. This level obviously has the most activities and is more complex. In terms of its activities, it is responsible for customs clearing, landside, forwarding, purchasing, financing, storage, distribution and shipping. As a complete solution, its moves goods internationally, finances, purchases, clears, stores, distributes and performs the shipping functions as well. This means, the clearing and forwarding agent can either own vessels, charter them or simply ship the goods and pay freight. This is all links together to provide a seamless supply chain and logistics solutions to the clients. This gives the clients comfort, and the clearing and forwarding agent can provide a service that is more predictable as it controls all the aspects of the movement of the goods from the manufacturer in one country to the consumer in another country. For this to happen, the clearing and forwarding agent requires a very high level of digitalisation with sophisticated integration but must be agile enough to seamlessly enable the transfer of data across and countries and functions. Because of the global nature of its operations, it presents a fragile impact on workforce with this high level of digitalisation should a country not have the necessary skills and infrastructure to support the advanced digitalised systems in place. Impact on workforce will be discuss in the next section.

In conclusion, the essence of classifying and looking at the different levels of required digitalisation, is because it presents different impacts on labour and productivity.

4.3.3 Digitalisation (2005-2010) Impact on the Workforce in Clearing and Forwarding

According to data collected through interviews, during this timeframe digitalisation had a definite impact on the workforce, though the degree of the impact was not uniform across different clearing and forwarding agency sizes. While sixty percent of persons interviewed indicated a particular trend of the impact on the workforce during this timeframe (discussed below), forty percent did not confirm having witnessed the same where they worked. Further probing indicated the reasons for these variations: the impact was related to the size of the clearing and forwarding agent that our interviewee was working with at the time of the change.

Interviewed persons who worked with clearing and forwarding agents which fell in level 4 as per table 1 above, described a negative impact on workforce. Fewer entry clerks were required as they became more proficient to frame entries electronically. The amount of work that was previously performed by ten employees could easily be performed by one person, meaning that with digitalisation, one person could easily replace ten people. Older workers, between the ages of 50 and 60, who were unwilling to begin acquiring new computer skills either chose to retire early or were laid off by the company. The company then hired young entry clerks who had an affinity with the new technology to take their place. Interviewee 9, in his words stated “a lot of older people in their late 50s took early retirements when digitalisation was being introduced with the advent of computers. They were in the stage in their lives where they were not keen to learn how to use computers”. To quantify the impact, Interviewee 9, indicated that about 15 percent of the staff were retrenched at this time or went on early retirement. IT departments were established in these companies and the IT staff numbers doubled within this time, and they were more expensive. Management thought IT could take over completely as the drive was to embrace digitalisation to streamline and integrate seamlessly with international clients and benefit from the increase in the volume of business.

There were initial problems with tariff values and origin, since not all products requiring clearance had product literature in the database provided by these new systems. This situation was exacerbated by the fact that, at this time, the world was going through rapid globalisation and there was a massive shift in production to the East. There were new products being imported every day

that were not often found in the list on system database. This posed a real challenge to the new entry clerks who are 100 percent dependent on the system and did not have the experience in manual framing of entry, product valuations, tariffing and well as determining product origin that the older employees had had. Interviewee 1 summarised this as follows “initially, management thought embracing digitalisation was going to be cost effective, however, it did not prove to be so in the early stages.

A bloated IT department came at a hefty cost compared to the reduced number in Entry Clerk employees. The situation was exacerbated by the fact that the less experienced Entry Clerks with newly acquired IT skills started having problems with tariff and Framing Entry. The companies also had to pay more money for early retirement and retrenchment packages”. From the interviews, a further probe into the demographics of those employees who were retrenched or took the option of early retirements, revealed that, apart from age, 80 % were white and 20 % were Indians and 98 % were males. This painted a picture of how racially skewed and male dominated the industry was in the past. This observation was a recurrent theme in the interviews which form the basis for the type of impact digitalisation is having on workforce which will be discussed in the next segment.

The other view from 40% of the interviews, represent the view of those who worked with clearing and forwarding agencies level 1-3. This group did not witness retrenchment or early retirement to the same extent as the first observation with the 60% of the group interviewed. According to Interviewee 2, one of the persons interviewed in this group, she indicated “digitalisation was resisted, it was not welcomed at the beginning. We were dealing with largely old people with an old mindset. The challenge was not only Framing Entries on the computer, but the ability to start learning the fundamentals of using a computer. Eventually, with people who could offer clear streamline training, it was easily accepted. There was no retrenchments or early retirement. There was however, one old person who could not transition to the computerised system and resisted training. Because of his knowledge and experience in tariff determination, customs valuation, and processing, he was kept on to lead from a position of experience rather operational process”. The rest of the 40% interviewees agreed with this position as described by Interviewee 2. This meant that the transition was better managed when it came to clearing and forwarding agencies classified from level 1-3.

This situation could have possibly been due to a smaller staff complement and a lower digitalisation requirement as was indicated in table1 above. With small size clearing and forwarding agencies, retrenching someone with critical skills could prove damaging for the company. With smaller agencies, staff have a closer relationship with the owners and are often treated like family, and in

situations like this, retrenchment is usually the last resort. This can be confirmed from the interviews as staff were trained on the new systems and even those that resisted and refused to be trained were still offered another position in the company as indicated in the case mentioned by Interviewee 2.

In conclusion, the impact of digitalisation on the workforce in this timeframe was not the same across the board. The position taken by each company to deal with the transition was always focused on how it would benefit the company. The high level (level 4-7) classified clearing and forwarding agencies saw digitalisation as cost effective and a way to tap into the international markets. They were more radical in their management of the transitions, not necessarily because they had a choice. However, this sometimes came at a cost to the companies in the short run. The smaller size companies (classified level 1-3) were more tactical in their approach and managed to evade retrenchments or early retirement which would have affected them negatively should they have gone that route. Irrespective of how it was handled, digitalisation within this timeframe had an impact on workforce, as well as on productivity which will be discussed below under impact on productivity.

4.3.4 Digitalisation (2005-2010) Impact on productivity in Clearing and Forwarding.

As a transition phase, comments on the impact of digitalisation on productivity was rather timid and were mostly discussed as in current digitalisation which still need to be examined in the next segments. This was particular so as most respondents were interested with the two extremes experienced, the inception and present digitalisation. Initially, productivity slowed down as companies were struggling to switch from manual to the digitalisation. That did not take long as volumes of imports and export were also increasing at that time. Productivity soon increased when staff were able use the new technology to Frame Entry and clear goods fasters. As already mentioned under digitalisation's impact on workforce, one person was able to replace or do the work of ten people which signified that they were more productive in this timeframe. Unlike the period of 2000-2005, the impact of digitalisation in this period (2005-2010) was quite significant and it has continued in that trajectory to the present.

The impact on productivity would be better discussed in the next segment.

4.4 Digitalisation (2010-to present) -Current Digitalisation in Clearing and Forwarding.

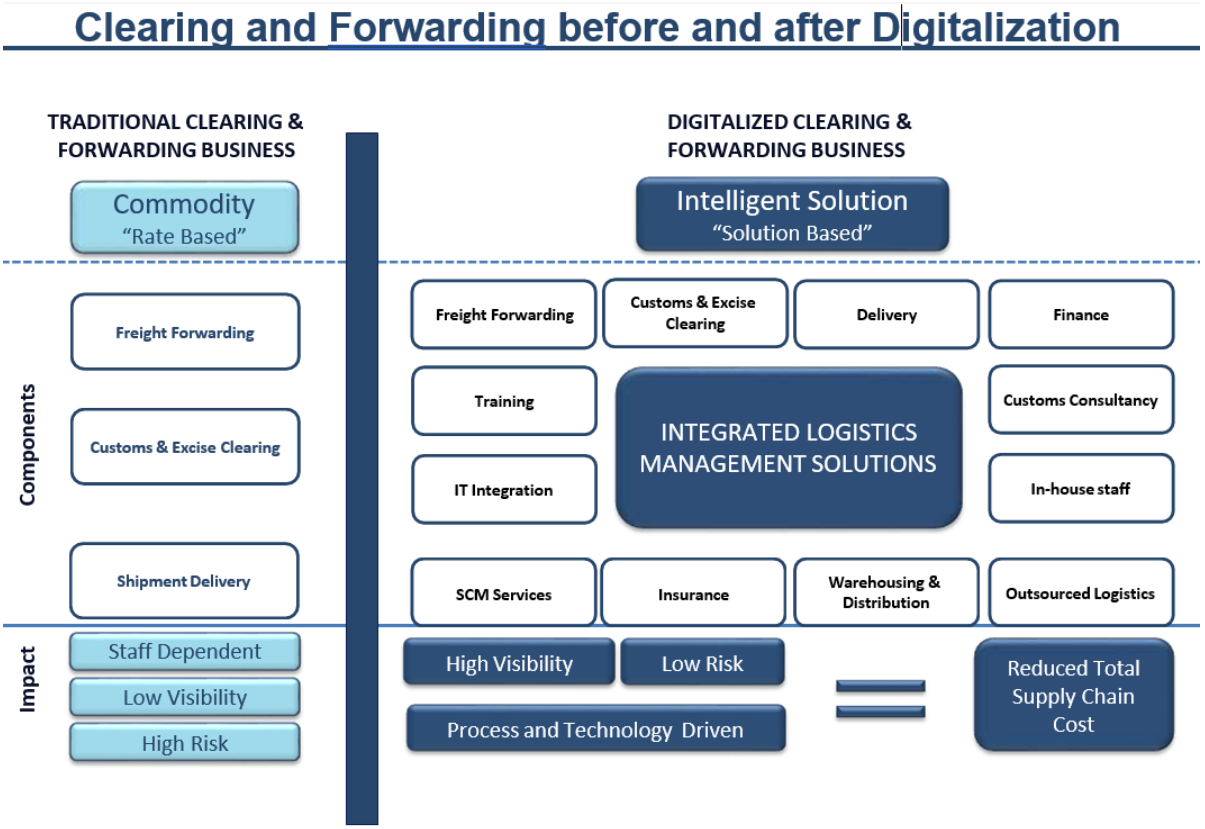
This section will deal with current digitalisation on clearing and forwarding. It will start by looking at the characteristics of the current digitalisation in clearing and forwarding landscape and proceed to examining its impact on the workforce and productivity.

4.4.1 Characteristics of Digitalisation (2010-Present, Current Digitalisation in Clearing and Forwarding)

This phase has almost eclipsed the two phases discussed earlier, especially the first phase (period 2000-2005) when things were still almost exclusively done manually. Then there was the introduction of the EDI, and the use of different software packages such as Shipshape, Cargo Wise and other which have integrated well with the SARS. system This has streamlined processes, resulting in a paperless submission of BoE which has characterised this timeframe under consideration. From the interviews conducted, 60% indicated that Cargo-Wise was their preferred software package, 20% chose Shipshape while the remaining 20% were using their own inhouse software packages. One of the interviewees described current digitalisation in clearing and forwarding agencies as characterised by “software packages such as Cargo Wise, Shipshape, other in-house systems, Apps, Trackers, seamless integration systems, from invoice to processing of entries to payments”. Some of the value-added services that distinguished these systems were automation in the systems, auto-check fields, and seamless, simple processing with correctness. These qualities enable clearing and forwarding agencies to process the work more quickly, but they are also necessary because their clients are relatively young and of the digital generation, which demands digital services. As a result, the systems are created to satisfy the requirements of their users. They are free to access the systems' databases whenever it is convenient for them. Their shipment status reports are available for them to track, view, and print. Web trackers, track and trace features, and clients who provide information can also request online quotations. Additionally, they can upload all the necessary documents for their shipment online. The systems give them more control in terms of internal and external sharing of information for seamless productivity.

Figure 8 below demonstrates the stark contrast between the prior Clearing and Forwarding features and the systems that are currently headed into the future.

Figure 8: Clearing and Forwarding before and after Digitalisation



Source: (Dwyer, 2022)

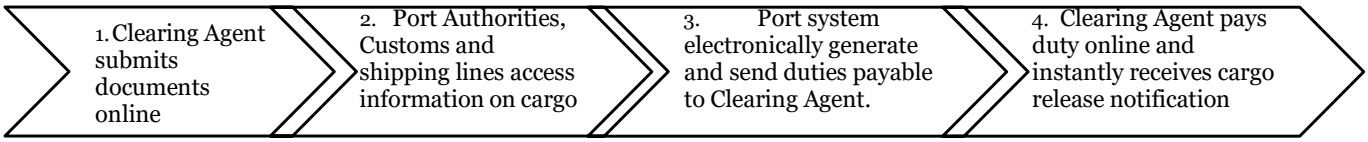
Figure 8 above illustrates a clear distinction between traditional Clearing and Forwarding and digitalised Clearing and Forwarding. The traditional clearing and forwarding agencies have been well described already, however, figure 8 summarised the sector in three key words. It is highly dependent on staff, which means it is labour intensive and is also commodity rate based. Since the system is staff dependent, there is low visibility. It is difficult to manually process and check for accuracy irrespective of the number people involved, consequently, there is low productivity. The fact that its inherently characterised by low visibility, results in high risk. With high risk, the appetite to trade is significantly diminished. Importers and exporters will be more willing to invest in circumstances where the risk is low. Clearing and forwarding agencies play an important part in the supply chain, and their inability to process cargo faster with low risk not only affects the importers and exporters, but also the country's macro and micro economic objectives. This could be the reason why SARS and TNPA which are both an extended part of the government, were the institutions responsible for driving some of the interventions required for the implementation of digitalisation in the clearing and forwarding sector. The triggers for digitalisation were therefore a

response to the changing world, and external and internal pressure which had an impact on workforce and the quality of the work required to yield satisfactory productivity.

On the other hand, a digitalised clearing and forwarding business is intelligent solution based. At the centre, is an integrated logistics management solutions where aspects such as training, IT integration, Supply Chain Management (SCM), insurance, warehousing and distribution, outsourced logistics, in-house staff, customs consultancy, finance delivery, customs and excise clearing, and freight forwarding are all integrated and working together. This integration has resulted in high visibility, low risk, and less dependent on labour as it is process and technology driven. As a result, there is a reduction in total supply chain cost compared to the traditional system. It characteristics and benefits are embedded in it operational application which include automation, data driven insights, increased efficiency, improved accessibility, enhanced data management, streamline communication and the potential for further innovation and growth. This model of clearing and forwarding represents the present and the future. It will undoubtedly, have an impact on the workforce, unfortunately, it might lead to retrenchment if workforce skills are not upskills to keep up with the demand.

Figure 9 below briefly explains the post-digitalisation import clearance process.

Figure 9: Post-Digitalisation Import Clearance Process



Source: (Amankwah and Effah, 2018:5)

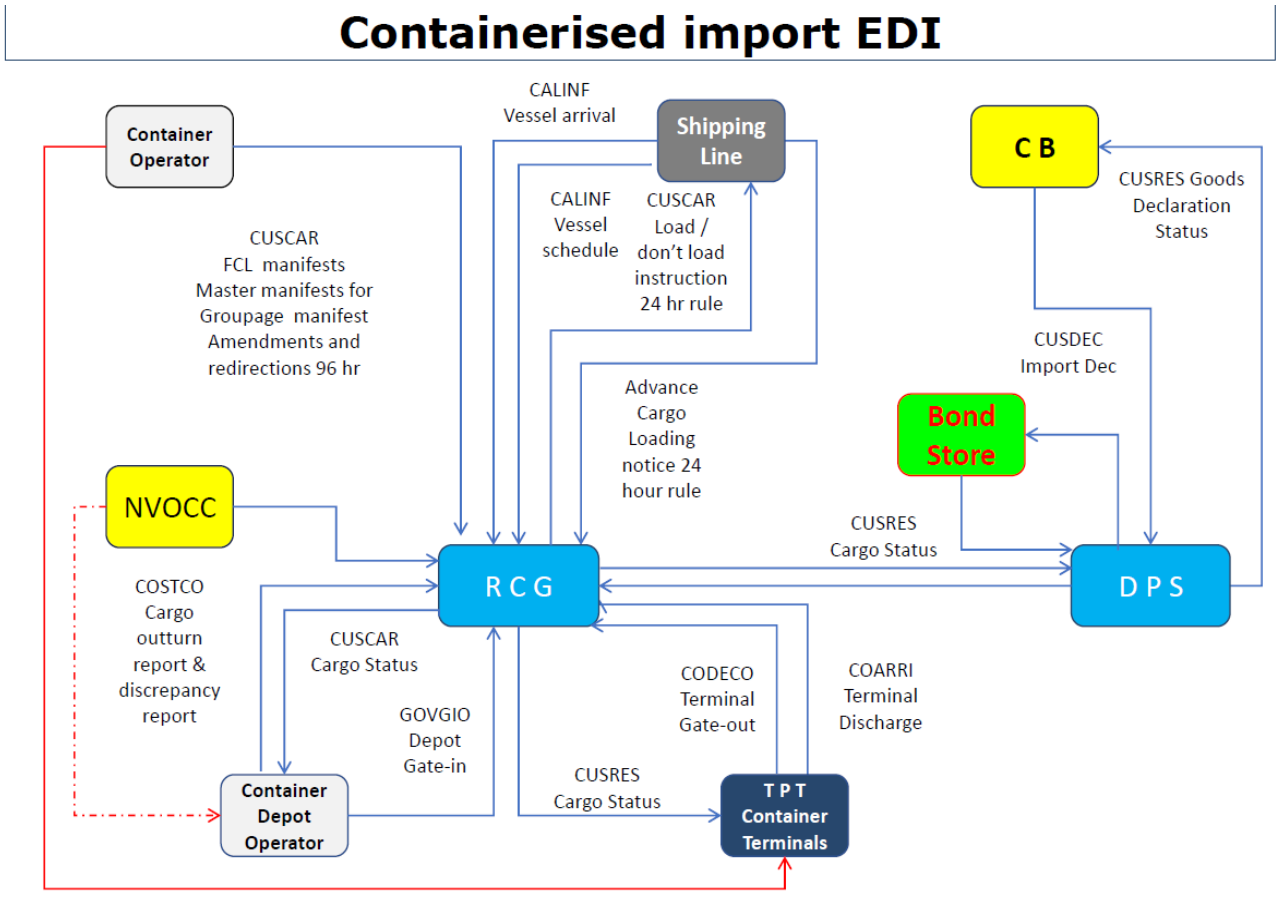
The post-digitalisation import clearance process starts with the clearing agent submitting documents online (BoE). In the second step, port authorities, customs and shipping lines access this information on cargo instantaneously as soon as it has been uploaded. For the 3rd step, port systems and customs (SARS) electronically generate and send duties payable to the clearing agent. At step 4, the clearing agent pays the duty online and instantly receives cargo release notification. This quick and efficient system saves time as well as the costs involved in physically sending the documents between offices as was the case pre-digitalisation. It is a more productive way of working. All parties involved are satisfied with the process. The clearing agent wants to clear cargo

quicker and more cost effectively, the Port Authorities do not want the cargo spending more time in the port than it is requires because the faster the cargo passes through the port, the more ships the port handles and the better return on investment they earn. Customs on the other hand, are more likely to collect more revenue in taxes with the digital system than the manual systems. For the clients, the quicker the cargo is cleared through Customs, the shorter the timeframe his capital is tied up in goods. The post-digitalisation import clearance process illustrated in figure 9 from research conducted in Ghana by Amankwah and Effah, (2018), mirrors the same characteristics in South Africa customs clearing and forwarding processes post-digitalisation. As mentioned above, the eminent characteristics of digitalisation in this present era, has, to a large extent, been driven by the controller of Customs and in this context, reference is made to SARS. This is illustrated below in figure 10.

4.4.2 SARS and Digitalisation (2010-Present, Current Digitalisation in Clearing and Forwarding)

SARS has been instrumental in driving some of the digitalisation targets in Clearing and Forwarding agencies. This has been implemented through the issuance of mandatory directives for clearing and forwarding agencies with respect to declaration and clearance of goods through the mandatory use of EDI processes. According to SARS, (2009), "In terms of Government Notice R814 dated 31 July 2009, SARS is legally mandated to enforce the use of EDI for the submission of certain cargo and goods declarations and reports". This system is illustrated in figure 10 below.

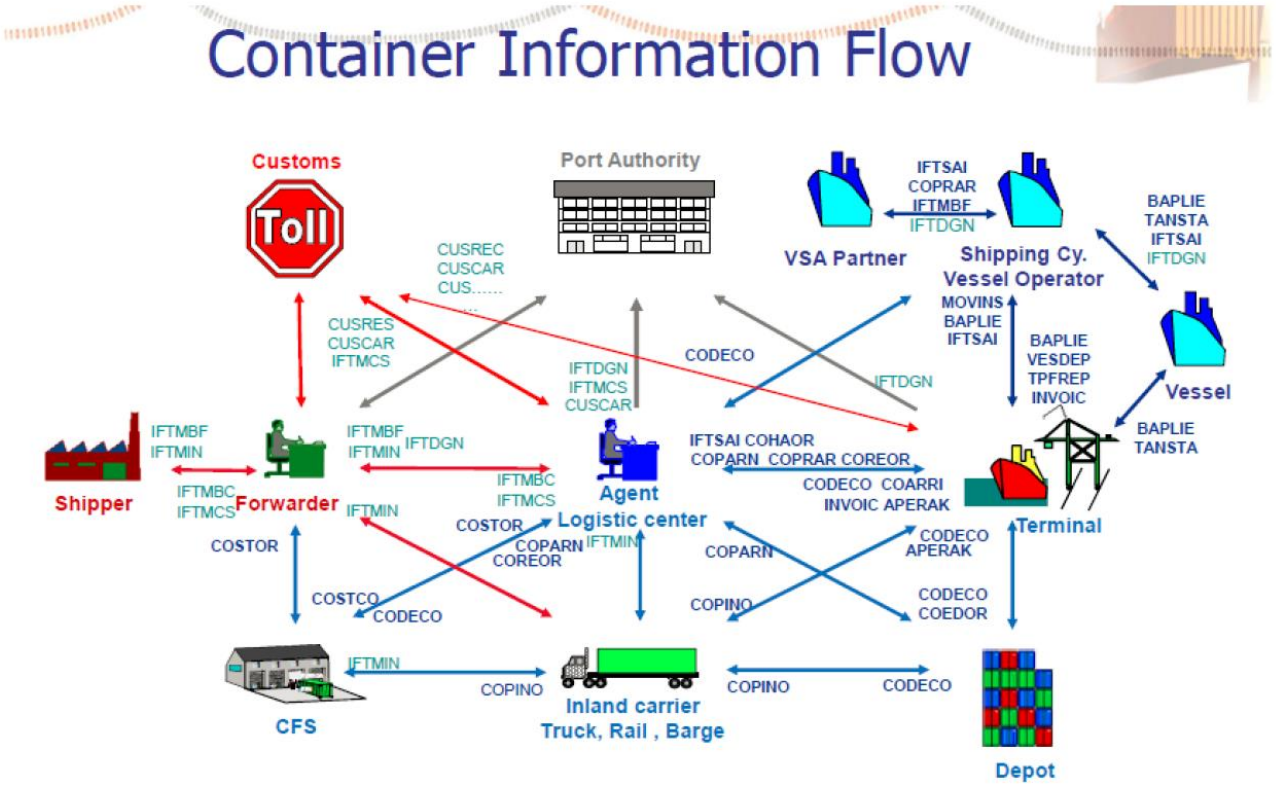
Figure 10: SARS Control of its Clients through EDI for Containerised Import



Source: (L. Dwyer, 2022)

In figure 10 above, all the parties involved in the movement of the goods are mandated to complete declarations through EDI by SARS. The information is converged at the Reporting of Conveyances and Goods (RCCG), which is then sent to Declaration Processing System (DPS). Customs Broker/Clearing and Forwarding (CB), will then process the Customs Declaration for the imported goods (CUSDEC). All the communication and the submission of documentation is done through EDI as mandated by SARS. This further illustrates the development of and the reliance on digitalisation for Customs Clearing and Forwarding Agents in this present dispensation. Figure 11 below from Ship Message Design Group (SMDG), further elaborates on the role of digitalisation for Customs Clearing and Forwarding.

Figure 11:Digitalisation and container flow information



Source: (SMDG, 2015)

Figure 11 above, shows the important role digitalisation is playing in managing the flow of information for the movement of cargo. The clearing and forwarding agent is strategically located in this logistics chain and needs to communicate with all parties through EDI for the clearance of goods. Coded, standardised messages are used for all parties in the chain for ease of understanding. This further confirms the evidence gathered from the interviewees which points to the fact that increased globalisation and standardisation in recent years have left clearing and forwarding agencies in South Africa no choice but to join the digitalisation waves to better serve their customers. The nature of the impact on workforce within the timeframe under consideration will be explored below in the next section.

4.4.3 Digitalisation (2010-Present, Current Digitalisation) Impact on the Workforce in Clearing and Forwarding

According to data collected through interviews, unlike the uneven agreement on the impact of digitalisation of clearing and forwarding agencies on the workforce in the previous segment timeframe, there was an agreement on the impact on workforce on current digitalisation on workforce by all the interviewees. According to interviewee 2, the impact can be better understood through the work that was being completed during the early inception of digitalisation, and the work that is being done which shows the direct impact of digitalisation on business size and workforce requirements. In her words, she stated "if we had the same number of clients and work, we would have reduced the number of staff due to digitalisation. However, the system has grown so fast, and have been able to offer us so much more, speeding up processes. We are offering faster quality services, which means that we could go out there and look for more clients. Getting more customers has become easier because the digitalised systems has given us more offerings than what used to exist before digitalisation." These clearing and forwarding companies have capitalised on these systems and have been able to acquire more clients with the help of digitalisation and consequently, have had to employ more people instead of retrenching staff. She added "our company has grown, and we now have more branches all over the country". This piece of evidence illustrates a positive impact of digitalisation on the clearing and forwarding agencies workforce.

Another interviewee explained the impact he observed as "people often think that the manual systems provided employment because it was labour intensive and required people to make copies and things like that, but the digital systems has allowed businesses to grow and so does the workforce". Explaining further, he stated "if one were to stick to a system that was manual and slow, their growth as a business would've been stunted. Meanwhile, digital systems have allowed for business to expand extremely quickly, which has encouraged employment." Referring to his lived experienced with his present company, he indicated that the company he worked with grew exponentially in the past 15 years after embracing digitalisation. Comparing to the size of the company before digitalisation in term of workforce, it becomes clear that the spinoff of digitalisation is following the trend of a positive impact on the workforce particularly in this segment (timeframe) under consideration.

Similarly, contextualising it, and comparing pre- and post-digitalisation situations, interviewee 5, stated that, "staff complements of 100 in the past doing the same kind of work, have reduced with digitalisation. However, digitalisation has ushered in the ease of global trade, companies go where trade goes." With digitalisation, clearing and forwarding companies are more agile to respond as

their business network expands. This agility according to interviewee 5, means that staff complements in a company's network are either reducing or stagnant because productivity tools are deployed through digitalisation to manage the increased workload. This statement viewed from a single network perspective can be interpreted as digitalisation having a negative impact on workforce. However, what must be noted here is the ability of the digital systems and processes to offer flexible employment for staff in the company by growing networks which in most cases is no longer limited to national boundaries.

Another similar but slightly different observation from data collected was that digitalisation has led to an increase in the volumes of shipments (import and export) to be cleared by clearing and forwarding agencies, and according to Interviewee 6, the increased volume, and the increased in the size of the company have left them with the choice to either train existing staff on the digital platform or recruit more staff with digital skills and knowledge. She further stated that, the problem of skills shortage in the industry, does not give them room to retrench any staff because of digitalisation, they have to rather embark on training and upskilling their staff to keep up with the demand and the pace required for the digital platform.

Agreeing with the other interviewees on the impact of digitalisation on the workforce in the current dispensation, interviewee 7, who has accumulated 39 years' experience in clearing and forwarding, said their strategy has been to keep the old while blending in the youth. She explained that knowledge of tariffing, and product knowledge library is still required to properly frame entries. This is something that the young or new workforce into the industry are still battling to grasp, and the old experience (manual) knowledge is becoming very important, especially in recent years with constant loadshedding. The youth who are mostly digitally skilled to perform their task, find it difficult to perform with unreliable electricity because of their over reliance on technology.

Discussing her experience, interviewee 10 indicated that many young people have been joining the industry not only because the volume of work have increased, but also because the industry has been lacking skills for a very long time. It would appear that digitalisation has not led to retrenchment, instead, it has accelerated or is addressing the problem of skills shortage in the industry. The impact of digitalisation of clearing and forwarding agencies on the workforce has been viewed as positive according to the data collected through interviews. The negative impact identified with digitalisation in this time segment seems to be the over reliance on digital technology by youth at the expense of investing more time in understanding the fundamentals of the clearing and forwarding processes as imbedded in it tariffing, product library knowledge etc.

4.4.4 Digitalisation (2010-Present, Current Digitalisation) Impact on Productivity in Clearing and Forwarding

Productivity within this timeframe witnessed a tremendous increase according to all the interviewees. Interviewee number two stated “digitalisation has been a time and cost saver”. The rest of the interviewees agreed with this statement although there were slight variations in terms of how quickly they were able to process a Bill of Entry and receive feedback. This variation was, however, said to be due to the different software packages that these clearing and forwarding agencies were using to process their Entries such as Computclear, Shipshape, CargoWise etc. Similarly, to qualify the statement on productivity, interviewee 2 indicated that “in the past, to process an Entry it took so long, Entry clerks could only complete 10 entries a day, and today, 40-45 entries are completed a day by a single-entry clerk.” Another positive impact on productivity as highlighted by one of the interviewees, was open and easy communication for internal, inter-branch customs, national and international clients. The aspect of communication was also mentioned by one of the interviewees as being the game changer in increasing productivity. The interviewee stated that, “while it used to take more than two weeks to receive feedback from SARS after a submission of BoE, with digitalisation, an electronic submission of BoE, one can receive feedback within 5-10 minutes”. The rest of the interviewees agreed with these statements. While agreeing with the statement, interviewee number 5 stated “the new systems(digitalisation) eliminate a lot of errors that would occur manually. Pre-populated fields in the systems eliminate double capturing. The same information is shared through integrated upstream and downstream supply chain. The system can warn the user should there be any information that is not compatible being inputted such as vessel voyage number with container numbers, port of departure and shipment etc”. All of this eliminates the time taken for double checking, eliminating mistakes, reworking the documents, which consequently, increases productivity. Refer to appendix 1 for further details on interview coding and analysis.

Data collected from interviews, also indicate that digitalisation has embraced a more racially diverse inclusive workforce as opposed to pre-digitalisation and the era of the National Party. Commenting on this, interviewee 4 indicated that, harnessing a diverse workforce, yielded more productivity because it reflected the diverse clients clearing and forwarding agencies were serving nationally and internationally. A diverse workforce gave clearing and forwarding agencies the flexibility to meet their clients’ needs and thereby provide quality service which in turn led to increased productivity. While this was the common observation among the interviewees,

interviewee 2, highlighted the aspect of racial and gender imbalance as persisting and believed to be slowing down productivity. According to interview 2, if this situation is dealt with, it will open up the industry to tap into diverse skills which can increase productivity. This statement was also confirmed by interviewee 4 who stated that, most of the workforce entry the clearing and forwarding agencies are young black males who often required further upskilling to be productive. Despite this, the overriding response from the interviewees was an overwhelming increase in productivity in the current digitalisation timeframes under consideration.

4.5 Conclusion

Digitalisation in the clearing and forwarding agencies from 2000 to the present could be seen to have been implemented or rather occurred in three distinctive phases with different impact. The early 2000 digitalisation was still characterised by manual processes. As time went on, from 2005 to 2010, digitalisation was more common as were its impacts on both the workforce and productivity. However, it only became more common in the sector from 2010 to present with a more profound impact on workforce and productivity. To understand the impact on workforce and productivity, it was necessary to classify clearing and forwarding agencies into seven levels, each with unique digital requirements. The speed at which digitalisation and digital transformation has been observed, has been triggered by two main factors, the first one being globalisation and the second one being the need to standardise operational processes with the external world. Digitalisation has been achieved through identifying specific targets within a specified timeframe and driven by SARS, TNPA's need for external integration. The impact of digitalisation on both the workforce on productivity has been positive, especially for the period 2010 to the present. The next chapter will give a concise summary of the findings, limitations of the study, make recommendations and finally draw a conclusion.

CHAPTER FIVE - CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter will start by presenting the findings of this research in a concise and summarised manner. It will then proceed to briefly examine how the data has answered the research question, and if the research objectives have been met. It will also look at the benefits of this research to stakeholders and make recommendations to solve the business problem (Clearing and Forwarding) scarcity of skills. The section will then conclude by looking at the limitations of this study as well as recommendations to overcome the limitations while pointing the direction to future research.

5.2 Findings of the research

The first findings of this research were to produce data that the pace at which digitalisation has evolved within the clearing and forwarding sector within three distinctive timeframes. This data was based on interviews with employees of various clearing and forwarding agencies as follows:

i. Digitalisation in the period from 2000 to 2005 evolved at a very slow pace. Most clearing and forwarding procedures were still largely dominated by manual processes. During this timeframe, the implementation of digitalisation in clearing and forwarding agencies led to retrenchment and early retirements particularly within the age cohort of 50 years and above. These employees resisted the changes and opted for early retirement. Data also showed that clearing and forwarding agencies' early implementation challenges within this timeframe led to companies ending up with a bloated IT departments and huge bills in retrenchment packages and early retirements.

ii. Digitalisation in the period from 2005 to 2010 saw a more coordinated, structured and targeted implementation at a much faster pace. It is within this timeframe that major clearing and forwarding agencies' digital transition and transformation started taking place. This was largely triggered by globalisation and a drive to achieve or ensure standardisation in the sector. Research data also indicates that, during this timeframe clearing and forwarding agencies started witnessing an increase in volumes of goods handled due to globalisation as the world started opening up in favour of trade liberalisation rather than restrictive trade policies. The findings here further indicate an increase in productivity while there were no retrenchments or earlier retirements. Instead, the industry was opening up for

more employment.

iii. Digitalisation in the period 2010 to present is the timeframe which the research data presents a finding of a fastest pace of implementation of digital tools. Globalisation and a rise in personal income coupled with the modernisation of customs procedures as spelled out in the Kyoto Declaration which SA was a signatory, ushered in an unprecedented volume of goods which forced SARS and TNPA to issue declarations mandating clearing and forwarding agencies to digitalise certain processes. EDI BoE submission soon became a clearing and forwarding agency compliance requirement. Digitalisation led to an increase in productivity as cost were falling. Clearing and forwarding agencies witnessed growth. While more clearing and forwarding companies were created, the existing ones expanded and opened more branches. Research data also showed that\ the faster pace of digitalisation meant quicker adjustment for clearing and forwarding agencies workforce to adapt. While young new recruits were entering the industry, training was being offered to old staff. Findings here indicate that, while there were some casualties in terms of those staff members who could not adapt easily to the training and had to be retrenched, most of the staff received training and, in some cases, even those who refused to be trained were kept for their deep wealth of experience. Findings also indicate that it was in this timeframe that the industry witnessed a shortage of skills in the sector. This finding was confirmed by the DHA, (2022) critical skills list.

5.3 Findings and Research Question

This research set out to find out the extent and pace at which clearing and forwarding processes have been digitalised since 2000. Findings in 5.2 above indicate that the pace and extent of digitalisation was very slow from 2000-2005, moderate in 2005-2010 but that the pace of digitalisation from 2010 to present (2023) has been rapid and the extent of digitalisation within timeframe has been the definition of its existence and compliance with mandated legislative instruments from SARS.

The second research question looked at what happened to employees who lost their jobs due to digitalisation. Research data did not show anything that happened to those who lost their jobs. Most of them were 50 years and above, they either took early retirement or were retrenched. This created a skills gap that still exists today. While the new entrants to the industry have great digital skills, they still lack some of the fundamental skills and experience required for tariffing, framing entries,

product literature and knowledge. These skills are not readily available in the system in a world that is continuously changing and producing new complex goods.

The third research question looked at alternatives and options available for those who would have been affected by digitalisation. Research data indicated that the only options that were made available to these people was training. Those who were unable to adapt through this training were retrenched.

The last research question investigated the extent to which digitalisation has improved employee productivity. Research data indicates a tremendous improvement in employees' productivity due to digitalisation especially within the timeframe 2010 to present. Employees who could only frame two entries a day pre-digitalisation, are now able to frame more than 10 entries in an hour. See Annex 1.

5.4 Benefits of this Research

The findings of this research will be beneficial to these stakeholders:

i. Clearing and forwarding can still bring back those who were retrenched due to their lack of digital skills. They would be valuable to mentor the young people entering the industry with a lack of experience. This would help bridge the gap of continuous skills scarcity.
ii. Training providers can also benefit by providing training that meets the needs of the industry. A skills audit is required to identify the skills gap before providing appropriate training. Training must be adaptive and dynamic to meet the constant changes in the digital clearing and forwarding job specifications.
iii. The responsible labour representative body could use this research to formulate policies with clear guidelines and options to be implemented by clearing and forwarding agencies should the workforce be affected by digitalisation. This is particularly important as digitalisation is not static.

5.5 Limitations of this study

The sample size of 10 participants could be considered as a limitation in the sense that, had more interviews been conducted, more data would have been collected. This limitation was, however, overcome by selecting only persons who have more than 20 years' experience in the clearing and forwarding agencies. Their in-depth experience meant that the information collected was of a high quality. Snowball purposive sampling technique could also be considered as a limitation compared

to random sampling. This limitation was overcome by the fact that, random sampling would have selected persons with experience less than 20 years which would have posed a limitation with regards to the study timeframe under consideration.

5.6 Recommendations

It is recommended that, clearing and forwarding agencies should not be quick to retrench staff who are not digitally skilled, especially if they have a wealth of knowledge and experience. These staff members should be retained to mentor the new staff who do not have experience. This will help bridge the skills shortage gaps that currently exist in the industry.

The government through the department of Customs (SARS), should identify those who have been negatively affected by digitalisation and harness their skills for other sectors of the economy. This could prove very productive. The resistance to adapt through training in the industry could be because of the pressure exerted by the employer who was trying to train and, at the same time, maintain productivity. If this training is conducted by a different body like a government sponsored department, it might just yield the desired results.

5.7 Future Research

Future research should look at the impact of digitalisation from SARS perspectives. Investigation from that direction would provide clarity and well quantifiable data on the impact of digitalisation. Future study could also look at the role of Customs in the digitalisation of the Customs Clearing and forwarding.

5.8 Conclusion

Research data collected has helped answer the research questions. The literature review hinted at massive job loses as was the case in USA and some European countries who implemented digitalisation, though this was not specifically in the clearing and forwarding sector. Research data identified a loss of jobs at the early inception phase of digitalisation, as the process progressed, clearing and forwarding agencies did not witness the level of job losses that were found in other countries as reviewed in the literature. This situation was particularly so because of the recent history of the country during the National Party era when the workforce was racially, and gender biased. The advent of digitalisation coincides with the political new dispensation presenting a more

diverse dynamic force with a digital appetite. This led to an easy transition and increased productivity as the companies grew. However, the downside to the young labour force has been their lack of fundamental skills and experience to complement their digital skills.

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Appendix 1: Interviews coding and analysis

Data Source			
Interview (code)	3.Vanitha Naidoo (VN operations Manager for Spediag South Africa)	2. Michelle Davides (General Managerfor Aviocean, MD have worked for 3 C&F companies)	1.(LD-Lionel Dywer)-Director, Consultant in C&F (LD have worked for 5 C&F companies)
Interview Time(mins)			60
Experience(years)	35	33	45
C&F Footprint	National and Global	National	National and International
Pre-Digitalization (Early 2000-2005)			
Characteristics	Typing the declarations on the typewritters		Hand frame, floppy disks, stated testing electronic mails.
Impact on Labour	More pressure on employees with no digitalisation	The system was labour intensive. There were 15 data capturers in Durban SARS office.There were also registration officers who received the file and stamped with an assessment date stamp.The file was then taken by a lift system, and received by a clerk who split it in to different colour codings. The data would be captured and then sent to the collection clerk who sort it out and takes to the checking system. The documents then goes to the QA check system. After this, the numbering was then finalised by 8 people. The document was then ready for payment to be processed. The process clearly indicate how labour intensive it was.	The system was labour intensive. There were 15 data capturers in Durban SARS office.There were also registration officers who received the file and stamped with an assessment date stamp.The file was then taken by a lift system, and received by a clerk who split it in to different colour codings. The data would be captured and then sent to the collection clerk who sort it out and takes to the checking system. The documents then goes to the QA check system. After this, the numbering was then finalised by 8 people. The document was then ready for payment to be processed. The process clearly indicate how labour intensive it was.
Impact on Productivity	Productivity was low. Though there were many people involved in the process, and the volumes were small, it still took between one to two weeks to get a release and clear cargo.	Productivity was low. Though there were many people involved in the process, and the volumes were small, it still took between one to two weeks to get a release and clear cargo.	Productivity was low. Though there were many people involved in the process, and the volumes were small, it still took between one to two weeks to get a release and clear cargo.
Comment			
Early Digitalization (Approxiamtely 2005-2010)			
Characteristics			The early Digitalization was characterised with no acess to internet. There was no acess to commonly used search engines such as google, No emails and no apps. Labour intensive. 80-90 hours a week
Impact on Labour	Offer Training to staff members	It was not welcomed at the beginning. We were dealing with largely old people with an old mindset and the transition became a challenge. Dealing with old school who did not have the new mindset. The challenge was not only framing Entries on the computer, but the ability to start learning the fundamentals of using a computer. Eventually, with people who could offer clear streamline training, it was easily accepted. There was no retrenchments or early retirement. There was however, one old person who could not transition to the computerised system and resisted training. Because of his knowledge and experience in tarrif determination, customs valuation and processing, he was kept to lead from a position of experience rather than operational process.	Fewer entry clerks were required as they became more proffiicient to do their work and one person could potentially replace 10 people. The older employees were replaced with young entry clerks from school already with an apetite for new technology. Some employee opted to go on early retirement as they did not want to learn new computer skills. Some were also retrenched. The IT staff doubled, and they were more expensive. They thought IT could take over completely. Started having problems with tarrif values and origin. Every product cannot be captured from a database, sometimes some products are new. New Entry clerk still lacks the experience.
Impact on Productivity			
Comment	Previously only male. Very few females, and white males and Indians males were dorminating tarrifing, calculation of Duties, framing of Entry.		Initially, management thought embracing digitalisation was going to be cost effective, however, it did not proof to be so in the early stages. A bloated IT department came at a hefty cost compared to reduce number in entry clerks employee. The situation was exacerbated for the fact that, the less experienced Entry clerks with newly acquired IT experienced started having problems with tariff and Framing Entry. The companies also had to pay more money for Early retirement and retrenchment packages.
Current-Digitalization(2010 to present)			
Characteristics	Cargo Wise systems, Apps, Trackers, Seamless integration systems, from invoice to processing of entries to payments. Auto check fields etc Customers are also very young and are of the digital age, requiring digital services. Customers can retrieve information from the systems at their own convinience. They are able to track, view and print staus reports for their cargo. Web trackers, track and trace functions, cleints can get online instance quotation, can upload their docs online as well as retriving documents online.Systems gives more control.	Cargo Wise systems, Apps, Trackers, Seamless integration systems, from invoice to processing of entries to payments. Auto check fields etc Customers are also very young and are of the digital age, requiring digital services. Customers can retrieve information from the systems at their own convinience. They are able to track, view and print staus reports for their cargo. Web trackers, track and trace functions, cleints can get online instance quotation, can upload their docs online as well as retriving documents online.Systems gives more control.	Currently making use of Cargowise systems which is integrated
Impact on Labour	Offer Training. We areable to provide more efficient service to our clients. They are able to log on to the systme, track and trace, check on shipment status. Invoices can be generated directly from the systme and email to clients eliminating delays in receiving documentation associated with pre-degitalisation. There is quicker turn around time for clients receiving documentation as well as updates to their shipment status.	If we had the same amount of clients and work, we would have reduced the number of staff because of the digitalization, however, the system was so vast, could offer us so much more and speed up things. We offer faster quality service, which meant that we could go out there an look for more clients. To get more customers has become more easy because the systems has given us more offerings than what used to exist before digitalisation. This is what we did, our business has grown with digitalization and we have had to employ more people instead of retrenching anyone. We now have more branches over the country.	
Impact on Productivity	Computclear moving into CargoWise which is one of the most best system, its upto date, easy to use, compliance with customs. Staff are giving the necessary training which is increasing productivity. One can submission of electronic Entries and have feedback within 5-10 minutes. Whereas, in the past, it will take two days.	Time saver, cost saver, in the past, it could take your 45 minutes. The process on an entry was very long. Entry Clerk could only do 10 Entries a day, and today, 40-45 Entries are done a day. Quality check online. Productivity is a huge. I can't even beigin to thin that this is how shipping use to be. Another positive impact on productivity open communication (internal, inter-branch) with Customs and even with international clients. This has led to quicker turn around time.	
Comment	Digitalisation has taken care of many aspects of the customs processes, how ever tarrifing and classification requires indepth knowledge and that's where the yough with computer savvy skills are lacking.Tecknology cannot replace people who are able to classify a product.Every system can crash and you need to have the skills to classify and calculate your duties. AS a negative point on technology, it has taken away the personal interaction. In the past, we could go to customs, other government departments and engage which let to the problem being understood better and resolved. Not everything can be resolved through technology.	Entry clerks are very quick and savvy with the computer systems like cargoWise and can frame Entries fast, quick and efficient but the challenge is, if you ask them to do the same thing manually, they cannot. They lack the fundamental logic and basic undertanding of the process. This is concerning as there is over reliance on the system could no productivity in the absence of it.	New Entry Clerks over dependence on computers and softwares have rob them of logic in framing entries. IT makes it easier for bad people to do the wrong things because there is less physical interaction with people and cargo and more with electronic paperwork. C&F business is not a very lucretive business, which therefore means that, alot of young people are not well paid and the challenge is they are often tempted, and are more suscipitble to do the wrong things when offered money by the bad guys. This often affects productivity and has a negative impact on productivity.

6. Feroza Ally (FA is an Operations Manager for Synergy Worldwide Logistics Durban Area)	5.Navin Naidoo(NN have worked with two C&F companies. He is currently, Regional Manager at Expeditors)	4. Vishnu Munien (VN have worked for SARS for 15 years before joining C&F for 18 years. Currently, Senior Manager at Turners)
20	15	34
National	National and Global	National
Did not experience a lot around this era	DA500 was a document manually completed for BoE. A carbon copy was used, it was put behind the original document and pressed hard so it can print in 5 or 6 copies. With the introduction of computers, calculation was still manual.	During this time, the BoE was completed on DA500. It was manually completeted in 10 copies using a machine using carbon paper. Revenue stamps was put on the original DA500, when it entered the system.This process could take 2 days on a single file with many lines entries. C&F, who could capture, in the early days, were allowed to capture and transposed on a disk and submit the disk to SARS. While this early transition was taking place, C&F were still manually completing their entries.
NA	When computers were introduced, there was restriction on who could use the computer. Only top Managment were allocated and allowed to use or operate computers. Fax machines were even protected and only one person was allowed to operate the machine. It was not a broadbased approach to use the computer back then, so it was very controlled and only few people were exposed to it. So, it had no impact on workforce initially. It is only when the computers started getting cheap that it started having an effect on labour. It is only when the computers started getting cheap that it started having an effect on labour.Putting in NN's words, "I don't think it was the case that the minute computers came about, people's jobs were threatened, it was more about the learning experience and learning how to use the equipment. As the prices of computers became more competitive, the companies started investing more in computers, but they still kept their workforce because they were very highly intellectual workforce that knew how to do things both manual and on computers. A lot of time emails won't come through and you have to result back to the manual".	The system was labour intensive. There were 15 data capturers in Durban SARS office.There were also registration officers who received the file and stamped with an assessment date stamp. The file was then taken by a lift system, and received by a clerk who split it in to different colour codings. The data would be captured and then sent to the collection clerk who sort it out and takes to the checking system. The documents then goes to the QA check system. After this, the numbering was then finalised by 8 people. The document was then ready for payment to be processed. The process clearly indicate how labour intensive it was.
NA	Productivity at the time was stable in that environment because the volumes were small, and cargo was mostly break bulk. In the days, it used to take 2-3 days for cargo clearance and today it is 5-10 minutes. The rejection rate was a lot higher because people tend to make a lot of mistakes completing or framing entries manually.	Productivity was low. Though there were many people involved in the process, and the volumes were small, it still took between one to two weeks to get a release and clear cargo.
NA	Good relationships were created with different government departments when during physical interaction for document processing. This had a downside to productivity in that time spent waiting for document to be process, the employee could bbe productive elsewhere.	This system was labour intensive, howere, it was also very slow. It was mostly dealing with Breakbulk cargo unlike today were there is a lot of containerized cargo
	Similar to the previous periods.	
	It was not welcomed at the beginning. We were dealing with largely old people with an old mindset and the transition became a challenge. Dealing with old school who did not have the new mindset. The challenge was not only framing Entries on the computer, but the ability to start learning the fundamentals of using a computer. Eventually, with people who could offer clear stramline training, it was easily accepted. There was no retrenchments or early retirement. There was however, one old person who could not transition to the computerised system and resisted training. Because of his knowledge and experience in tarrif determination, customs valuation and processing, he was kept to lead from a position of experience rather than operational process.	It was not welcomed at the beginning. We were dealing with largely old people with an old mindset and the transition became a challenge. Dealing with old school who did not have the new mindset. The challenge was not only framing Entries on the computer, but the ability to start learning the fundamentals of using a computer. Eventually, with people who could offer clear stramline training, it was easily accepted. There was no retrenchments or early retirement. There was however, one old person who could not transition to the computerised system and resisted training. Because of his knowledge and experience in tarrif determination, customs valuation and processing, he was kept to lead from a position of experience rather than operational process.
	Similar to the previous periods.	
		Interviewee was still with SARS at this time. Mr VN discussed the triggers for this stage. It was prompted by Standardization of SAD500, being trigger by the signatory of the KYOTO Convention and also being a member of WCO
Cargo Wise systems, Apps, Trackers, Seamless integration systems, from invoice to processing of entries to payments. Auto check fields etc Customers are also very young and are of the digital age, requiring digital services. Customers can retrieve information from the systems at their own convinience. They are able to track, view and print staus reports for their cargo. Web trackers, track and trace functions, cleints can get online instance quotation, can upload their docs online as well as retriving documents online.Systems gives our clients visibility and more control of their business.		The introduction of EDI and the use of different software packages such as Shipshape, CargoWise etc which integrating well with SARS and streamlining processes resulting in a papaerless submission of BoE has characterissed this time
Time taken to process entries has reduced. We can deal with more shipment easily in a quicker time. Productivity has gone up. We have doubled our productivity, which has increased the number of workforces in the form of employment in our new branches." I haven't witnessed retrenchment due to digitalisation on our company. We provide training to our staff" The increase in volume of work has allow us to maintain our staff and upskill them while employing more staff.	Staff compliments of 100 in the past doing the same kind of work, have definitely reduced with digitalisation. It's a global trade, companies go where trade goes. With digitalisation, companies are more agile as their next work expand. "Compliments of staff per location in your network is not increasing, it is either stagnant or reduce because there are more productivity tools to manage it or through digitalisation, you have a further reach in your network. (With digitalisation, the company will first look at how it can improve the processes and smarter in the more digitalised manner, making use of more digitalised tools like vector, instead of reading the documents, get the computer to do it, instead of uploading information in to and excel spreadsheet, I will just scan it to the right fields in excels. Previously, you would have had many people inputting the data.	In his words, VM, explained the impact he observed as "people often think that the manual system provided employment because it required people to make copies and thinks like that, but the digital systems has allowed people to grow. If you sticked to a system that was slow and manual, your growth as a business(C&F) will be stunted. Looking at it from the perspective that the digital system allow expansion extremely quickly, that in itself will encourage employment. I started with a new company 15 years ago, i can confidently say that, the size of the company has grown exponentially over the past 15 years. The growth has been simply possible because of digitalisation
The new system(digitalisation) eliminate a lot of errors that would occurred manually. Pre-populated filed in the system eliminate double capturing. The same information is shared through integrated upstreams and downstrames . The system can warn the user should there be information that is not compatible being inputed such as vessel voyage number with containers numbers, origine etc. All of this eliminate in checking, reworks, and thus enhances productivity.		From almost two days processing an entry in the early days, and only getting a clearance withing a week, today, the digitalised process has enable BoE to be processed in a very short time, and upon submission, a feedback is received between 5-10 minutes
Similar comments on characteristics and impact on labour and productivity as identified by other interviewees.	Staff that were at risk of retrenchment due to digitalisation, were trained to fit other roles, especially as the company was expanding to other areas. The company has attained it digitalisation making use of internal software systems, and other 3rd party sofwares such as Vectors.	Interview data and field observation indicates digitalisation has embraced a more racially inclusive workforce as opposed to pre digitalisation and the era of the national partiy. Though management and ownership still exhibits glaring racial imbalance. The tendency has been more black race entry the industry and still requiring to accumulate experience.

9. Dudley Groundland (DG is a senior Manager at New Horizone Feright solutions NHFS)	8.Alexander Robertson(AR have worked with many C&F companies for more than 53 years, He is currently consulting)	7. Mala Govender(MG is a senior manager at Experditors, Cape Town Region)
N	S	W
National	National	National and Global
All C&F had boxes with customs in which they had to come check if their submission (BoE) has been finalised. At this time, there was also the use of a disks to submit entries.	Before Digitalisation, BOE were manually written, put in to a copy machine, not a photocopy machine. It was a mnual machine with ink. The handle will be turned and print the number of pages needed.	
A lot of older people in their late 50s took early retirements when digitalisation was being introduced with the advent of comouters. There were in the stage of their lives where they were not very keen to learn how to use comouters.Mr DG indicated about 15% of staff would've been retrenched at this time or went on early retirement.	The system was labour intensive. There were 15 data capturers in Durban SARS office.There were also registration officers who received the file and stamped with an assessment date stamp.The file was then taken by a lift system, and received by a clerk who split it in to different colour codings. The data would be captured and then sent to the collection clerk who sort it out and takes to the checking system. The documents then goes to the QA check system. After this, the numbering was then finalised by 8 people. The document was then ready for payment to be processed. The process clearly indicate how labour intensive it was.	
Since BoE was handwritting and manually printed in 6 copies, it took longer to process a BoE and consequently, productivity was low.	Productivity was low. Though there were many people involved in the process, and the volumes were small, it still took between one to two weeks to get a release and clear cargo.	Productivity was low. Though there were many people involved in the process, and the volumes were small, it still took between one to two weeks to get a release and clear cargo.
In the early 200, C&F were most whites with a few Indians and it was male dominated		
	It was not welcomed at the beginning. We were dealing with largely old people with an old mindset and the transition became a challenge. Dealing with old school who did not have the new mindset. The challenge was not only framing Entries on the computer, but the ability to start learning the fundamentals of using a computer. Eventually, with people who could offer clear stramline training, it was easily accepted. There was no retrenchments or early retirement. There was however, one old person who could not transition to the computerised system and resisted training. Because of his knowledge and experience in tarrif determination, customs valuation and processing, he was kept to lead from a position of experience rather than operational process.	MG" I did not notice an retrenchment. There was training and staff were very willing to learn
		Productivity slow down due to the challenges of switcing to new systems. Different systems withing different companies required more training making it difficult to switch from one company to another.
		Earliy Digitalisation was difficult to accept. MG indicate she still work with some manual on the side. "Its been difficult to switch but the changed was mandatory".
Cargo Wise systems, Apps, Trackers, Seamless integration systems, from invoice to processing of entries to payments. Auto check fields etc Customers are also very young and are of the digital age, requiring digital services. Customers can retrieve information from the systems at their own convinience. They are able to track, view and print staus reports for their cargo. Web trackers, track and trace functions, cleints can get online instance quotation, can upload their docs online as well as retriving documents online.Systems gives our clients visibility and more control of their business.	The same characteristics above	Cargo Wise systems, Apps, Trackers, Seamless integration systems, from invoice to processing of entries to payments. Auto check fields etc Customers are also very young and are of the digital age, requiring digital services. Customers can retrieve information from the systems at their own convinience. They are able to track, view and print staus reports for their cargo. Web trackers, track and trace functions, cleints can get online instance quotation, can upload their docs online as well as retriving documents online.Systems gives our clients visibility and more control of their business.
The same impact as per previous interviewees	The same impact as per previous interviewees	There has been need to keep the old while blending in the yougth. Tariff product knowledge library and coding is still required to properly framed entries, especially when there is outages which is a big problem to digitalisation. This is particularly challenging if staff are only knowledgeable on the systems and are working remotely. This knowledge is still primarily held by the old schools. Many youth has been joining the industry not only because the volume of work have increased, but also because the industry has been lacking skills for a very long time. So digitalisation has not let to retrenchment, instead, it has accelerated or is addressing the problem of skill shortage.
The same impact as per previous interviewees	The same impact as per previous interviewees	Productivity has increased. BOE can be processed in 30 minutes and withing 5-10 minutes, there is a feedback.
		While indicating that digitalisation have led to employment in the sector, the interviewee also indicated that there is still male dominated while ownership is still mainly in the hands of white and Indians.

10. Moosa Ayoob (MA have been in the industry for 36 years, currently a senior manager at Rayson Shipping)

SK

National

we used a bended machine, put some ink, liquid and print or use carbon paper, pump the liquid on it, use a foot paddle to print. At the time, it was mostly breakbulk. Documents had to be ready two weeks for goods to be cleared. With the introduction of comouters, manual documentations were still accepted. It required SARS manual capturing at SARS again after submission.

The process was labour intensive, requiring a lot of staff to be enaged in manual processeing of documentation. When computers began to emerge, only top management were allowed to use computers.

Manual processing let to a lot of stop orders. This led to reworks and time was significantly wasted in the process. Even when computers were available, only few individuals were allowed to use them, these individuals were also very slow in typing and were only using one finger to type. This did not help productivity as writting was even still faster in some cases. The capturing still requires alot of checkings which alot of time was also wasted.

When the transition happened and staff were required to be trained on these computers, older employees of 50+, decided to go on early retiremens while some were retrenched. " Mr M indicated" I still know of people who lost their jobs because of digitalisation, they could only frame entry manually. Even now, i'm not very savvy with modern technology but i have been kept so i can tranfer knowledge and skills to the young ones we are employing".

Same characteristics

There has been need to keep the old while blending in the yougth. Tariff product knowledge library and coding is still required to properly framed entries, especially when there is outages which is a big problem to digitalisation. This is particularly challenging if staff are only knowledgeable on the systems and are working remotely. This knowledge is still primarily held by the old schools. Many youth has been joining the industry not only because the volume of work have increased, but also because the industry has been lacking skills for a very long time. So digitalisation has not let to retrenchment, instead, it has accelerated or is addressing the problem of skill shortage.

Ther is a need to blend the old generation with the new generation. The young generation are educated, they are learning and they are catching things very fast. If they have the right person, there will be a perfect transition.

Appendix 2: Turnitin

MCMS Dissertation

ORIGINALITY REPORT

9%	8%	2%	4%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	journals.uran.ua Internet Source	1%
2	aisel.aisnet.org Internet Source	1%
3	www3.weforum.org Internet Source	1%
4	www.brookings.edu Internet Source	1%
5	www.researchgate.net Internet Source	<1%
6	www.eajournals.org Internet Source	<1%
7	Submitted to University of KwaZulu-Natal Student Paper	<1%
8	www.nisc.co.za Internet Source	<1%
9	ikesra.kra.go.ke Internet Source	<1%

Appendix 3: Ethical Clearance

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

26 February 2023

Emmanuel Nyouweke Jin (220111497)
School Of Acc Economics & Fin
Howard College

Dear EN Jin,

Protocol reference number: HSSREC/00004876/2022
Project title: The impact of digitalization of clearing and forwarding processes on the workforce.
Degree: Masters

Approval Notification – Expedited Application

This letter serves to notify you that your application received on 11 October 2022 in connection with the above, was reviewed by the Humanities and Social Sciences Research Ethics Committee (HSSREC) and the protocol has been granted **FULL APPROVAL**.

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number. PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

This approval is valid until 26 February 2024.
To ensure uninterrupted approval of this study beyond the approval expiry date, a progress report must be submitted to the Research Office on the appropriate form 2 - 3 months before the expiry date. A close-out report to be submitted when study is finished.

HSSREC is registered with the South African National Health Research Ethics Council (REC-040414-040).

Yours sincerely,

Professor Dipane Hlalele (Chair)

/dd

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

11 April 2023

Emmanuel Nyouweke Jin (220111497)
School Of Acc Economics & Fin
Howard College

Dear EN Jin,

Protocol reference number: HSSREC/00004876/2022
Project title: The impact of digitalization of clearing and forwarding processes on the workforce.
Amended title: The impact of digitalisation of clearing and forwarding processes on the workforce
Degree: Masters

Approval Notification – Amendment Application

This letter serves to notify you that your application and request for an amendment received on 04 April 2023 has now been approved as follows:

- Change in title

Any alterations to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form; Title of the Project, Location of the Study must be reviewed and approved through an amendment /modification prior to its implementation. In case you have further queries, please quote the above reference number.

PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

HSSREC is registered with the South African National Health Research Ethics Council (REC-040414-040).

Best wishes for the successful completion of your research protocol.

Yours faithfully

[redacted]

……
Professor Dipane Hlalele (Chair)

/dd