Exploring the automation of business processes and business successes in accounting firms of South Africa

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DECLARATION

This dissertation, exploring the relationship between the automation of business processes and business successes in accounting firms in South Africa, is submitted for the degree of Master's in Business Administration at the North-West University, North-West Business School. To the best of my knowledge, I, Pagias Vanhuvaone, declare that the entirety of this dissertation is my original work and that I am the sole author, except where guidance was sought from my supervisor. Referenced material made by previous scholars and other practitioners has been acknowledged. I further declare that this dissertation or part thereof has not been presented or submitted for an academic qualification elsewhere.

……
Signature

DEDICATION

To my wife Eveline and our children Takudzwa, Tanaka and Tawananyasha, with love.

PREFACE

The study presented in this dissertation focused on exploring the relationship between the automation of business processes and business successes in accounting firms in South Africa from November 2021 to November 2022.

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The researcher thanks the individuals working for accounting firms in South Africa for participating in the study. The researcher appreciates the participants for taking the time to respond to the questionnaires and availing themselves of the interviews.

Special appreciation also goes to the researcher's wife Eveline and their children Takudzwa, Tanaka and Tawananyasha for their constant support and patience during the study period.

Finally, the researcher wants to honour God, the Almighty, for the strength, wisdom and divine guidance during this study.

ABSTRACT

This study explores the relationship between business process automation and business success in accounting firms in South Africa. In manufacturing industries, business success is related to the extent to which business processes are automated. Automation of business processes in accounting firms has progressed slower than in industries such as manufacturing. Consequently, this leads us to question the nature of the relationship between business process automation and business success among accounting firms. Therefore, this study explores the nature of the relationship between the automation of business processes and business success among accounting firms in South Africa.

The study adopted the mixed-method approach. An explanatory sequential design was used. The study first collected quantitative data and then gathered qualitative data to verify and authenticate the quantitative data. Qualitative data was collected using semi-structured interviews, whilst quantitative data was collected using self-administered questionnaires based on a five-point Likert scale rating. The qualitative data was analysed using the thematic approach, while the quantitative data was analysed using descriptive statistics.

The study revealed several findings from the empirical data. Automation results in efficiency, lower operating costs, higher profits, satisfied clients and an enhanced capacity to service more and more prominent clients. These factors may lead to the success of accounting firms. The study also found that automation can be deployed in business processes like payroll processing, processing and capturing accounting transactions, preparing financial statements and auditing. The study also revealed that employee consultation is needed when introducing automation and that employees need information technology skills to adapt to automated environments. The study found that data security may be compromised in automated environments, and automation may be costly.

The study recommends that accounting firms in South Africa implement automation in their business processes. Automating accounting firms' business processes helps them achieve efficiency, lower operating costs, increase profits, satisfy their clients and enhance their capacity to serve more prominent clients, eventually leading to their success. The study recommends that accounting firms automate payroll processing, processing and capturing accounting transactions, preparing financial statements and auditing. Accounting firms in South Africa are recommended to upskill and reskill their employees with information technology skills to work with automated systems. The study recommends that accounting firms implement cybersecurity measures to safeguard data and information processed by automated systems. Finally, it is recommended that

accounting firms in South Africa should perform a cost-benefit analysis before implementing automated systems to evaluate whether automating business will result in a profit or not.

Key terms: accounting firm, automation, business processes, business success

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CHAPTER 1 INTRODUCTION TO THE STUDY

1.1 Introduction

This study explores the relationship between the automation of business processes and business successes in accounting firms in South Africa. Automation has been mainly deployed in heavy manufacturing industries (Hanley, 2014:401). Thus, automation has not been applied in other sectors like services, as indicated by Kepes (2017:58) who believes that automation in service industries like accounting and auditing has been less implemented. Törnqvist and Forss (2018:4) remark that automation in the accounting sector is relatively minimal as the focus has been on the automation of the accounting divisions of companies, with little focus on the automation of accounting firms. The author's view leads us to believe there is little automation in accounting firms, while automation is better in other companies' accounting functions.

The importance of automation of the business process includes gathering and capturing data speedily and boosting critical data storage (Jurubita, 2017:658). Thus, automation is vital in processing data and its preservation in various organisations, including accounting firms. According to Soni *et al.* (2020), automation saves time and money by automating repetitive tasks and procedures and tasks in manufacturing industries. Automation also leads to operational efficiencies and increased productivity. In the end, this gives an organisation a competitive advantage. The authors' view demonstrates that automation has several benefits to organisations, including accounting firms, as it improves efficiency and provides an entity with a competitive edge. Khakurel *et al.* (2018) explains that automation replaces the unskilled workforce with exponential increases in productivity. Hence, business-process automation has resulted in labour cost savings while increasing productivity in manufacturing industries. Kowalkiewicz *et al.* (2017:52) point out that automation replaces knowledge-intensive tasks. The benefit is freeing humans from performing routine tasks and concentrating on higher-order tasks like decision-making, problem-solving and high-level analysis. The argument leads us to believe that automation takes over repetitive and mundane tasks and frees humans to concentrate on cognitive tasks. Ionescu and Ionescu & Prichici (2013:284-286) summarise the benefits of automation in manufacturing industries as better productivity, cost-effectiveness and relocation of employees to concentrate on business development. Thus, implementing automation has several advantages to manufacturing organisations, resulting in higher profits as productivity increases while costs decrease. Warren *et al.* (2015:402) observe that automated systems can analyse massive data that humans cannot comprehend. The

author adds that automation has an overall effect of increased efficiency in time and costs. Automation also leads to a significant reduction in errors. The authors' view proves that automated systems can easily process big data that humans cannot process without the aid of machines and systems. Automation also reduces costs and time to complete tasks and errors.

In light of the above discussion, this study sought to explore the relationship between the automation of business processes and business successes in accounting firms in South Africa. Therefore, the study commences with an outline of the background of the study in the section below.

1.2 Background of the study

1.2.1 Background of automation

The concepts of automation and mechanised and automated work have been around for decades (Janssen *et al.*, 2019:99). Thus, automation is quite an old phenomenon. According to Billings (1991), quoted in Gawron (2019:1), "Automation is a process that controls a function or task without human intervention." Therefore, automation replaces a human carrying out a task using hardware or software that automatically completes a task. Peruffo *et al.* (2017:1) view automation as "the replacement of (human) labour input by (digitally-enabled) machine input for some types of tasks within production and distribution processes". Therefore, automation attempts to minimise human involvement in completing tasks, especially those manual, repeatable and time-consuming activities that humans normally perform. According to Wajcman (2017:123), the industrial revolution was the precursor to automation. The argument leads us to believe that automation can be traced back to the industrial revolution.

According to Cagle *et al.* (2020:102), automation began in the 18th century when steam power was used to mechanise production. The mechanisation of agriculture production increased production eight-fold. Therefore, automation of production through the deployment of steam engines significantly increased productivity. Cagle (2020:104) further describes the advent of electricity, where assembly lines were used in production as another phase and improvement in automation. The use of electricity and mass production introduced by Henry Ford resulted in significantly faster and lower-cost production. The author's view leads us to believe that automation of production lines through electricity resulted in more efficiency in production and lower cost of production. Cagle (2020:106) reports that the introduction of computers and programmable memory controls in the 20th century resulted in the automation of the entire production process for manufacturing firms with little to no human assistance. The

advancement further improved efficiency and reduced the unit cost of production. Thus, Industry 3.0 led to further efficiency and production cost reduction. The last and most recent phase (Industry 4.0) is the use of information and communication technology in production, which has resulted in smart factories where production systems, components and people communicate using networks. Production is nearly autonomous. Therefore, Industry 4.0 has led to machines needing little human involvement in production while productivity has increased exponentially.

According to Krzywdzinski (2021:4), Ford's automation of metal parts manufacturing began in the 1920s. Car industries started using Numerical control and computer Numerical Control Machines between 1940 and the 1970s. Welding jigs and welding robots were also in use in the factories. Thus, car manufacturers are some of the first implementers of automation. Large presses and press lines replaced most manual works. Thus, the early application of automation was in the motor manufacturing industry. Krzywdzinski (2021:7) says that by 1993, Automobil Production reported that plants at three major automobile manufacturers (Toyota, Mazda and Nissan) had almost wholly automated the production of the bodies of the vehicles. Therefore, motor manufacturers are the early adopters of automation.

Sampson (2021:122) notes several advantages of automation to heavy industries. These include handling unpleasant and dangerous jobs like welding and painting. Automation assists with carrying heavy loads and working in unpleasant temperatures like too hot or too cold. Automation has the further benefit of significantly increasing productivity and reducing the number of workers required for specific tasks. Workers may also perform higher-order roles like supervising the machines instead of executing tasks. It can, therefore, be concluded that automation brought several benefits to the manufacturing industries where productivity has significantly increased, and humans started performing different roles like operating the machines that carry out the tasks rather than doing the actual tasks themselves. Adding to the benefits of automation, Sampson (2021:122) suggests that automation has significantly impacted the industry in recent years. Robotics and other automation permeated manufacturing industries, increasing productivity and decreasing employment. For example, between 2000 and 2010, United States manufacturing employment declined by 5.6 million jobs, with 88% of the decline attributed to productivity improvements primarily due to automation. The argument leads us to believe that automation increased production in manufacturing industries. However, it harmed employment as some workers lost their jobs in countries like the United States of America. It, however, is worth noting what Sampson (2021:122) says regarding the effect of automation on employment. He says consolation comes from the well-known Clark-Fisher hypothesis, which states that with productivity

increases in one economic sector, employment shifts to other sectors of lower productivity (Clark, 1957). For example, when agricultural productivity increased in developed economies, workers shifted to manufacturing jobs. Then, as manufacturing productivity increased due to automation, workers flocked to the service sector. Thus, automation does not always lead to unemployment but may open other opportunities for displaced employees.

Fröhlich *et al.* (2020:725) comment, "Automation is finding its way into many parts of everyday life." Thus, automation is also applicable to other areas besides the production of tangible goods. Sampson (2021:122) explain that automation of services is possible and further notes that automation can substitute human workers with computers in performing manual tasks and transferring humans to non-routine tasks where complex cognitive ability and problem-solving are needed (2020:123). Thus, office work can be mechanised just like other processes in producing physical goods. Sampson (2021:123) adds that automation started with the introduction of typewriters and calculators in the 19th century. Automation then integrated information processing systems to do away with many clerical tasks formerly performed by humans. Automation has also been used to monitor the efficiency of workers. Therefore, there are several areas where automation can be applied in the services sector. According to Sampson (2021:233-234), professionals must focus more on enhancing their unique tasks (the augment strategy). They may, in some cases, be willing to shift to technology-mediated interactions with customers to provide better economies of scale (the centralisation strategy). Thus, automation can free humans to concentrate on cognitive tasks rather than wasting time on routine tasks. Peruffo *et al.* (2017:8) support this when they say future jobs will be a combination of technical tasks and non-routine work where workers are focused more on problem-solving, communication with each other and finding ways to be flexible and adapting to changes. Thus, automation assists in augmenting human effort in the provision of services.

1.2.2 Background of accounting firms and automation in the world

According to Winshuttle (2019:5), automation has helped accounting firms to process creditors, debtors, journal entries, payroll records, employee data management, and inventory management in the Western world, including Europe and America. Thus, automation applies to accounting and related services. According to Rozario *et al.* (2019), professionals in accounting and auditing in the United Kingdom have been introduced to automation and have benefited from various automation tools. Therefore, automation can improve the operations of accounting firms. Rozario *et al.* (2019) add that automation in the accounting and auditing field in the UK has been applied to specific tasks like preparing working papers, testing in auditing, and performing statistical calculations. He further explains that UK auditors achieved efficiency

and effectiveness when they concentrated on higher-risk sections while automated processes performed routine tasks. The submission leads us to believe that automation can improve efficiency in auditing.

According to Frey and Osborne (2017:257), the availability of more computers during the 1990s simplified calculating and writing, reducing the need to type things manually. Thus, automation in accounting firms can be traced to these humble beginnings, like automated calculations. Ryan (2012) observes that the development of software used in accounting around the 1990s in the UK resulted in the increased use of accounting software. Therefore, it can be concluded that the availability of relevant software enables the automation of accounting firms, and it can be traced back to the 90s. Mukhametzyanov *et al.* (2017:1233) mention that the increased use of computer technology in accounting processes started in 2009 in the UK. Thus, computerised automation started at the turn of the millennium. Jurubita (2017:658) remarks that digital solutions were deployable in the 90s around the Western world because of the drop in software prices, online programs, and the necessity of access to information. It can be concluded that automation using software started in the 90s, and the availability and affordability of software accelerated automation. FAR (2016:10) describes automation in three different stages. The first stage supports existing processes where computers assist with daily work. The second stage is when automation takes over many tasks and complements humans' work. The third and final stage is when automation replaces humans completely and takes over the performance of tasks. Thus, entities may need to adopt a stepped approach where automation may be gradually introduced until most business processes are completely automated.

According to Gotthardt *et al.* (2020:90), "the implementation of automation in accounting firms is still in its infancy. Thus, evidence from the literature study shows that automation is not widely used in the accounting firms' space. The authors further explain that accounting firms are still far from utilising the vast opportunities provided by automation". Therefore, automation has not been fully embraced by accounting firms around the world. Nagarajah (2016) concurs with this when they say only 15 per cent of accounting firms consider themselves mature in their use of automation, and only 5 per cent in Artificial Intelligence. Thus, the argument makes us believe that most accounting firms and their business processes are not fully automated. Kepes (2017:58) argues that automation in the service sector, particularly in the accounting industry, is not widespread and is still lacking. The comment proves there is little automation in the services sector, including accounting firms' business operations. Hanley (2014:401) declares that automation has been mainly deployed in the heavy manufacturing industries with less application in service industries. Thus, it can be deduced that the emphasis of automation

has been on manufacturing and processing industries with a little focus on service industries, including accounting firms' operations. Törnqvist and Forss (2018:4) say that "since automation in the accounting sector is a relatively new phenomenon, it is not yet fully discovered". Therefore, accounting firms still need to embrace automation of their business processes as it has not been fully implemented.

According to Gotthardt *et al.* (2020:90), "the implementation of automation in accounting firms is still in its infancy". The authors further explain that accounting firms are still far from utilising the vast opportunities provided by automation. Thus, automation has not been adequately implemented in the business operations of accounting firms. Nagarajah (2016) concurs with this when they say only 15 per cent of accounting firms consider themselves mature in their use of automation, and only 5 per cent in Artificial Intelligence. Therefore, most of the business processes of accounting firms have not been automated. Kepes (2017:58) argues that automation in the service sector, particularly in the accounting industry, is not widespread and is still lacking. The argument leads us to believe that accounting firms have minimal automation.

1.2.3 Background of accounting firms and automation in South Africa

There are broad similarities between accounting firms in South Africa and those in places like the USA, Europe, Australia and Asia. The market is dominated by firms headquartered in Europe (Firer & Swartz, 2007:49). South Africa is a member of the International Federation of Accountants (IFAC) and the International Accounting Standards Board (IASB). This aligns its accounting and auditing standards with international accounting and auditing standards (Firer & Swartz, 2007:50). Therefore, it can be concluded that the UK and other Western countries' accounting firms lead the trend in South African accounting firms. As a result, the challenges faced by UK and European firms are likely to exist in South African firms. It has been discovered that automation is not implemented in the UK and other Western accounting. Therefore, automation should be minimal in South African accounting firms as South African firms take the lead from headquarters. Harber and Marx (2019:3) confirm this when they say there is a highly concentrated market where a few companies dominate the accounting firms' market with the Big 4 accounting firms (KPMG, Deloitte, PWC and Ernst and Young) with a high concentration of supply. The firms are headquartered in the UK. Thus, the leaders in the South African accounting firms' market have links to European accounting firms.

1.3 RESEARCH PROBLEM

According to Gotthardt *et al.* (2020:90), "the implementation of automation in accounting firms is still in its infancy". The authors further explain that accounting firms are still far from utilising the vast opportunities provided by automation. Thus, automation has not been fully deployed in accounting firms, and there are still several untapped benefits. Nagarajah (2016) concurs with this when they say only 15 per cent of accounting firms consider themselves mature in their use of automation, and only 5 per cent in Artificial Intelligence. The argument leads us to believe that most of the business processes of accounting firms have not been automated. Kepes (2017:58) argues that automation in the service sector, particularly in the accounting industry, is not widespread and is still lacking. Therefore, automation has not been adequately deployed in accounting firms. Hanley (2014:401) declares that automation has been mainly deployed in the heavy manufacturing industries with less application in service industries. Therefore, the inference is that accounting firms have not automated most of their business processes and there is little automation in their business processes, as in manufacturing industries.

Automation deployed in other sectors like manufacturing has provided several benefits. Automation saves time and labour (Chan & Vasarhelyi, 2011:155). Automation lowers costs and betters the quality of goods produced. Thus, automation has benefits like saving time and labour costs (Manson *et al.*, 2001:127). Therefore, one can infer that lowering costs and providing better services results in more profits and quick service in accounting firms.

Törnqvist and Forss (2018:4) point out that automation in the accounting sector is a relatively new phenomenon and is yet to be fully deployed. Thus, automation has not been adequately implemented in accounting firms. Kokina and Blanchette (2019:1) note that automation and a virtual digital workforce in accounting have received much attention in the popular press. However, little is known about adopting this disruptive, transformative technology in accounting firms. Therefore, the practical implementation of automation in accounting firms is minimal, and the entities may lose out on the potential benefits of automating business processes. Kepes (2017) argues that accounting automation is becoming a popular topic, but automation in the services sector has not been adequately deployed. Therefore, automation is just being talked about with little practical implementation in accounting firms.

According to Kumar (2018:1), the technological revolution has been in process with the growth of digitalised markets. The course demands many industries to adopt digitalised techniques, to stay competitive and survive this technical shift. The conclusion from the argument is that

automation results in entities gaining a competitive edge, among other benefits. According to KPMG (2017:4), the Auditor is expected to move along technologies and understand what digitisation will bring to businesses. Therefore, automation has potential benefits for accounting firms. KPMG (2017:4) "go on to say that the auditor should apply digital technology in their business and audit processes to keep up with the audit quality, the increasing pressure on audit costs and the requirement of clients to receive value for money. Digitisation provides an opportunity for audit efficiency, quality and added value". Therefore, there are several benefits associated with automation in audit firms, including improving service quality, reducing operating costs and improving efficiency.

According to Rozario *et al.* (2019:4), "The accounting and audit professions have gradually been drawn into the usage of automation and benefited from automation tools." The author explains that "today's audit automation is mainly about isolated audit task automation, for example, digitising working papers and their management using audit software … to perform specific audit testing and using statistics software … to run regressions. Audit effectiveness can be improved by having auditors automate more and spend their efforts on higher risk areas such as evaluating audit test results". The above views of the authors lead us to believe that automation simplifies the audit process in risk assessment, preparation of working papers, audit testing, and routine tasks and leaves the auditor to focus on complicated procedures. According to Kumar (2018:1), "The discovery of digitalisation has transformed the financial industry and how business deals are transacted. Accountants can keep large amounts of data, conduct complicated calculations and manage financial transactions from a computer if they deploy automation in their business processes." Thus, automation is useful in processing big data, which is impossible if left entirely to humans.

As seen above, accounting firms worldwide are not adequately automating their processes. Therefore, accounting firms still rely on manual processes to carry out most of their daily tasks, as confirmed by various authors in the research problem above. The study investigates areas where automation may be deployed in accounting firms and proffer possible benefits that may accrue to accounting firms due to automation. As South Africa is part of the larger world, with most top accounting firms being part of the global industry, one can infer that automation is still lacking in South African accounting firms.

Weber (2010) talks about the context-dependence of social phenomena. The Webber theory alludes to the fact that the manifestation of social phenomena depends on a particular context. Specific circumstances in a specific setting dictate how something should be perceived.

The social setting of South Africa is different from other settings around the world. The South African landscape has rules and legislation governing accounting firms' operations, like the Auditing Profession Act 26 of 2005. Therefore, the study focuses on South African accounting firms that manifest uniquely in the context of South Africa.

Therefore, it is apparent from the preceding discussion that automation has generally not been fully implemented in accounting firms. Consequently, it can be inferred that automation implementation in accounting firms in South Africa is currently not widespread and needs to be studied further. Therefore, one must stitch together what has been discovered in automation to understand the possible impacts of automation on accounting firms. There is a problem and a research gap that needs to be solved by undertaking this study.

1.4 RESEARCH OBJECTIVES

1.4.1 Primary objective

The primary objective is to explore the relationship between business-process automation and business successes in accounting firms in South Africa.

1.4.2 Secondary objectives

Secondary objectives are:

- To investigate the business processes where accounting firms may deploy automation.
- To explore the benefits accruing to accounting firms by automating business processes.
- To assess the attitude of accounting firms' employees towards implementing automation.
- To investigate if automation of business processes and business success improve metrics like productivity, efficiency, service offering and revenue; and
- To explore the drawbacks of automation in accounting firms.

1.5 RESEARCH QUESTIONS

Primary research question

What is the relationship between the automation of business processes and business successes in accounting firms in South Africa?

Secondary research questions

- Which business processes can the accounting firms deploy automation in?

- What benefits can accrue to accounting firms by automating business processes?
- What is the attitude of the accounting firms' employees towards automation?
- Can automation of business processes of accounting firms improve metrics like productivity, efficiency, service offering and revenue?
- What are the disadvantages of automation for accounting firms?

1.6 IMPORTANCE AND BENEFITS OF THE STUDY

- Contribution to literature – the research adds to the knowledge about the automation of accounting firms' business processes in South Africa. The study explored the automation of business processes and business successes in accounting firms in South Africa. The success factors include productivity, efficiency, the breadth of service offerings, an increase in revenue and others. As the problem statement explains, the study was conducted in a relatively new field that previous research has neglected. Research on the effects of automation of business processes is scanty. This research, therefore, sheds more light on this field. The study's results may also assist in compiling a manual detailing the various business processes that accounting firms may automate, which explains the benefits of such disruption.
- Contribution to practice – at the end of the study, the study came up with areas where automation can be deployed in the business processes of accounting firms, together with the benefits realised from their implementation. Accounting firms may use this list to see the areas they can automate to realise the advantages of automation.
- Contribution to policy – the study looked at the effect of automation at a social level regarding its impact on employment and investigated how its negative result may be reduced.

1.7 DELIMITATIONS

The field of the study is accounting focusing on the Independent Regulatory Board for Auditors (IRBA)-registered accounting firms in South Africa. The IRBA is a statutory board in South Africa mandated to govern the operations of the auditing/accounting firms in South Africa. According to the IRBA website, the IRBA develops and maintains auditing and ethics standards for South African accounting firms. The IRBA also registers South African accounting firms and monitors their adherence to professional standards. Therefore, the study concentrates on IRBA-registered firms because their operations are regulated and monitored by a professional body. Consequently, they subscribe to prescribed professional standards

1.8 ASSUMPTIONS

- The participants in the interview and the questionnaire respondents responded to the questions honestly and accurately throughout the process of data collection.
- Data collected from the respondents and participants represent the situation in the entire country and the world.

1.9 DEFINITION OF KEY TERMS

Accounting firm

An accounting firm/professional service involves workers with extensive accounting and auditing knowledge and highly specialised education who offer their services to their potential customers (Sampson, 2021:124). Artana *et al.* (2019:16) view an accounting firm as an organisation that provides professional services in public accounting.

Firm size

The study uses the thresholds as stipulated in the *Government Gazette* No. 42304 of 2019 for defining enterprises as summarised below:

Table 1.1: Definition of the size of the accounting firm

Sector	Class of Enterprise	Total number of full-time paid employees	Total Annual Turnover
Finance & Business Services	Small	0 – 50	0 - 35 million rands
	Medium	51 – 250	35 million rands to 85 million rands
	Large	Above 250	Above 85 million rands

Source: Adapted from the *Government Gazette* No. 42304 of 2019

Business process

Chang (2016: 2-3) says that "from a business perspective, a process is a coordinated and standardised flow of activities performed by people or machines, which can traverse functional or departmental boundaries to achieve a business objective that creates value; for internal or external customers". Bataev and Davydov (2020:1) define a business process as an activity using resources to transform inputs into outputs.

Business success

According to Angel *et al.* (2018:613), "… success is firm growth using criteria such as growth in sales, profit or employees".

Annuar and Ali (2021:3) suggest that "in conventional business, success is evident through market performance, sales growth, turnover, staff numbers, and rate of growth, relationships in the workplace, personal fulfilment, impact on the community, individual financial reward and operating without financial distress".

Automation

According to Bataev and Davydov (2020:1), "automation is the application in the production of technical facilities, methods, and control systems that exempt a person from direct participation in production processes". According to Gawron (2019:1), "An early definition of automation in the human factors' literature came from Warren (1956), who says automation is the 'replacement of man by machine or use of machines to control machines'." Gawron (2019:1) further says studies complained about the lack of a standard definition of automation; all definitions were system dependent. Billings (1991) in Gawron (2019) overcame this problem by introducing the following widely accepted definition: "automation is a process that controls a function or task without human intervention".

1.10 CHAPTER OUTLINE

- Chapter 1 – Introduction – The chapter presents the background to the study, a statement of the problem, research questions and definition of terms.
- Chapter 2 – Literature review – The chapter details the theoretical and contextual review of the literature. It reviews and critically analyses previous researchers' work on related topics and reveals how this study contributes to new knowledge.
- Chapter 3 – Research Methodology – The chapter presents the research design and methodology.
- Chapter 4 – Findings and data analysis – The chapter presents the findings of the questionnaires and interviews.
- Chapter 5 – Conclusions and recommendations – The chapter details how the research objectives have been achieved through making conclusions concerning the research objectives. Furthermore, the chapter outlines the contributions of the study to future research, outlines the study's limitations, and offers recommendations for future studies.

1.11 CHAPTER SUMMARY

The chapter outlined the study's background and the research problem statement and revealed that accounting firms have not yet automated most of their business processes at the level of manufacturing industries. Manufacturing industries have realised several benefits from the automation of business processes. The minimal deployment of automation in the business processes of accounting firms has led us to question the relationship between business process automation and business success among accounting firms in South Africa. Therefore, this study explores the nature of the relationship between the automation of business processes and business success among accounting firms in South Africa. The first chapter also outlines research objectives and questions to describe the context of the research problem. The next chapter will detail the literature review.

CHAPTER 2 LITERATURE REVIEW

2.1 Introduction

Chapter 2 seeks to provide an overview of the concept of automation in general and the application of automation in the business processes of accounting firms by providing the ideas obtained from a literature review on automation. The literature review aims to assess the applicability of automation in the business operations of accounting firms and explore the benefits that accrue to businesses because of the deployment of automation. The chapter begins by tracing the history of automation, including areas where it was first applied until it found its way in the services sector, including its use in the business operations of accounting firms. The chapter also defines business success and critically analyses the benefits of automation, employees' attitude towards automation, the relationship between automation and business success, and the disadvantages of automation, as provided in the literature. The chapter closes by summarising the key findings from the literature study.

2.2 The concept of automation

The concepts of automation and mechanised and automated work have been around for decades (Janssen *et al.*, 2019:99). Thus, automation is not a new phenomenon. According to Billings (1991), quoted in Gawron (2019:1), "Automation is a process that controls a function or task without human intervention". Thus, automation is using machines to perform tasks previously completed by humans. Peruffo *et al.* (2017:1) view automation as "the replacement of (human) labour input by (digitally-enabled) machine input for some types of tasks within production and distribution processes". Thus, automation attempts to reduce human involvement in tasks. Wajcman (2017:123) supports this by saying that the industrial revolution was the precursor to technology. Therefore, automation can be traced back to the beginning of the industrial revolution.

According to Krzywdzinski (2021:4), Ford's automation of metal parts manufacturing began in the 1920s. Car industries started using Numerical control and computer Numerical Control Machines between 1940 and the 1970s. Welding jigs and welding robots were also in use in the factories. Large presses and press lines replaced most manual works. Thus, car manufacturers are, therefore, some of the early implementers of automation. Krzywdzinski (2021:7) says that by 1993, Automobile Production reported that plants at three major automobile manufacturers (Toyota, Mazda and Nissan) had almost wholly automated the

production of the bodies of the vehicles. The comment by the author leads us to believe those car manufacturers were early adopters of automation.

Sampson (2021:122) notes several pros of automation: handling unpleasant and dangerous jobs like welding and painting. Automation assists with carrying heavy loads and working in unpleasant temperatures like too hot or too cold. Automation has the further benefit of significantly increasing productivity and may reduce the number of workers required for specific tasks. Workers may also perform higher-order roles like supervising the machines instead of operating them themselves. It can, therefore, be concluded from the author's views that several advantages accrue to organisations because of automating their business processes. Sampson (2021:122) suggests that automation has significantly impacted the industry in recent years. Robotics and other automation permeated manufacturing industries, increasing productivity and decreasing employment. For example, between 2000 and 2010, manufacturing employment in the United States declined by 5.6 million jobs, with 88%of the decline attributed to productivity improvements primarily due to automation. Thus, automation brings about several benefits to businesses and society at large and the author concurs with the view that several benefits are associated with automation.

Concerning the effect of automation on employment, Sampson (2021:122) says consolation comes from the well-known Clark-Fisher hypothesis, which states that productivity increases in one sector of the economy, and employment shifts to sectors of lower productivity (Clark 1957). Workers shifted to manufacturing jobs when agricultural productivity increased in developed economies. Then, as manufacturing productivity increased due to automation, workers flocked to the service sector. Hence, the inference is that automation does not necessarily result in negative consequences for humanity but instead opens new work areas.

Fröhlich *et al.* (2020:725) support this when they say, "Automation is finding its way into many parts of everyday life". Hence, automation is also applicable to other areas like services besides the production of tangible goods. Sampson (2021:123) further says that automation can substitute human workers with computers in performing manual tasks and transferring humans to non-routine tasks where complex cognitive ability and problem-solving are needed. Thus, automation can take care of mundane and routine tasks leaving humans to concentrate on mental tasks. Sampson (2021:123) adds that automation started with the introduction of typewriters and calculators in the 19th century.

Additionally, integrated information processing systems have done away with many clerical tasks formerly performed by humans. Automation has also been used to monitor the efficiency

of workers. Thus, there are several facets of services where automation can be used. Chief amongst these areas of applicability is the completion of routine tasks. According to Sampson (2021:233-234), professionals need to focus more on enhancing their tasks uniquely (the augment strategy). They may, in some cases, be willing to shift to technology-mediated interactions with customers to provide better economies of scale (the centralisation strategy). The author's view proves that automation frees humans to concentrate on higher-order tasks requiring cognitive skills. Peruffo *et al.* (2017:8) support this when they say future jobs will be a combination of technical tasks and non-routine work where workers are focused more on problem-solving, communication with each other and finding ways to be flexible and adapting to changes. Thus, automation augments human effort and assists humans to be more efficient and concentrate on those tasks that machines cannot do.

According to Winshuttle (2019:5), automation helps to process creditors, debtors, journal entries, payroll records, employee data management, and inventory management in accounting firms. Thus, narrowing it down to accounting firms, automation applies to accounting and related services. According to Rozario *et al.* (2019), professionals in the accounting and auditing space have been introduced to automation and have benefited from various automation tools. Therefore, automation applies to accounting firms. Rozario *et al.* (2019) add that automation in the accounting and auditing field applies to specific tasks like preparing working papers, testing in Auditing, and performing statistical calculations. He further explains that auditors are efficient and effective if they concentrate on higher-risk sections while automated processes perform routine tasks. Hence, although automation has not been fully implemented in accounting firms' business processes, there are several areas where automation can be applied to improve the service offering and the efficiency of the accounting firms.

Hence, it is pretty evident from the critical literature review that the application of automation in accounting firms' business processes is not widespread. Gotthardt et al. (2020:90), "the implementation of automation in accounting firms is still in its infancy, and accounting firms are still far from utilising the vast opportunities provided by automation". PWC (2017) concur with this when they say only 15 per cent of accounting firms consider themselves mature in their use of automation, and only 5 per cent in Artificial Intelligence. Therefore, it leads us to believe that most accounting firms' accounting processes have not been automated. Kepes (2017:58) argues that automation in the service sector, particularly in the accounting industry, is not widespread and is still lacking. Hence, there is potential to improve automation in accounting firms. Hanley (2014:401) declares that automation has been mainly deployed in the heavy manufacturing industries with less application in service industries. Hence,

automation has not been implemented in accounting firms as much as in manufacturing industries.

2.3 Business success

According to Angel *et al.* (2018:613), business success is growth using criteria such as an increase in sales, profit, or employees. Thus, business success is measured through increased metrics like sales, profit and employees. Annuar and Ali (2021:3) explain that in conventional business, success is defined through market performance, such as sales growth, increase in revenue, staff numbers, and the business growth rate. The authors add another dimension to business growth and encompass aspects such as better relationships in the workplace, personal fulfilment, better impact on the community, enhanced individual financial reward and operating without financial distress. The inference from the above definitions is that business success is measured through several aspects. These include higher sales and profits, increasing the number of employees and other non-financial aspects like better morale of employees, reduced stress on employees and more social contribution of the business to the communities it serves.

2.4 Benefits that accrue to small accounting firms through the automation of business processes

According to Kokina and Davenport (2017:119), applying automation in Auditing makes it easier to understand risk assessment. Thus, automation is deployable in the auditing service offering of accounting firms assisting in business processes like risk assessment. Chan and Vasarhelyi (2011:155) postulate that automation saves the time and labour needed to complete tasks. Thus, some of automation's benefits include saving time and labour costs. Manson *et al.* (2001:127) support these views when they say automation in auditing results in better quality audits at a fraction of the cost. Hence, automation improves audit quality and reduces the operating cost of auditing.

Rogers (2010:15) talks about innovation related to technology and automation. The author explains that innovation is value creation for users and brings new benefits compared to previous processes. Innovation benefits are financial, social wellbeing, convenience and general satisfaction. Therefore, the benefits of automation are not limited to just financial but improve employee wellness and motivation. Minakov *et al.* (2015:307) add that innovation can be gradual where current methods are continuously and incrementally improved. Innovation,

on the other hand, may also be revolutionary. In this instance, innovation is sudden, radical, and disruptive in implementing new technology and processes. Automation then wholly changes how people work. Thus, automation can be introduced slowly in different stages or implemented quickly across the organisation. According to Gobble (2016:66), automation deployment in accounting usually takes the form of disruptive nature. Thus, automation is likely to drastically change the way the business operations of an entity are carried out.

According to Choi and Baker (2017:23), automation may result in several benefits to the business, including lower production costs, the potential for better quality, and more profits. Thus, automation benefits an entity by reducing operating costs, which results in higher profit and improves the quality of services offered.

Qiu (2016:5) argues that processing accounting transactions manually is time-consuming. He adds that the slow manual process impacts decision-making because the final reports and other output may be produced late. The author suggests that the solution to this problem is the implementation of automation in accounting. Thus, automation cuts the time needed to finish tasks and accelerates decision-making as information needed to make these decisions is quickly made available by the introduction of automation. Egiyi and Chukwuani (2021:33) report several benefits associated with automation, including non-stop performance that talks to no limitation on working hours. Automated processes can run 24/7/365, increasing productivity to unimaginable levels in manual systems. The authors also mention the advantage of consistency and reduced errors in work. Automated systems produce error-free data and reduce output variability. Automation takes care of slow data entry type work, and humans are left to tackle high-value work where they are genuinely needed. Thus, automation has several benefits, including continuous working without being limited to working hours and uniform processing, unlike humans, who may be inconsistent.

Al-Laith and Ghani (2012:12) discuss e-accounting, which is short for electronic accounting. They see this form of accounting as a system that uses computer technology for accounting work in organisations. E-accounting is used to record, review, track and assess organisational financial data. E-accounting results in reliable and accurate data. Thus, e-accounting simplifies the accounting process with better final output than the output under the manual environment. Wang and Huynh (2012:13) point out that organisations that use automated accounting systems potentially gain greater insight into the day-to-day company processes and better exposure to essential details. They further note that automated accounting systems can process vast transactions with high speed, accuracy, and efficiency.

Consequently, a conclusion may be reached that there are several benefits to automating the business processes of accounting firms. These benefits include better efficiency, timesaving, convenience, a better quality of output and better social well-being of employees. Businesses also benefit from automation through lower operating costs, higher profits, fewer errors, and non-stop performance of automated systems that can work during the day and at night, unlike humans, who only work eight hours per day.

2.5 The attitude of accounting firms' employees towards the implementation of automation

Murtagh *et al.* (2015:140) advise that it is essential to factor in the resultant attitude and psychological impact of the introduction of technology on users. Hence, there is an effect of technology on the employees of accounting firms. Murtagh *et al.* (2015:140) declare that for an organisation to realise the full capability of technology, users of the new technology must have the right attitude and proper behavioural response. Therefore, employees' buy-in and consultation are necessary before implementing automation. Yang *et al.* (2015: 254) express that there is potential for rejection of technology by users like employees, resulting in an inability to implement the technology. Thus, users' attitudes influence the successful implementation of automation and the realisation of its full benefits. Yang *et al.* (2015:254) express that if the organisation's employees reject the technology, the company may not deploy it. Thus, the support of the employees is needed for the successful implementation of technology.

Egiyi and Chukwuani (2021:34) observe that projections of automation taking over jobs from humans could be disturbing, and planned changes to work processes may increase employees' resistance to learning new technologies. They may be reluctant to accept new technologies. Thus, there is a perception that technology can take employees' jobs which may result in employees resenting efforts to automate business processes of accounting firms. Egiyi and Chukwuani (2021:34) add that employees may fear that automation will weaken their positions. Thus, employees may frustrate efforts to automate business processes out of fear of losing their power. Kedziora and Kiviranta (2018), quoted in Egiyi and Chukwuani (2021:34), comments that humans who in the past had to compete for jobs themselves now need to compete with machines. Additionally, fear of automation grows if the employees are not adequately engaged and aware of the consequences of automation. Hence, it is necessary to fully explain the effect of technology on the employees to allay the employees' fears of the potential effects of automation. However, Deloitte (2018), quoted in Egiyi and Chukwuani

(2021:34), remarks that employees who previously performed repetitive manual tasks may be upgraded to implement, manage and control automating machines. Thus, the employees may find their jobs more satisfying, reducing their doubts and suspicion of automation. Hunton (2002:5) argues that users' attitudes and psychological have an impact on getting a complete perspective and understanding of the full spectrum of new technology. Hence, the effect of automation needs to be explained to employees. Huntun (2002:6) explains that employees adapt to business changes differently. Some easily accept the changes, while others may be willing to adapt but do not know how to do it. At the same time, some unconditionally refuse to adapt to the company changes. The conclusion that can be reached from this information is that employees are likely to fear the introduction of new technology as it is perceived as replacing them. The study also infers that proper engagement of employees is needed were the full effect of envisaged changes and the effect on employees is explained to them so that the much-needed full support of innovative changes is obtained from the employees.

Törnqvist and Forss (2018:6) believe that employee attitudes toward new technology are vital to fully grasping how it impacts professions and workplaces. The authors add that perspectives and stances on accounting firms' staff automation need to be studied because their lack of cooperation in implementing new technology may result in new changes. Automation is not helpful and does not work optimally. Thus, the full benefits of automation are realised with the cooperation of employees after their full engagement before introducing automation.

Gould (2017:151) argues that the accounting profession will change its complexion in the future. There will likely be a change in the demand and what an accountant should do or know. Thus, the role of accountants and auditors may change in future because of the new phenomena of automation. Brante (2009:25) explains that a professional career is distinguishable by the higher education needed to attain it. However, over the years, the significance of this perspective is decreasing. A professional should solve a particular problem in society with their knowledge. A practitioner has integrity and importance in the community to be trusted. Therefore, one can infer that once certain aspects of the accounting firms' processes are automated, knowledge conveyance is no longer possible or necessary since the clients may no longer demand the skills and knowledge of accountants and auditors. Thus, accountants may need to upskill and reskill along the lines of technology so that their skills align with automated environments.

Goos and Manning (2007:118) speak of job polarisation. Job polarisation is when routine tasks are automated, resulting in demand for professions that cannot be automated. Hence, routine tasks are easy candidates for automation. Autor (2015:12) categorises professions into three.

The first is what he terms cognitive jobs. Cognitive job occupations need very high levels of education and receive high remuneration. Then there are the manual-handled and service-requiring jobs. The third profession is something in between cognitive jobs and service-intense jobs. It can be inferred that manual tasks are easily automated, while cognitive jobs cannot be automated easily. Shim and Yang (2018:144) argue that technology does not easily replace cognitive occupations. Service-intense jobs like service in restaurants are also challenging to substitute with machines. Thus, routine tasks are prominent candidates for carrying them out more efficiently using technology (automation). Goos and Manning (2007:118) explain that accountants are most prone to the effects of automation as they are part of routine tasks. Hence, most tasks for accountants can be automated easily. Frey and Osborn (2017:265) explain that employers now need employees with rare cognitive skills and high levels of education. Employees with less cognitive skills are replaceable by technology. Thus, employees performing routine tasks face the greatest risks in environments where business processes are automated. Accordingly, technology and automation cannot replace jobs requiring cognitive ability like analysis and interpretation.

2.6 Matrices that can be used to measure the relationship between the automation of business processes and business success for accounting firms

According to Annuar and Ali (2021:529), business success is measured through market performance; growth is sales, age of business, turnover/sales, the headcount of staff, and rate of growth. The authors add that business success may also be measured through the organisation's performance, relationships in the workplace, personal fulfilment, business impact on the community and financial rewards to individuals. Other factors considered in the success of a business include operating without financial distress and feelings of accomplishment. The conclusion that can be drawn from the foregoing literature is that the main measures of success of the business are its sales level, profit size, number of employees, growth rate, employee morale and wellness, social impact, and amount of salaries paid to employees. Thus, when these metrics increase, the business is viewed as succeeding.

Soni *et al.* (2020) concluded that businesses that correctly deploy technology and automation have realised savings in time and money by automating repetitive procedures and tasks. It enhances operational efficiencies and productivity, minimising waste from the process, giving the business a competitive advantage and maximising sales. Thus, savings in time due to the performance of routine tasks by machines opens up accounting firms to service more clients resulting in higher revenue. Rozario *et al.* (2019) explain that an audit's efficiency and

effectiveness are achievable if auditors concentrate on higher-risk sections while automated processes perform routine tasks. Hence, automation results in higher productivity and efficiency. According to Manyika *et al.* (2017:8-9), automation has several economic benefits, including increased profit, increased throughput and productivity, improved safety, and higher quality. Therefore, it can be concluded that automation results in accounting firms' success. Jabłoński and Ziębicki (2019:33-38) add that the development of automation technologies is capital intensive, but automated solutions usually have a low marginal cost compared to manual systems where wages are involved. The inference from the above view is that the costs of automating business processes result in future savings in costs like labour. Machines outperform humans on tasks like information retrieval, gross motor skills, optimization, and planning. Additionally, hardware and software costs are decreasing, making automated solutions more competitive than manual labour. Further, automation alters an accounting professional's work, eliminating most routine tasks and leaving room for more strategic tasks, interactions with stakeholders, drawing conclusions based on analysis of information produced by automated systems, and general improvement of business performance.

Jabłoński and Ziębicki (2019:38) summarise the benefits of automation to business as follows:

- Reduction in operating costs mainly from lower headcount in employment
- Reduction in human errors and improve efficiency
- Improved quality and better customer satisfaction as the processing of information is done in real-time, 24/7, including peak hours
- Allows employees to concentrate on processes that create value rather than routine or standard tasks
- Operations are performed and completed speedily
- Ability to process big data (diverse and extensive information), which assists in identifying, standardising, and analysing significant information at the level of the entire enterprise
- Increases scalability of operations and improves compliance

Thus, the success of the business in various areas, like increased sales and profits because of better efficiency and lower operating costs, can be achieved through the deployment of automation in the business processes of accounting firms. Thus, automation can be applied in the business's internal operations, and specific processes are undertaken to provide services to the clients of accounting firms.

2.7 Drawbacks of automation in accounting firms

Taipaleenmäki and Ikäheimo (2013:342) argue that companies' automation of transaction processing results causes less demand for outsourced accounting skills. The discovery of automation by accounting firms leads to the loss of clients and the inference from the preceding observation is that clients may insource the accounting function if consultants are no longer indispensable. Thus, automation disadvantages accounting firms as former clients may opt to do some work independently.

According to Choi and Baker (2017:23), automation can harm vulnerable societies, small entities and employees with undeveloped skills. Automation may result in lower wages, higher unemployment, and a disturbance of social stability. Thus, automation has detrimental effects on some sections of society, especially low-skilled workers. Egiyi and Chukwuani (2021:34) declare that automation will replace employees in performing repetitive and routine tasks. The authors estimate that at least 30% of most jobs will be automated, and about 50% of current work activities have the technical potential to be automated. Therefore, automation has great potential to displace workers. Manyika *et al.* (2017), quoted in Egiyi and Chukwuani (2021:34), submit that tasks that will be displaced by automation by 2030 are around 30%, equivalent to about 800 million jobs. Thus, soon, several jobs will be replaced by machines. Berruti *et al.* (2017), quoted in Egiyi and Chukwuani (2021:34), estimate that 43% of jobs in the finance sector will be automated. Therefore, machines will soon take over almost half of the jobs. The World Economic Forum (2016), cited in Egiyi and Chukwuani (2021:34), also adds that routine jobs, middle-skilled, white-collar jobs like data-capturing staff, accounts and payroll staff and auditors will be demanded less soon. Hence, machines are at the greatest risk of replacing lower-order tasks. Egiyi and Chukwuani (2021:34) also report the surveys by ACCA and Mckinsey, which shows that more than half of the employees surveyed are aware that humans will soon not perform some entry-level accounting jobs anymore. The authors' view leads us to believe that there are tasks where humans will be replaced, especially routine and repetitive tasks. Thus, the conclusion is that the displacement of workers is arguably the worst shortcoming of automation. The previous discussion also points to employees generally perceiving that technology and automation result in their displacement. As previously stated, proper engagement of employees is needed when automation is planned, and its full effect on them is clarified.

Sampson (2021:122) says consolation comes from the well-known Clark-Fisher hypothesis, which states that employment shifts to lower productivity sectors when productivity increases in one economic sector (Clark 1957). Thus, while automation may displace workers in other

sectors, new roles will be created in other sectors. Sampson (2021:122) adds that, over the years, technology has increased productivity in many industries and reduced demand for workers, especially those performing routine tasks, but it has opened new sectors. Therefore, employees displaced in one sector may get job openings in other sectors. Woods and West (2019:316) support this view when they note that a significant cause of stress in the future is the threat of job losses for billions of workers because of the introduction of technology that can perform tasks that used to be carried out by humans. The authors add that we should relax because technological advances may provide everything we need. The inference from these views of the authors is that technology creates other opportunities for people even though it takes over traditionally repetitive tasks. The other conclusion drawn from the views obtained in the literature study is that technology creates various other opportunities, especially in the services sector.

Egiyi and Chukwuani (2021:34) note that some accounting firm clients may be reluctant to adopt the automation of accounting processes due to data protection and transparency issues. Thus, one of the drawbacks of automated environments is cybersecurity risks to which the client data and information become exposed. The study can also conclude that accounting firms must invest in cybersecurity to mitigate risks brought about by interaction with client data in an automated environment.

2.8 Chapter summary

This chapter has reviewed the literature on the automation of accounting firms' business processes about the accounting firms' successes. There are several major findings from the literature review. Automation is an age-old concept introduced in manufacturing but later found application in the services sector. The other revelation is that automation is not fully and adequately applied in the operations of accounting firms. Business success is measured through higher sales and profits, an increasing number of employees and other non-financial aspects like better morale of employees, reduced stress on employees and more social contribution of the business to the communities it serves. The benefits of automation include better efficiency, timesaving, convenience, a better quality of output and better social well-being of employees. Other benefits include lower operating costs, higher profits, fewer errors, and non-stop performance of automated systems that can work during the day and at night. The literature study has also revealed a strong perception that automation and technology displace workers, but technology also brings new opportunities. Drawbacks of automation include the displacement of workers. The other shortcomings of automation include clients

insourcing certain business operations if they can easily do them using available technology and automated processes. Automated environments are also prone to cyberattacks, client data and information loss through hackers and viruses. Chapter 3 explores the research philosophies, methodology and methods that were followed in this study.

CHAPTER 3 RESEARCH METHODOLOGY

3.1 Introduction

The previous chapter detailed the literature review related to the topic of study. A critical literature review assisted the researcher in grasping detailed knowledge about the automation of business processes in accounting firms. This chapter details the research methodology that informs the study. The chapter has the following major sections: research philosophy, research approach, research strategy, research methods, research design, instrument design, population and sample description, data analysis, validity and reliability and ethical considerations.

3.2 Research Methodology

The research follows a mixed approach. Reliance was made on both the deductive and inductive approaches. According to Saunders *et al.* (2019:51), inductive methods involve theories extracted from the study rather than starting the research with a theory as a starting point. On the other hand, deductive approaches begin with an idea and strive to build on it or prove it with research. Thus, inductive methods rely on the results of the study to formulate a theory, while deductive approaches prove a theory using the results of the study. Creswell and Plano Clark (2011:64) and Leedy and Ormorod (2016:329) express that many research problems are too complicated and need to deploy quantitative and qualitative approaches to resolve them thoroughly. Thus, difficulties in the automation of business processes of accounting firms in South Africa are suited to both the qualitative and quantitative data hence the choice of the mixed methods approach. The mixed-method approach involves collecting, analysing, and interpreting data using qualitative and quantitative techniques (Leedy & Ormrod, 2016:329). Therefore, a mixed approach is a combination of qualitative and quantitative techniques. Creswell and Plano Clark (2014:214) also support using two or more iterative designs. They believe one approach may be inadequate to fully grasp the reality and develop knowledge of automating accounting firms' business processes in South Africa. Thus, two approaches may be used to augment each other. Teddlie and Tashakkori (2009:29) add that pragmatism is the best approach to address research problems from an epistemological point of view. Bryman (2006:107), Greene (2007:29) and Teddlie and Tashakkori (2009:23) suggest that pragmatism goes along with both inductive and deductive reasoning when answering research questions. Thus, the hybrid method allows for both interaction of the study with the participants while at the same time placing importance on the study's value system.

3.3 Research Philosophy

Philosophy is a belief or worldview that guides research. The worldview has a bearing on the methods selected in the study (Lor, 2011:4). Research philosophy or a social and organisational theory paradigm is the philosophical view on positioning research (Lor, 2011:5). Cresswell and Piano Clark (2011:119) explain that philosophical assumptions help to articulate the basis and foundation in a study. Thus, paradigms or worldviews influence research development. A proper grasp of different paradigms assists in resolving the research questions and solving the problem identified in the research. Antwi and Kasim (2015:218) explain two main research paradigms. These include the positivist and interpretivism paradigms.

3.3.1 Positivism

This research generally falls under the positivist paradigm, precisely, logical positivism. The positivist paradigm is the natural-scientific method in human behavioural research. The Positivist paradigm says that research should be constrained to observable and objectively measured phenomena (Ryan *et al.*, 2002:36). The strict natural scientific method holds that universally valid and applicable laws explain all objectively observable and measurable behaviour (Morgan & Smircich. 1980:493). Hopper and Powell (1985:432) argue that objectivity in the context of research means that people rather than the study should agree on observable phenomena. An example is a score registered on the measuring instrument of the observer. Positivism is a derivation of natural science and is known as the testing of meaning variance hypothesis developed from the theory already in existence and measured through observable social realities. Therefore, one can infer that knowledge is universal and verifiable under positivism, transcending beyond borders.

3.3.2 Interpretivism

The study also takes the interpretivism paradigm, which is the opposite of positivism. Interpretivism is constructivism. According to Ryan *et al.* (2002:36), the social world produces people's actions and how the social actors interpret the social world to construct reality. The social world is not static. Northcut and McCoy (2004:7) explain that the interpretivism paradigm interprets reality, changing reality with time, circumstances, objectives, and context. Northcut and McCoy (2004:7) remark that interpretivism is about entering the world of the generators of social processes and models. Knowledge models are not unidirectional but somewhat circular. Knowledge reciprocally interacts with causality models. Northcut and McCoy (2004:7)

further point out that interpretivism involves understanding how people who have something familiar think or feel about a given subject. Basically, in interpretivism, knowledge is qualitative and subjective. The study chose a hybrid approach because the positivism paradigm, when used alone, may not provide adequate solutions. Therefore, the study combines positivism with interpretivism to balance the two worldviews.

This study employs pragmatism as the appropriate paradigm for mixed methods because the research falls under accounting and finance. Most studies prefer positivism as the most appropriate approach for finance and accounting. The hybrid method results better when the study takes the middle ground (post-positivism). In post-positivism, knowledge is universal within a context. The selection of a hybrid system in this research on the accounting and finance theme contributes to the body of knowledge by adding new insights into the accounting and finance research environment where the hybrid approach is still not commonly used.

3.4 Research Strategy

3.4.1 Justification of explanatory design

Leedy and Ormrod, (2016:331) remark that explanatory design uses theory to explain specific problems and does not produce generalisations. The study uses theory to explain accounting practices and systems in this study. However, the study leaves room for modifying theories if they fail to explain clearly. New theories emerge in the study process that assists future studies. The main aim of an explanatory design is to produce theories and frameworks that proffer sound explanations of the population. The study employs an explanatory design to give room to the study to attain a thorough understanding of the study of a phenomenon. The study deploys multiple sources of evidence (Yin 2011:20). The explanatory design is suitable as it addresses the research problem and answers the research questions associated with automating business processes in accounting firms in South Africa. Using an explanatory design enhances the employment of multiple data sources as part of triangulation (Myers, 2009:56). An explanatory design enables the study to produce two-phased quantitative and qualitative results.

3.5 Research Methodology

Ryan *et al.* (2002:154) declare that the widely used research methods in accounting and finance are qualitative and quantitative. Otley and Berry (1994:45), Ryan *et al.* (2002:75), and

Spicer (1992:2) confirm that accounting and finance borrow from economics when it comes to research methods – quantitative being more popular, primarily questionnaires and surveys. The authors also remark that qualitative methods are rare, hence the limited literature on the qualitative approach. The researcher responded by employing qualitative and quantitative methods in this study. The quantitative method gathers data from a large sample. On the other hand, the qualitative method extracted participants' perceptions, truth, reality, and feelings. Interviews are the main tool used in the qualitative study. The use of mixed methods addresses the inherent weaknesses in qualitative and quantitative methods. The mixed-methods approach assists in designing a focused study about the subject under investigation that would otherwise be impossible if the study used a single method. Anderson and Widener (2006:142), Atkinson and Shaffir (1998:67), and Lachmann *et al.* (2017:43) confirm that the use of mixed methods allows a thorough understanding of the phenomenon being studied and, in a case in point, automation of business processes in accounting firms in South Africa.

3.5.1 Mixed-method research strategy

This study is a mixed-method study and the philosophy is based on post-positivism; the approach is both quantitative and qualitative. Onwuegbuzie and Leech (2006:474) define mixed methods as collecting, analysing, interpreting, and integrating qualitative and quantitative data to understand the research problem properly. Mixing methods occurs at different stages of the research, such as research design, data collection, and data analysis. The mixed-method strategy suits this study because it produces holistic and richer findings on the complex automation problem of South African accounting firms' business processes. It assists the study in avoiding reliance on a single design method. The research question and objectives of this study also influenced the selection of the research method. (Wiggins *et al*., 2013:279). Romm and Ngulube (2014:158) explain that mixed methods consider different ontological, epistemological, and doxological points. These are direct inquiries about the phenomenon under investigation (scientific inquiry). Teddlie and Tashakkori (2009:22) add that the mixed methods align with the pragmatic approach, which combines different philosophical perspectives. Cameron (2009:145) confirms that pragmatists in research sit somewhere between quantitative and qualitative research paradigms. Creswell and Plano Clark (2011:119) acknowledge that mixed methods are part of methodological pluralism. Pragmatism combines both positivism and interpretivism in single research. The research used mixed methods for various accounting and finance scientific study methods.

3.5.2 The rationale and strengths for the use of mixed methods

Greene *et al.* (1989:196) believe that it is vital to have a valid explanation to support mixed methods, which incorporate both the quantitative and qualitative methods in a single study. The authors add that a single procedure may be inadequate to capture all the investigated situation trends and details. Caracelli and Greene (1993:195), Greene, (2007:29), Miles *et al*. (2014:3), and Teddlie and Tashakkori (2009:22) all agree that a mixed approach allows the different methods to complement each other and allow for robust analysis through benefiting from the strengths of both qualitative and quantitative methods.

3.5.3 Sequential explanatory mixed methods design

The study used a sequential explanatory design. According to Creswell and Plano Clark (2011:119), sequential explanatory design involves collecting data sequentially in different quantitative stages followed by qualitative data (Quan – Qual). Leedy and Ormrod (2016:330) view sequential explanatory design as a two-phased design. Therefore, this study first collected quantitative data and then gathered qualitative data to verify and authenticate the quantitative data. The overall picture of the research problem provided detailed and comprehensive quantitative data. At the same time, qualitative data refined, extended, and explained the general view of the research. Thus, the benefit of employing the sequential explanatory design was that it draws from the strengths of both the quantitative and qualitative data.

3.6 Population and samples

3.6.1 Study population

The study population is the entire group of people (or animals or companies or whatever you choose) that you are interested in researching (Bryman *et al.*, 2014:144). In this research, the study population is all the South African accounting firms registered with the Independent Regulatory Board for Auditors (IRBA). The population is homogeneous as IRBA controls them. As of 15 February 2022, the total number of active firms stood at 1 940.

Table 3.1: Distribution of registered active audit firms in South Africa

Province	Number of Active Firms
Gauteng	960
Western Cape	338
KwaZulu Natal	219
Northern Cape	39
Mpumalanga	81
Eastern Cape	89
Free State	75
Limpopo	60
Northwest	79
Total	**1940**

Source: **Adapted from the Independent Regulatory Board of Auditors (IRBA) email confirmation**

3.6.2 Where participants are located

The participants are all IRBA-registered accounting firms located around South Africa.

3.6.3 Accessibility of participants

The study started with the accounting firms' directors/owners/employees that the researcher knows. Questionnaires were distributed to directors, management and other senior staff of the accounting firms. The study also considered the POPIA Act. The IRBA and SAICA websites list the contacts and addresses of accounting firms in South Africa.

3.6.4 Inclusion and exclusion criteria

The study included all the accounting firms registered with the Independent Regulatory Board of Auditors (IRBA) in South Africa. The participants in the study should have a minimum experience of two years working in an accounting firm in the role of Audit Senior or above (supervisor, manager, director or partner). A minimum of two years of experience in the audit field is required because the respondent or participant should understand how the accounting/auditing firm works to appreciate where automation may be applicable in the business operations of the accounting firm. The participants should be associated with IRBA-

registered accounting firms in South Africa as they are monitored and consequently subscribe to professional standards and ethics. The inclusion and exclusion criteria are summarised in the table below.

Table 3.2: Inclusion and exclusion criteria for the population

Inclusion Criteria	Exclusion Criteria
Accounting Firms registered with IRBA	Accounting firms not registered with IRBA
The human participants should have a minimum experience of two years working in the accounting/auditing field	Staff with relevant experience of fewer than two years.
Firms that are resident in South Africa	Accounting firms outside South Africa

Source: **Own source**

3.6.5 Sampling and sampling techniques

Strüwig and Stead (2013:116) define convenience sampling as a sampling method where respondents are selected to represent the population-based entirely on their availability for the study. This study used the non-probability sampling technique of convenience sampling. The list of accounting firms was obtained on the IRBA website.

3.6.6 Sample size

Sample size refers to the number of participants included in a study. A sample is a segment of the population selected for investigation (Bryman *et al.*, 2014:170). According to Bryman *et al.* (2014:170), a representative sample reflects the population accurately. Distortion in the representativeness of the sample is called sample bias.

Saunders (2012:1229) recommends that the saturation point determines the sample size in qualitative studies. The data saturation point concerning the selection of participants is reached when the next participant will not add new data to the research. Therefore, the sample size in this study was ten participants for the qualitative research.

The sample size for the quantitative study is guided by Leedy and Ormrod (2015:184), who recommend that the sample be representative and guided by Gay *et al*.'s (2012:139) guidelines. The guideline says that if the population size is between 1 500 and 5 000, 20%

should be sampled. The authors recommend that for a population of around 1 500, 20% should be sampled. Therefore, the sample size in this study was 388 (1 940 X 20% = 388). A simple random process was followed in identifying the study participants. Of the 388 questionnaires sent, 60 responses were received. The response rate is 15.5%.

3.7 Instrument design

The instruments have been designed following the research objectives.

Questionnaire and Interview Schedule

Section 1 contains demographic information.
Section 2 relates to areas where automation can be deployed in accounting firms.
Section 3 relates to the benefits of automation to accounting firms.
Section 4 deals with the attitude of employees towards automation.
Section 5 relates to automation and business success.
Section 6 deals with the disadvantages of automation to accounting firms.

The questionnaire consists of six questions with an average of five sub-parts for each question. It took approximately 25 minutes for a respondent to complete the questionnaire and 20 minutes to complete the interview.

3.7.1 Reliability Tests

The researcher used mainly descriptive statistics to analyse and interpret the quantitative data that was collected in this study. The questionnaire was constructed using the information gathered through the literature review. The study developed the five-point Likert scale for the questionnaire with the following ranges: 1. A five-point Likert scale was used to develop the questionnaire with the following ranges: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree. The study instructed the questionnaire respondents to answer the questions during the survey.
An instrument is reliable if it gives consistent results when used to measure the same subject under the same conditions (Cortina, 1993:99; Nunnally, 1978:26; Vaske *et al*., 2017: 165).

3.7.2 Qualitative data collection

After the first phase (quantitative data), the study embarked on the qualitative data collection phase, collecting quantitative data. The study used a convenient sampling technique to develop the sample for the qualitative phase. A sample of ten (10) participants was selected, and the saturation point was reached. The second stage aimed to explain the central phenomenon in depth based on the participants' perceptions and opinions (Creswell & Plano Clark, 2011:119). Yin (2011:20) explains that the qualitative approach enables us to study human beings in real-life situations related to the world's conditions concerning a particular subject. The study tape-recorded the interview to ensure the method's effectiveness in collecting data. The qualitative research addressed the complexity of the automation of business processes in South Africa and the diversity of the participants. The qualitative study allowed the participants to describe their real-life experiences. The participants explained the perceived relationship between the experiences. They produced a conceptual map representing how they understand the automation of business processes in accounting firms vis-à-vis the success of accounting firms.

3.7.3 Sampling techniques for qualitative research

The relationship between quantitative and qualitative research in this study was used to formulate the questions, which is the study's secondary objectives. The participants in the second phase were selected using convenience sampling. Qualitative data was used to clarify quantitative data's inconclusive findings. The study used similar variables from the quantitative analysis to design the interview guides. These face-to-face or Zoom interviews helped the researcher get more insights and a deeper understanding of the differences in the construct's variables. Qualitative data corroborated the significant findings from the quantitative research. The convenient sampling method availed valuable information related to the research questions

3.7.4 Interview schedules

The study developed one interview schedule for senior staff of accounting firms in South Africa. The interview schedule includes five sections: Section one focuses on the respondent's demographic information and section two on business processes that are candidates for automation in accounting firms. Section three focuses on the benefits of automation to accounting firms and the relationship between automation and business success. Section four

focuses on the attitude of accounting firms' employees towards automation and section five focuses on the drawbacks of automation.

3.7.5 Qualitative interviews

The study used the interview schedule during the interview process. A pretest of the interview schedule was conducted on two (2) participants to identify potential problems and establish possible solutions before data collection. A pretest in a qualitative study demonstrates how participants understand the questions asked, the consistency of the questions asked, whether the questions are understood the same way, whether the participants answer the questions, and whether the questions are in line with what the study intended to ask, and all participants understand the terminology. The pretest results were not used in the final analysis to avoid duplication. According to Rothgeb *et al.* (2007:6), pretesting research instruments include literature review, focus groups, expert review, interviewer debriefing, observational interviews, behaviour coding and cognitive interviews. The circumstances of the pretest should be similar to the actual data collection process. The study tape-recorded actual interviews to retain the exact words from the participants. The researcher took supplementary notes during the interview process.

3.7.6 Integration of results

Meta-inferences involve the integration of quantitative and qualitative results (Venkatesh *et al.*, 2013:23). The research used meta-inferences to enable the study to compare quantitative and qualitative analysis. The result was rich conclusions about the findings on the automation of business processes of accounting firms in South Africa.

3.7.7 Data management procedure

The study ensured that collected data using questionnaires and interviews was not made publicly available due to legal and ethical reasons (privacy of the respondents). The data will be confidential and kept on the researcher’s personal computer, which restricts access through a regularly changed password. Additionally, the researcher’s computer is locked away in secure offices and houses when it is not in use. Both qualitative and quantitative data were anonymised and then processed afterwards. The data would not be shared unless the respondents gave consent.

3.8 Data analysis

3.8.1 Quantitative data analysis

The quantitative data was analysed using the Statistical Package for Social Sciences (SPSS) computer software. The study summarised the data to produce trends and patterns using descriptive statistics like tables, standard deviations and correlations. (Teddlie & Tashakkori, 2009:22). The study explained the relationships utilising a summary of indicators from the numeric data obtained from descriptive statistics. The study used inferential statistics methods to enhance descriptive statistics about the sample data. Inferential statistics confirm relationships between variables. The study also uses analytics tools such as mean, variance, standard deviation, and correlations to study the data. The study used inferential statistics to test relationships between variables and estimate the degree of error of inferences. According to Teddlie and Tashakkori (2009:22), group means and multiple regression analysis assist in understanding the degree of relationships between variables. The study uses univariate to test the dependent variables to answer the research question. The study also tests the relationship between predicted (dependent) variables before univariate statistics through multivariate statistics. The study correlates the automation of business processes as the dependent variable and other constructs as independent variables.

3.8.2 Qualitative data analysis

Thematic analysis is essential for enhancing data reliability and achieving a thorough understanding of the subject under study. The inductive approach identifies themes and patterns of meaning across the qualitative data collected. The themes have their basis in research objectives and questions and the participants' perceptions and views towards automating business processes in South Africa. Various scholars agree that thematic analysis allows for examining different topics and participants' views and provides verbatim quotations from the data. Corden and Sainsbury (2006:98) report that verbatim quotes remove the risk of fabricating findings. A research study using the qualitative approach must analyse collected data properly to get meaningful results (Attride-Stirling 2001:386). Braun and Clarke (2006:79) confirm that a widely used method in qualitative research is thematic analysis, which is used to identify, analyse and find themes of the empirical data. Braun and Clarke (2006:81) further suggest that thematic analysis effectively analyses empirical qualitative data regarding participants' perspectives, similarities, and differences.

The qualitative audio data was transcribed into narrative text and then processed. The study coded the text data for the qualitative analysis to form themes using the manual approach and literature review. Figure 8.1 below shows the steps for the thematic analysis for the inductive approach, based on Braun and Clarke (2006:175).

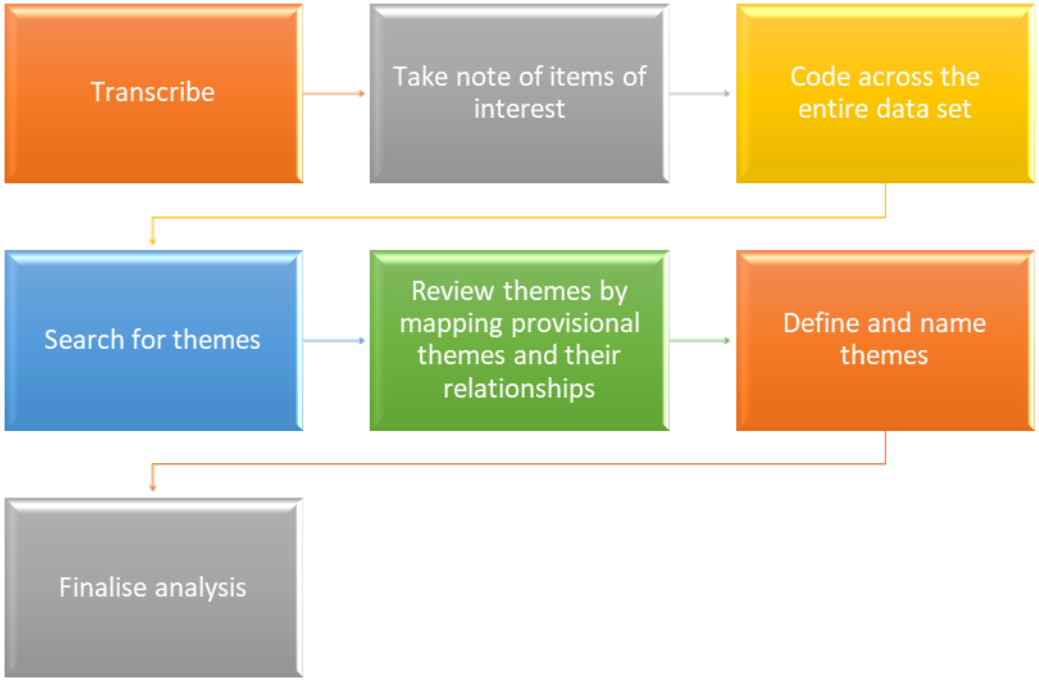

Figure 3.1: Steps in thematic analysis

Source: **Adapted from Braun and Clarke (2006:175)**

3.9 Reliability and validity

Trustworthiness is a set of criteria advocated by some authors for assessing the quality of qualitative research, and it is reliable and valid for qualitative research (Bryman *et al.*, 2014:385). Trustworthiness consists of four criteria (Bryman *et al.* 2014:44-45) as detailed below:

Credibility: The study submits the findings to the participants to validate whether the study has interpreted the results correctly and if there are additions that the participants want to add. Therefore, the study allowed the participants validation by sharing the interpretation of their interview responses to ensure credibility. Credibility is also known as respondent validation (Bryman *et al.* 2014:44-45).

Transferability: It is a transfer of the results of a study to another context; by doing so effectively, the readers need to read in more depth the original research to compare the similarities to their cases (Bryman *et al.* 2014:44-45). The study involves accounting firms, and the participants are professional and trained accountants or auditors. Accounting and auditing are traditional disciplines whose applicability should be generally universal. Although the study concentrated on South Africa, it should be easily transferrable to other parts of South Africa.

Dependability: Studies can ensure the research process is logical, traceable, and documented. A research study may demonstrate the trustworthiness of its process if it is auditable (Bryman *et al.*, 2014:44-45). The study thoroughly explains the research design, chosen methodology, and the exact data steps. A detailed description of a choice selection of samples and data gathering using interviews and questionnaires and the method used for analysis is detailed. Additionally, the study gave a complete description of the theoretical concepts and reasons for selecting a particular procedure.

Confirmability occurs when the study can prove that the research is credible, transferrable, and dependable. It is a measure that the study's interpretations and findings are derived strictly from the data collected and do not allow personal values to influence the research (Bryman *et al.* 2014:44-45). The study gave details of the various decisions the chosen approaches arrived at during the study. A complete audit trail is available if someone has to carry out the same research. The study conducted the interviews and circulated questionnaires to ensure that the gathered data came from the actual participants. The study recorded the discussions using a tape recorder so that no information gets lost through memory loss. The study allocated one to five hours to transcribe the recorded interviews. The study thoroughly familiarised itself with the subject of automation before the discussions and other theories, including how to conduct a research interview to reduce biases. The analysis is ethical and honest, including transparency from the start to the end of the research process.

Table 3.3: Techniques to ensure the trustworthiness of qualitative research

Traditional Criteria	Trustworthiness Criteria	Methods of Meeting Trustworthiness Criteria
Internal Validity	Credibility	• External engagement in the field • Triangulation of data types • Peer debriefing • Member checks
External Validity	Transferability	Detailed (thick) description of: • Concepts and categories in the grounded theory • Structures and processes related to processes revealed in the data
Reliability	Dependability	• Purposive and theoretical sampling • Informants' confidentiality protected • Inquiry audit of data collection, management and analysis processes
Objectivity	Confirmability	Clear separation of 1st-order and 2nd-order findings. Meticulous data management and recording: Verbatim transcription of interviews: • Careful notes of observations • Clear notes on theoretical and methodological decisions • Accurate records of contacts and interviews

Source: Adapted from Lincoln and Guba (1985) cited in Locke (2000:59)

3.10 Ethical considerations

It is paramount for the study to consider the ethical issues that can arise during the research process. Bryman and Bell (2011:128) explain that ethical considerations are important, especially in cases involving individuals or human participants. The study, therefore, prioritised four principles. The study strove not to harm participants and the researcher did not violate their privacy and avoided deceiving participants. Deception occurs when the study misleads participants in a study on purpose. The illusion also occurs when a false intent is presented to the respondents (Bryman & Bell 2011:136). Robben and Sluka (2012:46) declare that a study should not plagiarise, fabricate, provide false evidence or deliberately misrepresent information or sources. The study upheld ethical principles throughout the study. The study sought participants' consent to take part in the study. Face-to-face interview data and information in the research were confidential. No third parties were privy to the qualitative data

to avoid infringing on the interviewees' privacy rights. The study did not coerce the respondents to participate. The participants willing to withdraw from the study were permitted to do so at any time. The ethical code of the North-West University was observed throughout the study, and necessary approvals and consent were sought from the relevant authorities.

3.10.1 Conflict of interest

There is no relationship between the researcher, the participants and the respondents in this study. Therefore, there is no conflict of interest on the researcher's part. There are no relationships with participants regarding hierarchy, family, or romance.

3.11 Chapter Summary

Chapter 3 detailed the research methodology used in this study. The philosophical stance of the research was identified and defended. The sequential explanatory method, quantitative-qualitative, also referred to as Quan-Qual research, was explained in this chapter. The chapter also discussed the research paradigm, methodology, design, and justification for using mixed methods. The study population, sampling, data collection, data analysis and presentation, and ethical considerations were also detailed. The chapter also explained the study's validity, credibility, and reliability. The next chapter presents and interprets the data collected from the quantitative and qualitative research.

CHAPTER 4 DATA ANALYSIS AND INTERPRETATION

4.1 Introduction

The chapter presents the data collected using two methods: questionnaires and interviews. The reason for the collection of data was to try and answer the research questions outlined in Chapter One. The chapter presents the quantitative and qualitative study analysis and interpretation and concludes with the key findings from the empirical study.

4.2 Quantitative data analysis

Data was collected from the employees of accounting firms in randomly selected accounting firms in South Africa. Data were collected through self-administered questionnaires that were designed to address research problems that were being analysed. Three hundred and eighty-eight (388) questionnaires were issued to respondents, and 60 questionnaires were collected, providing a response rate of 82%. Quantitative and descriptive statistics are used to present the data. These include frequencies, percentages, graphs, and pie charts. The quantitative data was analysed using SPSS software.

4.2.1 Demographic information

4.2.1.1 Highest qualification

Table 4.1: Questionnaire respondents' highest qualification

Respondents' highest qualification					
		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Diploma	1	1.7	1.7	1.7
	Bachelor's degree	12	20.0	20.0	21.7
	Honours Degree	45	75.0	75.0	96.7
	Master's Degree	2	3.3	3.3	100.0
	Total	60	100.0	100.0	

Source: Research data

The table above shows that most of the respondents in the study had honours degrees representing 75%. Holders of bachelor's degrees represent 20%. Only two respondents have a master's degree, and one has a diploma. The inference is that all the respondents had basic qualifications for the positions they hold in accounting firms.

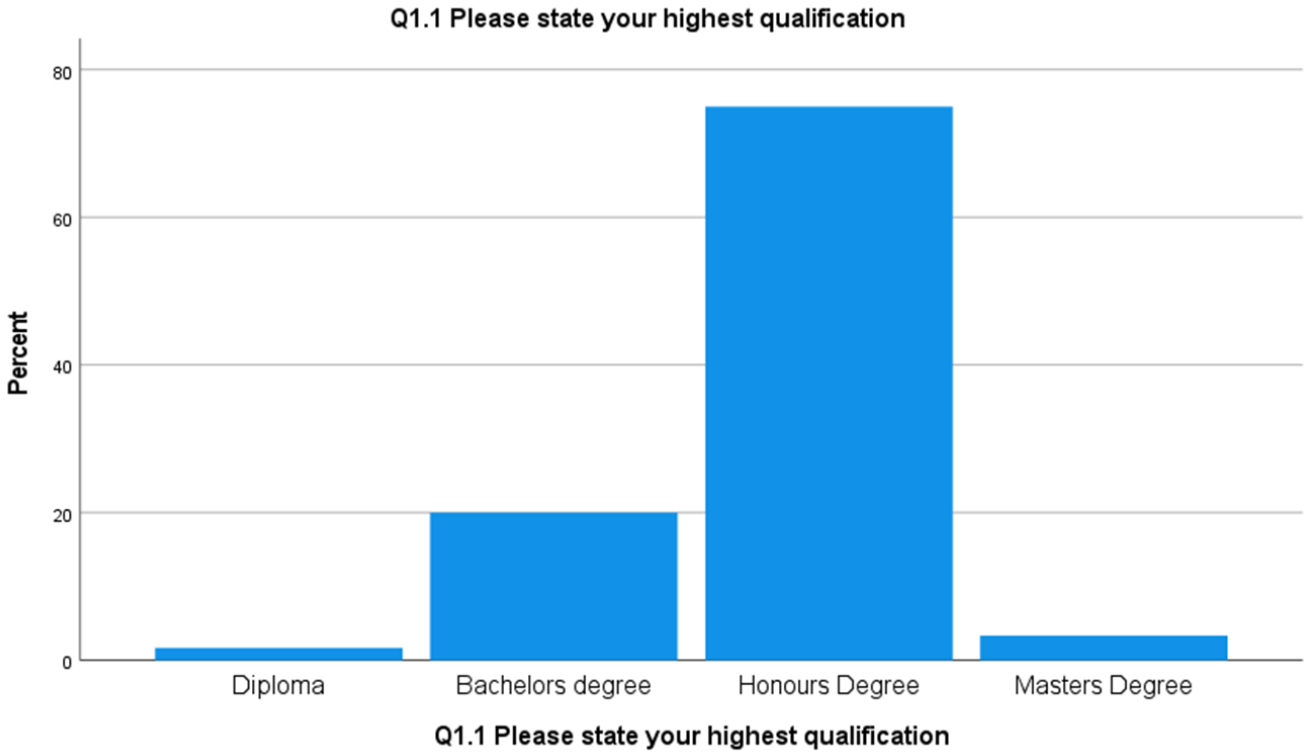

Figure 4.1: Highest qualification of respondents

Source: Research data

The graph above emphasises the information shown in the table above it. It is clear from the chart that most of the respondents are holders of honours degrees, followed by bachelor's degrees, two with master's degrees, and only one respondent had a diploma. It is evident from the results that all the respondents have tertiary qualifications. The inference is that all the respondents had basic qualifications for the positions they hold in accounting firms.

4.2.1.2 Job description

Table 4.2: Questionnaire of respondents' job description

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Supervisor	3	5.0	5.0	5.0
	Audit Senior	32	53.3	53.3	58.3
	Manager	13	21.7	21.7	80.0
	Director/Partner	7	11.7	11.7	91.7
	Other	5	8.3	8.3	100.0
	Total	60	100.0	100.0	

Source: Research data

The most significant number of respondents were audit seniors, representing 53.3%, followed by managers, representing 21.7% of the respondents. Then other respondents are directors or partners, other job descriptions and supervisors, with 11.7%, 8.3% and 5%, respectively. The results are not surprising as the study targeted senior employees with a minimum of two years of experience. Directors and managers usually have the most experience, and their insights are informed by rich experience.

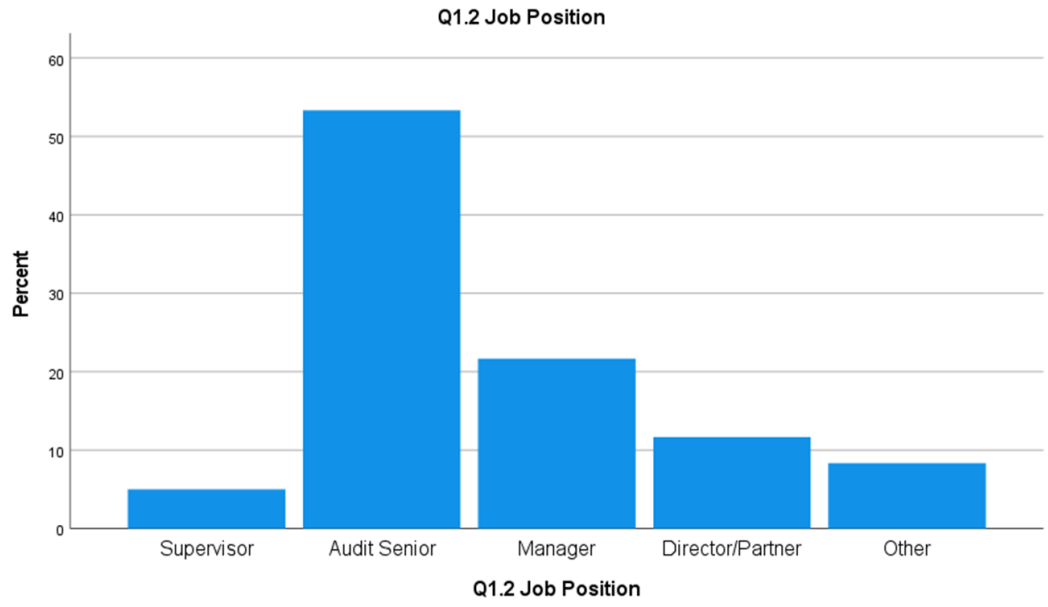

Figure 4.2: The job position of respondents

Source: Research data

The graph above depicts the classes of respondents who answered the questionnaire. Audit senior dominated in the study, followed by managers, directors/partners, others, and supervisors in descending order. The inference is that all the participants were senior staff who could provide insightful and reliable information.

4.2.1.3 Years of experience in the accounting/auditing field

Table 4.3: Questionnaire of respondents' years of experience

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	2-5 years	31	51.7	51.7	51.7
	6-10 years	17	28.3	28.3	80.0
	11-15 years	7	11.7	11.7	91.7
	16-20 years	4	6.7	6.7	98.3
	More than 25 years	1	1.7	1.7	100.0
	Total	60	100.0	100.0	

Source: Research data

The table above shows that most respondents had an experience of two to five years, representing 51.7%. The category that follows is six to 10 years, representing 28.3%. Those with 11 to 15 years account for 11.7%. Four out of 60 respondents had 16 to 20 years of experience, and one respondent had experienced more than 25 years. The table shows that about half of the respondents have experience of between two and five years. The other half had experience of at least six years. These results show that the study had a good balance between respondents with relatively short experience and those with long experience. The balance also assists in getting balanced insights into the phenomenon being researched. The inference is that all the participants had adequate experience to provide insightful and reliable information.

Figure 4.3: Years of experience of respondents

Source: Research data

The graph above emphasises the experience of most of the respondents, with the more significant percentage having less experience. The upside of this scenario is that the respondents will have up-to-date theoretical knowledge of automation. The downside is that half of the respondents do not have long experience and may not fully understand how accounting firms work. However, about half of the respondents had experience longer than five years which assists in bringing balance to the insights obtained from the respondents. The inference is that all the participants had adequate experience to provide insightful and reliable information.

Table 4.4: Revenue of accounting firms employing questionnaire respondents

		Frequency	Per cent	Valid per cent	Cumulative %
Valid	0 to R35 million	20	33.3	33.3	33.3
	Over R35 million but below R85 million	10	16.7	16.7	50.0
	Over R85 million	30	50.0	50.0	100.0
	Total	60	100.0	100.0	

Source: Research data

The table above shows the size of the accounting firms employing the respondents. Fifty per cent of the respondents worked for accounting firms with annual revenue above R85 million. The *Government Gazette* No. 42304 of 2019 classifies these accounting firms as large. Sixteen point seven per cent of the respondents worked for accounting firms earning between R35 million and R85 million. The *Government Gazette* No. 42304 of 2019 classifies these accounting firms as a medium. Thirty-three point three per cent of the respondents worked for accounting firms earning less than R35 million. The *Government Gazette* No. 42304 of 2019 classifies these accounting firms as small. Therefore, half of the respondents in this study were from large firms, and another half worked for small and medium firms. The mix and balance in terms of the firm's size brought some diversity in the demographic of respondents. Small, medium and big firms were all represented in the study, which assists in getting insights from all the firms' sizes. According to Jabłoński and Ziębicki (2019:33), automation of business processes is usually capital-intensive and is implemented more by large businesses than smaller firms. Bigger accounting firms are likelier to have more automated processes because they can afford them compared to smaller firms. The inference is that the respondents' experience differs depending on the size of the accounting firm they work for.

4.2.1.4 Number of employees in the accounting firm

Table 4.5: Number of employees in accounting firms employing questionnaire respondents

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	0 to 50	10	16.7	16.7	16.7
	51 to 250	22	36.7	36.7	53.3
	More than 250	28	46.7	46.7	100.0
	Total	60	100.0	100.0	

Source: Research data

The table above shows the size of the respondents' firms regarding the number of employees. Forty-six point seven per cent worked for accounting firms with a staff headcount of more than 250. Thirty-six point seven per cent of the respondents worked for accounting firms employing 51 and 250 employees. Sixteen point seven per cent of the respondents worked for accounting firms employing less than 50 employees. The *Government Gazette* No. 42304 of 2019

classifies these accounting firms as large. It classifies those between 51 and 250 as medium and those less than 50 employees as small. The mix of the different sizes gives a balanced perspective from the background of the firm's size. According to Shore and Wright (2018:5), big four firms have better financial resources and the capability to invest in technology and automated processes to assist them in their service offering compared to smaller accounting firms. This inference is that big auditing firms use more technology and automated processes than smaller firms. Therefore, the inference is that the employees' experience is different depending on the size of the accounting firm they work for.

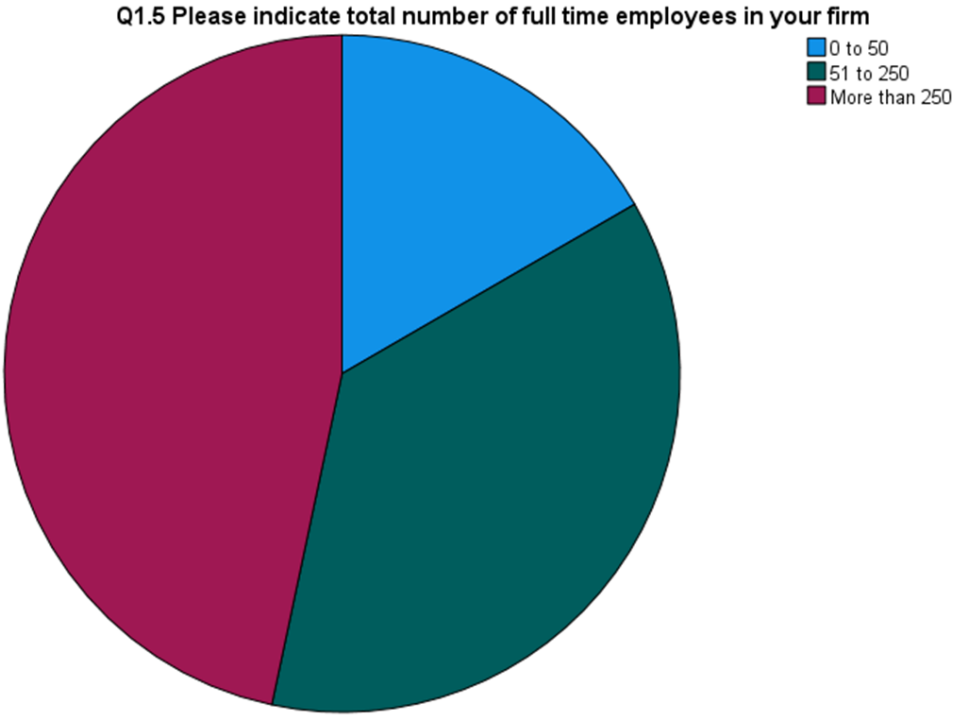

Figure 4.4: Number of full-time employees in the respondents' firms

Source: Research data

The figure above shows that most of the respondents came from large firms per the classification of *Government Gazette* No. 42304 of 2019. 36.7% and 16.7% came from medium and small firms, respectively. The inference is that the study provided a good mix of respondents in terms of the size of the accounting firms they worked for. The diversity of firms assisted by bringing a variety of views regarding the size of the accounting firm the respondents came from.

4.2.2 Business processes where automation is applicable

Question 2.1: Applicability of automation to payroll processing

Table 4.6: Business processes where automation is applicable

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Neutral	8	13.3	13.3	13.3
	Agree	11	18.3	18.3	31.7
	Strongly Agree	41	68.3	68.3	100.0
	Total	60	100.0	100.0	

Source: Research data

The table above shows that 68.3% of the respondents strongly agree, while 18.3% agree that payroll processing can be automated. Only 13.3% are neutral. Thus, most respondents believe that automation applies to most business processes of payroll processing. The findings align with what Winshuttle (2019:5) observes when he says that automation helps process payroll records and employee data management.

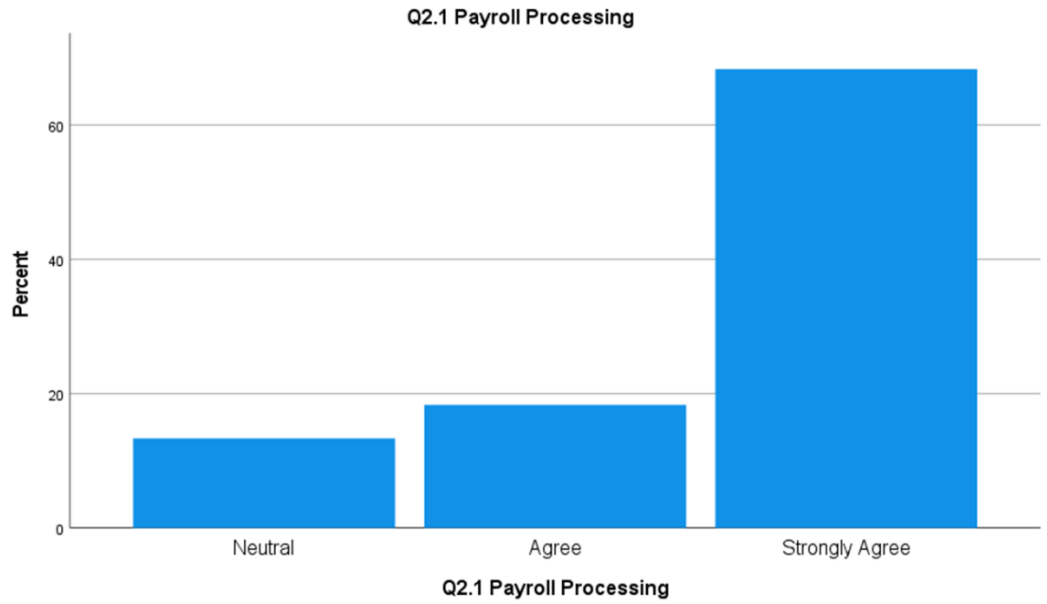

Figure 4.5: Applicability of automation to payroll processing

Source: Research data

From the figure above, payroll processing is one of the two business processes that got the most significant vote for the applicability of automation; agree and strongly agree to add to 86.7%. The inference from the results is that most respondents see payroll as one area where

automation is highly applicable. The findings align with what Winshuttle (2019:5) observes when he says that automation helps process payroll records and employee data management.

Q.2.2 Accounting transactions capturing and processing

Table 4.7: Accounting transactions capturing and processing

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Neutral	6	10.0	10.0	10.0
	Agree	21	35.0	35.0	45.0
	Strongly Agree	33	55.0	55.0	100.0
	Total	60	100.0	100.0	

Source: Research data

From the table above, 55% of the respondents strongly agree, while another 35% agree that capturing and processing accounting transactions can be automated. Ten per cent were neutral, and none disagreed. The inference is that transaction processing and capturing are big candidates for automation. Qiu (2016:5) argues that processing accounting transactions manually is time-consuming. He adds that the slow manual process impacts decision-making because the final reports and other output may be produced late. The author suggests that the solution to this problem is the implementation of automation in accounting.

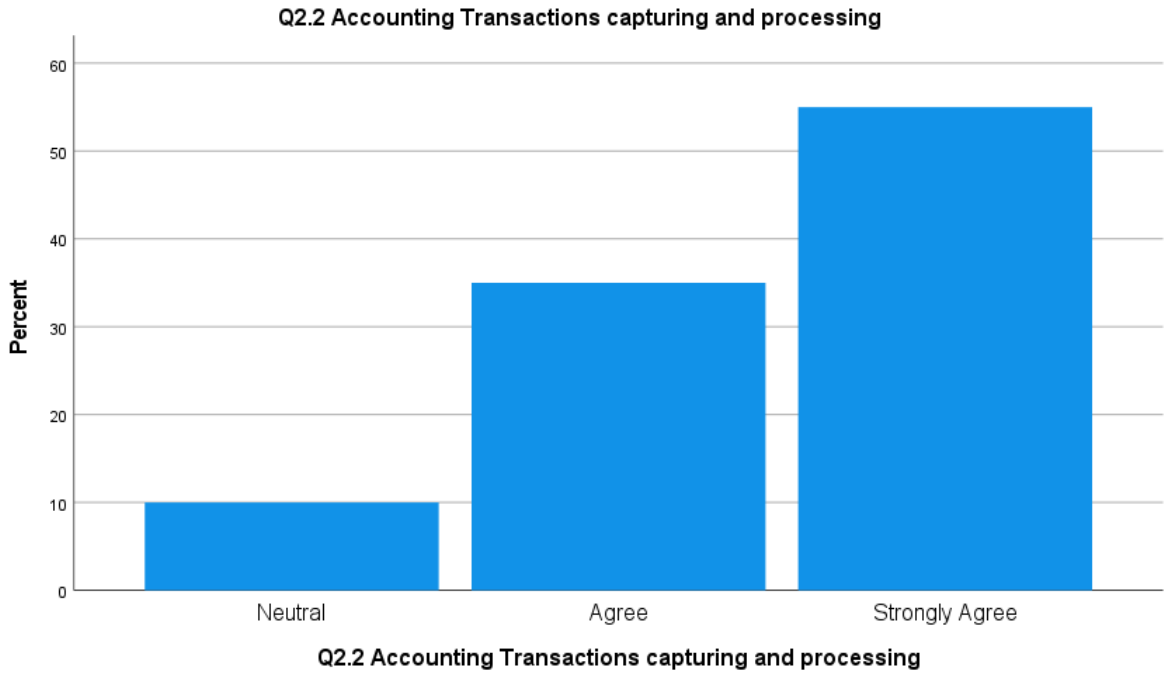

Figure 4.6: Applicability of automation to accounting transactions capturing and processing

Source: Research data

From the figure above, it is evident that accounting transactions capturing and processing are favourite candidates for automation by most respondents. Accounting transaction processing got the most significant vote for the applicability of automation, with a combined vote of 90% for strongly agree and agree. Thus, transaction processing and capturing can be efficiently performed using automated systems. Al-Laith and Ghani (2012:12) discuss e-accounting, which is short for electronic accounting. They see this form of accounting as a system that uses computer technology for accounting work in organisations. E-accounting is used to record, review, track and assess organisational financial data. E-accounting results in reliable and accurate data.

Q.2.3 Managing debtors and creditors

Table 4.8 : Applicability of automation to managing debtors and creditors

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Strongly Disagree	1	1.7	1.7	1.7
	Disagree	6	10.0	10.0	11.7
	Neutral	9	15.0	15.0	26.7
	Agree	13	21.7	21.7	48.3
	Strongly Agree	31	51.7	51.7	100.0
	Total	60	100.0	100.0	

Source: Research data

The table above shows that 51.7% of the respondents strongly agree that automation can be used to manage debtors and creditors. In comparison, another twenty-one point seven per cent agree that automation may be used to manage debtors. Fifteen per cent of the respondents are neutral, while 10% disagree and another 1.7% strongly agree. From the responses, the inference is that respondents do not think that automation may be applied to managing debtors and creditors as much as it applies to payroll and transaction processing, where none disagreed. Winshuttle (2019:5) expresses that automation helps process creditors and debtors. Sampson (2021:123) cannot substitute humans in non-routine tasks requiring complex cognitive ability and problem-solving. Thus, debtors and creditors management may involve cognitive abilities that automated systems cannot perform.

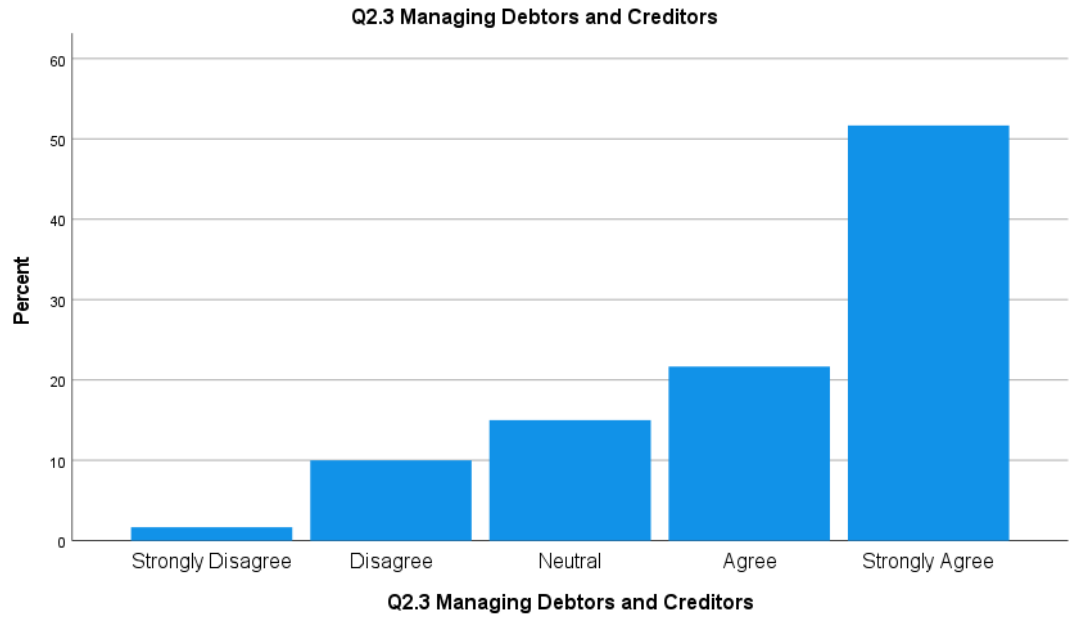

Figure 4.7 : Applicability of automation to managing debtors and creditors

Source: Research data

From the figure above, it is evident that the applicability of automation in managing debtors is debatable, with some respondents thinking that this cannot be automated. Winshuttle (2019:5) expresses that automation helps process creditors and debtors. Thus, debtors and creditors management may involve some cognitive abilities which automated systems cannot perform. Sampson (2021:123) believes one cannot substitute humans in non-routine tasks requiring complex cognitive ability and problem-solving.

Q.2.4 Accounting reconciliations

Table 4.9 : Applicability of automation to accounting reconciliations

		Frequency	Per cent	Valid per cent	Cumulative %
Valid	Strongly Disagree	2	3.3	3.3	3.3
	Disagree	4	6.7	6.7	10.0
	Neutral	11	18.3	18.3	28.3
	Agree	18	30.0	30.0	58.3
	Strongly Agree	25	41.7	41.7	100.0
	Total	60	100.0	100.0	

Source: Research Data

From the table above, 41.7% of the respondents strongly agree that automation may be deployed in accounting reconciliations, plus another 30% also agree that accounting reconciliations can be automated. However, 10% disagreed that accounting reconciliations may be automated. The inference is that just like managing debtors and creditors above, respondents are divided regarding the applicability of automation in reconciliations. Thus, reconciliations may involve some cognitive abilities that automated systems cannot perform. The results are supported by Peruffo *et al.* (2017:8), who point out that automated systems cannot fully complete technical tasks and non-routine work where workers focus more on problem-solving.

Q.2.5 Financial statements preparation

Table 4.10: Applicability of automation to financial statements preparation

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Disagree	2	3.3	3.3	3.3
	Neutral	13	21.7	21.7	25.0
	Agree	21	35.0	35.0	60.0
	Strongly Agree	24	40.0	40.0	100.0
	Total	60	100.0	100.0	

Source: Research data

From the table above, 40% of the respondents strongly agree that financial statement preparation can be automated, and 35% agree that automation can be applied to financial statement preparation. Twenty-one point seven per cent are neutral, while 3.3% disagree. One can infer that automation somewhat applies to financial statement preparation, as most respondents feel that way. Qiu (2016:5) argues that processing accounting transactions manually is time-consuming. He adds that the slow manual process impacts decision-making because the final reports and other output may be produced late. The author suggests that the solution to this problem is the implementation of automation in accounting.

Q.2.6 Auditing

Table 4.11: Applicability of automation to auditing

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Strongly Disagree	4	6.7	6.7	6.7
	Disagree	5	8.3	8.3	15.0
	Neutral	27	45.0	45.0	60.0
	Agree	12	20.0	20.0	80.0
	Strongly Agree	12	20.0	20.0	100.0
	Total	60	100.0	100.0	

Source: Research data

From the table above, 20% of the respondents strongly agree that automation is applicable in auditing, plus another 20% agree that automation is applicable in auditing. On the other hand, auditing is the only business process where strongly agree and agree are less than 50% at 40%. Therefore, the inference is that certain routine tasks can be automated while others involving cognitive skills cannot. Kokina and Davenport (2017:119) explain that applying automation in auditing makes it easier to understand risk assessment. Manson *et al.* (2001:127) support this view when they say automation in auditing results in better quality audits at a fraction of the cost if they are deployed on routine tasks like analysis and summarising of financial data. Rozario *et al.* (2019) add that automation in the accounting and auditing field applies to specific tasks like preparing working papers, testing in auditing, and performing statistical calculations. They further explain that auditors are efficient and effective if they concentrate on higher-risk sections while automated processes perform routine tasks. Thus, automation can perform certain tasks in auditing, while there are other tasks where humans are required to perform cognitive and problem-solving tasks.

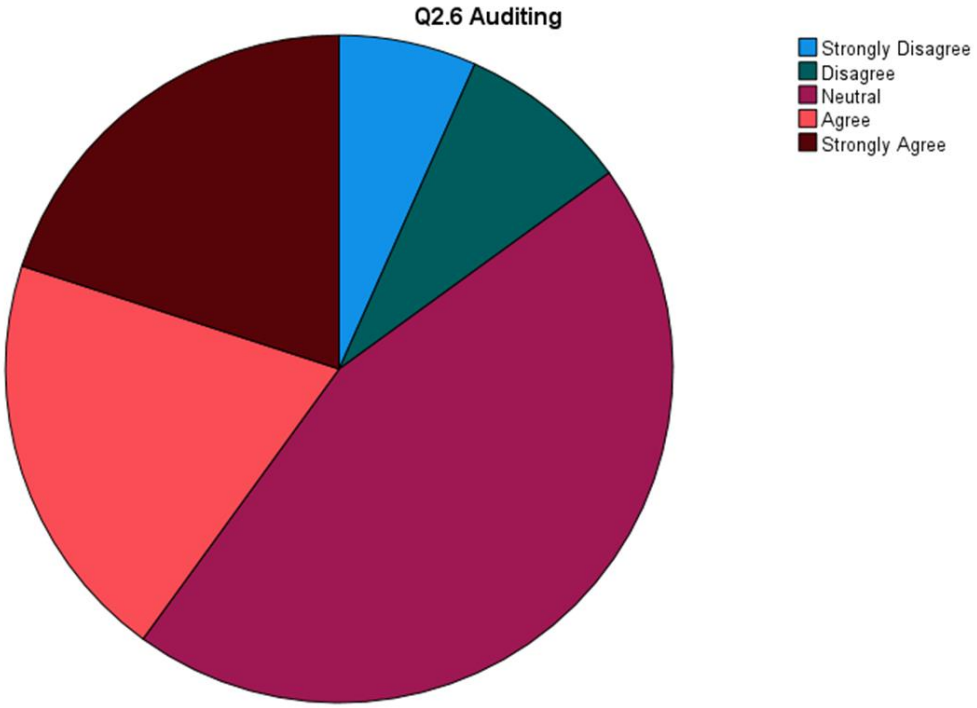

Figure 4.8: Applicability of automation to auditing

Source: Research data

It is evident from the figure above that most respondents are neutral in terms of the applicability of automation in auditing. Less than half of the respondents agree or strongly disagree that automation applies to auditing. Thus, as stated above, automation can perform certain tasks in auditing, while there are other tasks where humans are required to perform cognitive and problem-solving tasks.

4.2.3 Benefits of automation for accounting firms

Q3.1 Lower operating costs

Table 4.12: Automation results in lower operating costs

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Disagree	4	6.7	6.7	6.7
	Neutral	4	6.7	6.7	13.3
	Agree	19	31.7	31.7	45.0
	Strongly Agree	33	55.0	55.0	100.0
	Total	60	100.0	100.0	

Source: Research data

The data tabulated above shows that 55% of the respondents strongly agree, plus another 31.7% agree, representing most respondents, that automation of business processes of accounting firms leads to lower costs. Six point seven per cent are neutral, and another 6.7% disagree. The inference from the results is that automation reduces the operating costs of accounting firms. According to Jabłoński and Ziębicki (2019:38), automation reduces operating costs mainly from lower headcount in employment as automated systems perform routine tasks. The results are supported by Chan and Vasarhelyi (2011:155), who postulate that automation saves the time and labour needed to complete tasks. Manson et al. (2001:127) support these views when they say automation in auditing results in better quality audits at a fraction of the cost.

Q3.2 Less human errors and improved efficiency

Table 4.13: Automation results in fewer human errors and improves efficiency

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Neutral	6	10.0	10.0	10.0
	Agree	19	31.7	31.7	41.7
	Strongly Agree	35	58.3	58.3	100.0
	Total	60	100.0	100.0	

Source: Research data

The table above shows that 58.7% of the respondents strongly agree, plus an additional 31.7% agree that automation reduces human errors and improves efficiency. Ten per cent of the respondents are neutral, with none disagreeing. The inference is that automation is an important intervention to reduce human errors and improves efficiency. The results are supported by Egiyi and Chukwuani (2021:33) who mention several benefits associated with automation, including non-stop performance that talks to no limitation on working hours. Automated processes can run 24/7/365, increasing productivity to unimaginable levels in manual systems. The authors also mention the advantage of consistency and reduced errors in work. Automated systems produce error-free data and reduce output variability and operating costs, mainly from lower headcount in employment. According to Jabłoński and Ziębicki (2019:38), operations are performed and completed speedily with automation. Thus, automated systems significantly reduce errors and improve efficiency.

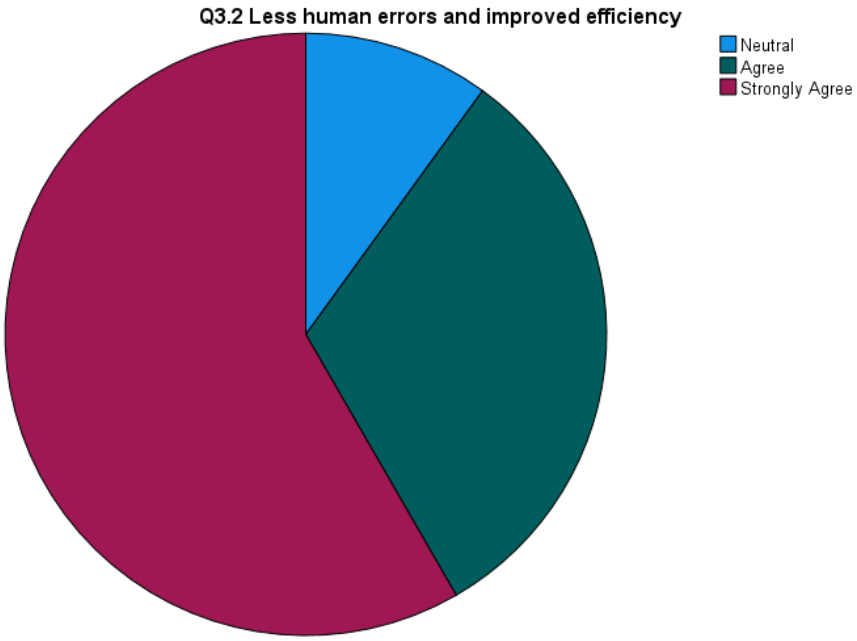

Figure 4.9: Automation results in fewer human errors and improves efficiency

Source: Research data

It is quite evident from the figure above that most respondents either strongly agree or agree that automated processes result in fewer human errors and improve efficiency. Only a small fraction of the respondents decided to be neutral. The inference is that automation reduces human errors and improves efficiency and productivity.

Q3.3 Better quality work

Table 4.14 : Automation results in better quality work

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Disagree	1	1.7	1.7	1.7
	Neutral	10	16.7	16.7	18.3
	Agree	22	36.7	36.7	55.0
	Strongly Agree	27	45.0	45.0	100.0
	Total	60	100.0	100.0	

Source: Research data

The table above shows that 45% of the respondents strongly agree, and another 36.7% agree that automation leads to better work quality than manual processes; 16.7% of the respondents were neutral, while 1.7% disagreed with the statement. The inference from the results is that automation results in a better quality of output in work performed by accounting firms. The views are supported by a literature review by Choi and Baker (2017:23). They say automation may result in several benefits to the business, including lower production costs, the potential for better quality, and more profits. Jabłoński and Ziębicki (2019:38) add that automation reduces human errors and improves efficiency.

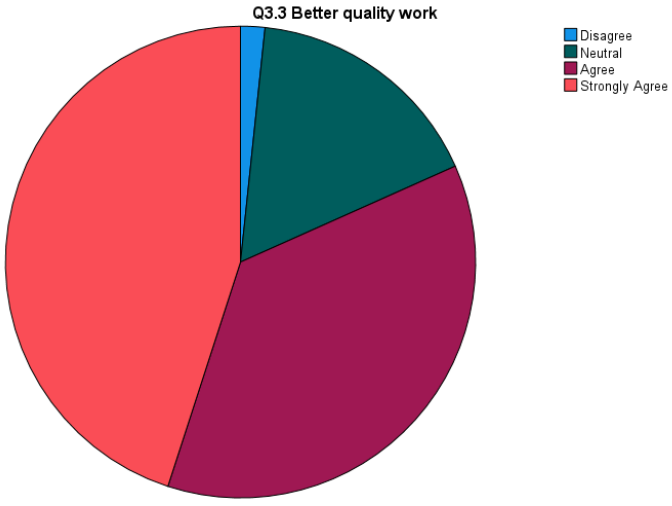

Figure 4.10: Automation results in better quality work

Source: Research data

The graph above is an excellent pictorial representation of the respondents' views. Large segments of the pie chart represent strongly agree and agree. Only a small sector was neutral or disagreed with the statement that automation leads to better quality work output when automated business processes are automated. As discussed above, the inference is that automation results in better quality output for accounting firms.

Q3.4 Speedy performance of operations and completion

Table 4.15 : Automation results in a speedy performance of operations and completion

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Neutral	4	6.7	6.7	6.7
	Agree	20	33.3	33.3	40.0
	Strongly Agree	36	60.0	60.0	100.0
	Total	60	100.0	100.0	

Source: Research data

The table above shows that 60% of the respondents strongly agree, plus another 33.3% agree that automation leads to faster performance and completion of tasks; 6.7% of the respondents were neutral, and none disagreed with the statement. The inference is that automation accelerates the speed at which accounting firms perform and complete tasks. The results align with the literature review as Qiu (2016:5) argues that manually processing accounting transactions is time-consuming. He adds that the slow manual process impacts decision-making because the final reports and other output may be produced late. The author suggests that the solution to this problem is the implementation of automation in accounting. According to Jabłoński and Ziębicki (2019:38), operations are performed and completed speedily. Egiyi and Chukwuani (2021:33) comment that automated processes can run 24/7/365, increasing productivity to unimaginable levels in manual systems. Thus, automated processes increase the speed of completing tasks.

Q3.5 Processing of big data

Table 4.16: Automation assists in processing big data

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Disagree	1	1.7	1.7	1.7
	Agree	13	21.7	21.7	23.3
	Strongly Agree	46	76.7	76.7	100.0
	Total	60	100.0	100.0	

Source: Research data

From the table above, 76.7% of the respondents, plus 21.7% of the respondents, agree that automation assists with processing big data. Only 1.7% of the respondents disagreed with the statement. Most of the respondents are, therefore, of the view that automation assists with processing big data. The inference is that automated processes can handle and process big data. The literature review supports the results. Wang and Huynh (2012:13) note that automated accounting systems can process vast transactions with high speed, accuracy and efficiency. Jabłoński and Ziębicki (2019:38) believe that automation can process big data (diverse and extensive information), which assists in identifying, standardising, and analysing significant information at the entire enterprise. Kumar (2018:1) says the following: "The discovery of digitalisation has transformed the financial industry and how business deals are transacted. Accountants can keep large amounts of data, conduct complicated calculations and manage financial transactions from a computer if they deploy automation in their business processes."

Q3.6 Improved compliance with relevant legislation

Table 4.17: Automation results in improved compliance with relevant legislation

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Disagree	7	11.7	11.7	11.7
	Neutral	21	35.0	35.0	46.7
	Agree	14	23.3	23.3	70.0
	Strongly Agree	18	30.0	30.0	100.0
	Total	60	100.0	100.0	

Source: Research data

The table above shows that 30% of the respondents strongly agree, and another 23.3% agree that automation improves compliance with relevant legislation; 35% of the respondents are neutral, while 11.7% disagree that automation assists with compliance with various pieces of legislation. The study's results infer that compliance with legislation may not be left entirely to automated processes. There are other aspects where human intervention is needed to ensure full compliance rather than relying only on automated processes. Wang and Huynh (2012:13) point out that organisations that use automated accounting systems potentially gain greater insight into the day-to-day company processes and better exposure to essential details. Jabłoński and Ziębicki (2019:38) observe that automation improves quality and customer satisfaction by processing information in real-time, 24/7, including peak hours. The authors add that automation also improves compliance with legislative requirements like tax and the companies act.

Therefore, the overall conclusion that can be drawn is that most respondents see automation as an advantaging phenomenon in all these six areas, with compliance with legislation receiving a minor thumbs up.

4.2.4 The attitude of employees towards automation

Q4.1 Automation leads to unemployment

Table 4.18: Automation leads to unemployment

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Strongly Disagree	4	6.7	6.7	6.7
	Disagree	6	10.0	10.0	16.7
	Neutral	18	30.0	30.0	46.7
	Agree	15	25.0	25.0	71.7
	Strongly Agree	17	28.3	28.3	100.0
	Total	60	100.0	100.0	

Source: Research data

The table above shows that 28.3% strongly agree, and another 25% agree that automation leads to unemployment. More than half of the respondents (53.3%) believe that automation can replace humans; 30% of the respondents are neutral, 10% disagree, and another 6.7% strongly disagree. The inference that can be drawn from the results is that automation does not completely replace humans but rather takes certain tasks and leaves other tasks requiring cognitive skills to be performed by humans. The literature study is in line with the results. Egiyi and Chukwuani (2021:34) add that employees may fear that automation will weaken their positions. Kedziora and Kiviranta (2018), quoted in Egiyi and Chukwuani (2021:34), comment that humans who in the past had to compete for jobs themselves now need to compete with machines. However, Deloitte (2018), quoted in Egiyi and Chukwuani (2021:34), remarks that employees who previously performed repetitive manual tasks may be upgraded to implement, manage and control automating machines. The employees may find their job more satisfying, reducing their doubts and suspicion of automation. Goos and Manning (2007:118) speak of job polarisation. Job polarisation is when routine tasks are automated, resulting in demand for professions that cannot be automated.

Q4.2 Automation leads to employees performing better tasks

Table 4.19: Automation assists employees in performing better tasks

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Disagree	2	3.3	3.3	3.3
	Neutral	13	21.7	21.7	25.0
	Agree	25	41.7	41.7	66.7
	Strongly Agree	20	33.3	33.3	100.0
	Total	60	100.0	100.0	

Source: Research data

From the table above, 33.3% of the respondents strongly agree, plus another 41.7% of the employees agree that automation leads to employees performing better tasks. Therefore, the inference is that automation enables employees to perform better tasks. The views of the respondents are aligned with the literature review. According to Egiyi and Chukwuani (2021:33, automation is when machines take care of slow data entry type work, and humans are left to tackle high-value work where they are genuinely needed. Sampson (2020:123) further says that automation can substitute human workers with computers in performing manual tasks and transferring humans to non-routine tasks where complex cognitive ability and problem-solving are needed). Peruffo *et al.* (2017:8) support this when they say future jobs will be a combination of technical tasks and non-routine work where workers are focused more on problem-solving, communication with each other and finding ways to be flexible and adapting to changes. According to Jabłoński and Ziębicki (2019:33), automation alters an accounting professional's work. It eliminates most routine tasks and leaves room for more strategic tasks, interactions with stakeholders, drawing conclusions based on analysis of information produced by automated systems, and general improvement of business performance. The World Economic Forum (2016), cited in Egiyi and Chukwuani (2021:34), also adds that routine jobs, middle-skilled, white-collar jobs like data capturing staff, accounts and payroll staff and auditors will be demanded less soon.

Question 4.3: Employees support automation if its effect on them is clarified

Table 4.20: Automation is supported by employees if the effect on them is clarified

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Disagree	2	3.3	3.3	3.3
	Neutral	8	13.3	13.3	16.7
	Agree	27	45.0	45.0	61.7
	Strongly Agree	23	38.3	38.3	100.0
	Total	60	100.0	100.0	

Source: Research data

From the table above, a significant majority of respondents (38.3% strongly agree and 45% agree) believe that employees will support the implementation of automation if its effect on them is clarified. The inference is that accounting firms should clearly explain the effect of any planned automation of business processes if they are to get the buy-in of their employees. The results of the study are aligned with the literature review. Kedziora and Kiviranta (2018), quoted in Egiyi and Chukwuani (2021:34), comment that humans who in the past had to compete for jobs now need to compete with machines. The author further remarks that this fear will grow if employees are not adequately engaged and aware of the consequences of automation. Hunton (2002:5) argues that there is a need to study users' attitudes and the psychological impact on them to get a complete perspective and understand the full spectrum of new technology.

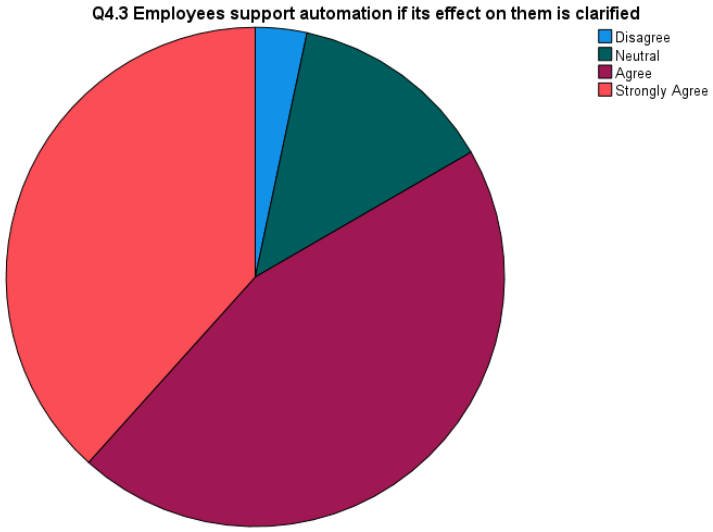

Figure 4.11: Automation is supported by employees if the effect on them is clarified

Source: Research data

The pie chart above is a clear representation of the views of the respondents in the study. An overwhelming majority of the respondents either strongly agree or agree that support for the automation of business processes is obtained from employees if its effect on them is clarified. The inference, as discussed above, is that employees support automation if the management of accounting firms clarifies the effect on them.

Q4.4 Employees generally accept change

Table 4.21: Employees generally accept change

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Strongly Disagree	1	1.7	1.7	1.7
	Disagree	25	41.7	41.7	43.3
	Neutral	17	28.3	28.3	71.7
	Agree	9	15.0	15.0	86.7
	Strongly Agree	8	13.3	13.3	100.0
	Total	60	100.0	100.0	

Source: Research data

From the table above, only 28.3% (13.3% strongly agree and 15% agree) of the respondents agree that employees accept change; 43.4% of the respondents disagree or strongly disagree that employees accept change, while another 28.3% are neutral. It can therefore be concluded that from the respondents' view, employees generally do not accept change. The views confirm what the study discovered through the literature review. Egiyi and Chukwuani (2021:34) observe that projections of automation taking over jobs from humans could be disturbing, and planned changes to work processes may increase employees' resistance to learning new technologies. They may be reluctant to accept new technologies. Huntun (2002:6) explains that employees adapt to business changes differently. Some easily accept the changes, while others may be willing to adapt but do not know how to do it. At the same time, some unconditionally refuse to adapt to the company changes.

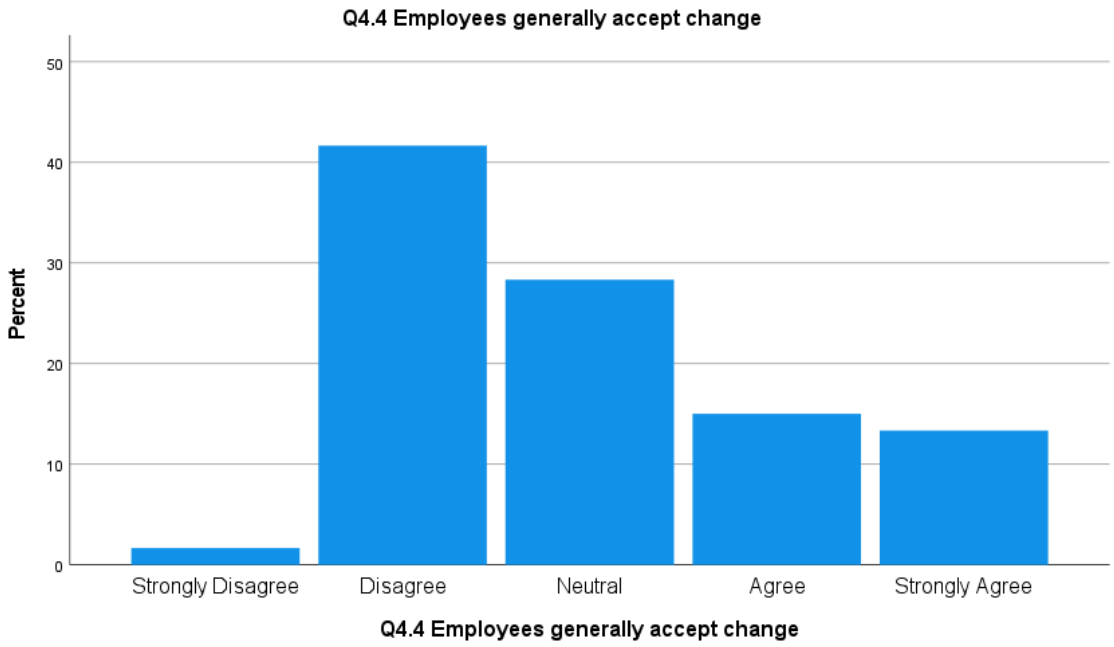

Figure 4.12: Employees generally accept change

Source: Research data

The bar graph above shows that majority of the respondents are of the view that employees do not accept change. The inference is that employees generally do not accept change. The views confirm what the study discovered through the literature review, as discussed in the table above.

Q4.5 Full cooperation of employees is needed to implement new technology properly

Table 4.22: Cooperation of employees is needed to implement new technology

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Neutral	2	3.3	3.3	3.3
	Agree	20	33.3	33.3	36.7
	Strongly Agree	38	63.3	63.3	100.0
	Total	60	100.0	100.0	

Source: Research data

The table above shows that most of the respondents (63.3% that strongly agree plus 33.3% that agree) believe that to successfully implement new technology, the cooperation of employees is needed. The inference is that accounting firms should solicit the cooperation of employees if they are to implement the automation of processes successfully. The views of the respondents are in line with the literature review. Murtagh *et al.* (2015:140) declare that for an organisation to realise the full capability of technology, users of the new technology must have the right attitude and proper behavioural response. Yang *et al.* (2015: 254) agree with this view when users' attitudes influence the successful implementation of automation and realise its full benefits. There is potential for rejection of technology by users like employees, resulting in an inability to implement the technology. Yang *et al.* (2015:254) express that if the organisation's employees reject the technology, the company may not deploy it.

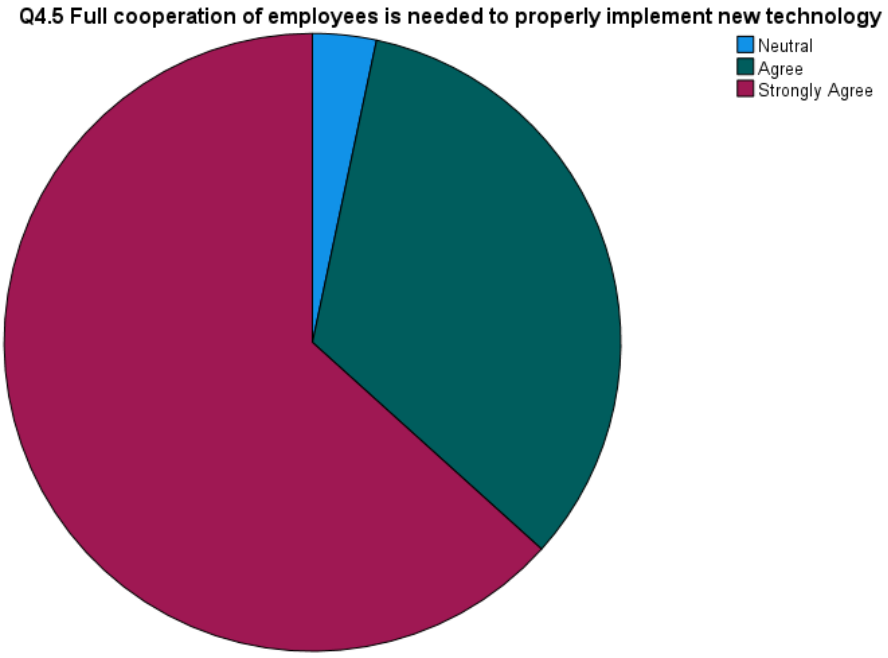

Figure 4.13: Cooperation of employees is needed to implement new technology

Source: Research data

The pie chart above clearly shows that respondents in this study believe that the full cooperation of employees of accounting firms is vital for the successful implementation of new technology. The inference is that accounting firms should solicit the cooperation of employees if they are to implement the automation of processes successfully. The views of the respondents are in line with the literature review. Törnqvist and Forss (2018:6) believe that employee attitudes toward new technology are vital to fully grasping how it impacts the

professions and entities they work for. The authors add that perspectives and stances on accounting firms' staff automation need to be studied because their lack of cooperation in implementing new technology may result in automation not being helpful and not working optimally. Thus, the co-operation and buy-in of employees are needed to implement automation successfully.

Q4.6 Most accounting tasks are susceptible to automation

Table 4.23: Most accounting tasks are susceptible to automation

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Disagree	3	5.0	5.0	5.0
	Neutral	14	23.3	23.3	28.3
	Agree	18	30.0	30.0	58.3
	Strongly Agree	25	41.7	41.7	100.0
	Total	60	100.0	100.0	

Source: Research data

The study's results tabulated above show that 41.7% of the respondents strongly agree, 30% agree, 23.3% are neutral, and 5% disagree. These are mixed results where one can infer that certain tasks can be automated in accounting while some cannot. The results are aligned with the literature study. Brante (2009:25) speaks of the theory of professions and explains that a professional career is distinguishable by the higher education needed to attain it. However, over the years, the significance of this perspective is decreasing. A professional should solve a particular problem in society with their knowledge. A practitioner has integrity and importance in the community to be trusted (Brante 2009:27). Therefore, one can infer that once certain aspects of the accounting firms' processes are automated, knowledge conveyance is no longer possible or necessary since the clients may no longer demand the skills and knowledge of accountants and auditors.

Shim and Yang (2018:144) argue that technology does not easily replace cognitive occupations. Routine tasks are prominent candidates for carrying them out more efficiently using technology (automation). Goos and Manning (2007:118) explain that accountants are

most prone to the effects of automation as they are part of routine tasks. Frey and Osborn (2017:265) explain that employers now need employees with rare cognitive skills and high levels of education. Employees with less cognitive skills are replaceable by technology. Ross and Weinberg (2017), quoted in Egiyi and Chukwuani (2021:34), estimate that 43% of jobs in the finance sector will be automated.

4.2.5 Automation and business success

Q5.1 Automation broadens the service offering of accounting firms

Table 4.24: Automation broadens the service offering of accounting firms

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Neutral	9	15.0	15.0	15.0
	Agree	21	35.0	35.0	50.0
	Strongly Agree	30	50.0	50.0	100.0
	Total	60	100.0	100.0	

Source: Research data

Fifteen per cent of the respondents are neutral. The inference is, therefore, that with automation, accounting firms can offer services they would not be able to provide in a manual environment. Automation increases the scalability of operations (Jabłoński & Ziębicki, 2019:38). Most respondents (50% that strongly agree, plus 35% that agree) think that automation enables accounting firms to offer broader services to their clients.

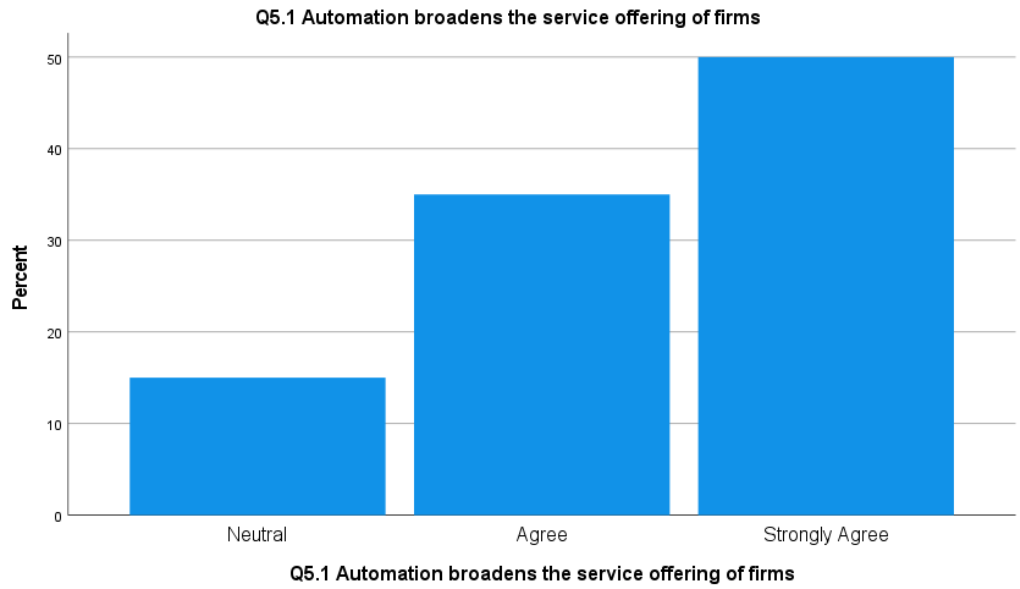

Figure 4.14: Automation broadens the service offering of accounting firms

Source: Research data

The above bar graph clearly shows the respondents' views, with none disagreeing that automation enables accounting firms to offer broader services to their clients. The inference is, therefore, that with automation, accounting firms can offer services they would not be able to provide in a manual environment, and automation increases the scalability of operations, as discussed above.

Q5.2 Automation leads to growth in a firm's revenue

Table 4.25: Automation leads to growth in a firm's revenue

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Disagree	4	6.7	6.7	6.7
	Neutral	11	18.3	18.3	25.0
	Agree	19	31.7	31.7	56.7
	Strongly Agree	26	43.3	43.3	100.0
	Total	60	100.0	100.0	

Source: Research data

The table above (43.3% strongly agree plus 31.7% agree) shows that automation aids in growing the accounting firms' revenue; 18.3% are neutral, while 6.7% disagree. The conclusion from the results is that automation grows the revenue of accounting firms. The views of the respondents are aligned with the literature study. Soni *et al.* (2020) observe that automation enhances operational efficiencies and productivity, minimising waste from the process, giving the business a competitive advantage and maximising sales.

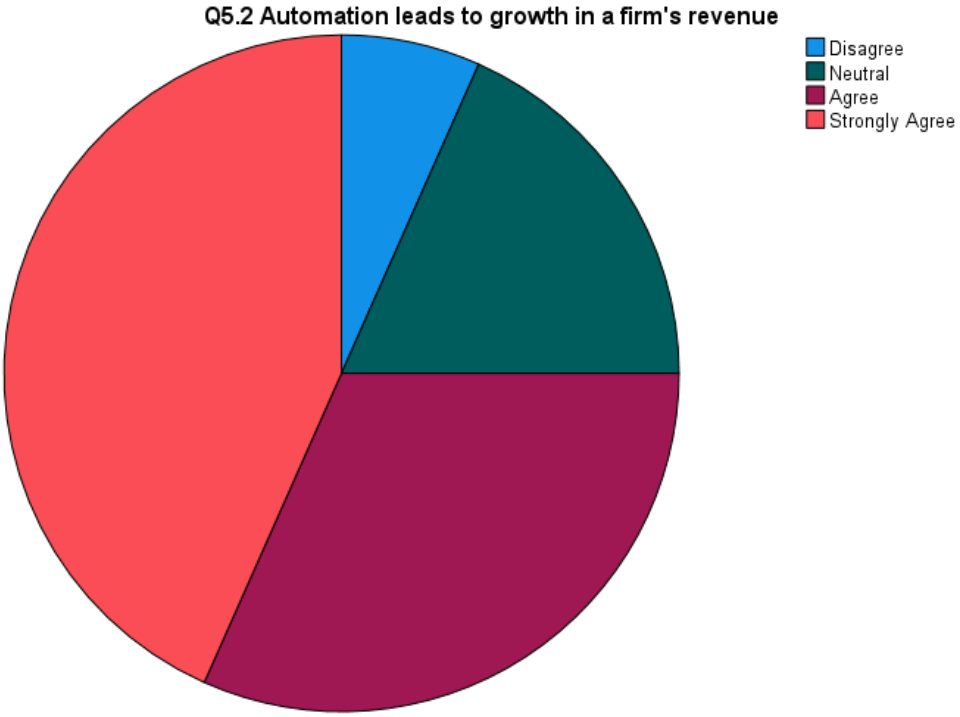

Figure 4.15: Automation leads to growth in a firm’s revenue

Source: Research data

The pie chart above clearly represents the respondents' views, with the majority throwing their weight behind the idea that automation assists in growing revenue for accounting firms. The inference is that automation increases the revenue of accounting firms because work can be completed faster, and they move to another client.

Question 5.3 Automation increases profits by reducing costs

Table 4.26: Automation increases profits by reducing costs

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Disagree	4	6.7	6.7	6.7
	Neutral	16	26.7	26.7	33.3
	Agree	19	31.7	31.7	65.0
	Strongly Agree	21	35.0	35.0	100.0
	Total	60	100.0	100.0	

Source: Research data

The table above shows that most respondents (35% strongly agree and 31.7% agree) believe that automation reduces the costs of accounting firms; 26.7% are neutral, while 6.7% disagree. The inference from the study results is that automation reduces the cost of operations for accounting firms. The results are aligned with the literature review. According to Choi and Baker (2017:23), automation may result in several benefits to the business, including lower production costs, the potential for better quality, and more profits. Soni *et al.* (2020) concluded that businesses that correctly deploy technology and automation have realised savings in time and money by automating repetitive procedures and tasks. Manyika *et al.* (2017:8-9) state that automation has several economic benefits, including increased profit, throughput, and productivity. According to Jabłoński and Ziębicki (2019:33), automated solutions usually have a low marginal cost compared to manual systems where wages are involved

Question 5.4: Automation improves the morale of employees

The study's results, as shown in the table above, confirm this as 45% (26.7% that strongly agree and 18.3% that agree) think that automation improves the morale of employees of accounting firms. Another 36.7% are neutral, while 18.3% (10% disagree and 8.3% strongly disagree) do not believe that automation improves employee morale. The inference is that automation somewhat improves the morale of employees. The results also show that some respondents do not agree with this view, with 18.3% not going with the view. The conclusion is that automation is not a significant factor in improving employees' morale. Rogers (2010:15) states that automation benefits are financial, social well-being, convenience, and general satisfaction. Thus, morale improvement comes from social well-being, convenience and satisfaction.

Table 4.27: Automation improves the morale of employees

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	5	8.3	8.3	8.3
	Disagree	6	10.0	10.0	18.3
	Neutral	22	36.7	36.7	55.0
	Agree	11	18.3	18.3	73.3
	Strongly Agree	16	26.7	26.7	100.0
	Total	60	100.0	100.0	

Source: Research data

Question 5.5 Automation enables accounting firms to take on more clients

Table 4.28: Automation enables accounting firms to take on more clients

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Strongly Disagree	2	3.3	3.3	3.3
	Neutral	15	25.0	25.0	28.3
	Agree	18	30.0	30.0	58.3
	Strongly Agree	25	41.7	41.7	100.0
	Total	60	100.0	100.0	

Source: Research data

The study's results tabulated above, most of the respondents (41.7% that strongly agree and 30% that agree) acknowledge that automation enables accounting firms to service more clients than they would if processes were performed manually; 25% of the respondents were neutral, and 3.3% strongly disagreed. The results show that automation enables accounting firms to service more clients. The literature study revealed similar views. According to Jabłoński and Ziębicki (2019:38), automation leads to improved quality and better customer

satisfaction as information processing is done in real-time, 24/7, including peak hours. Operations are performed and completed speedily with automation. The inference from the literature study is that if work is completed faster, capacity is increased to take on more clients.

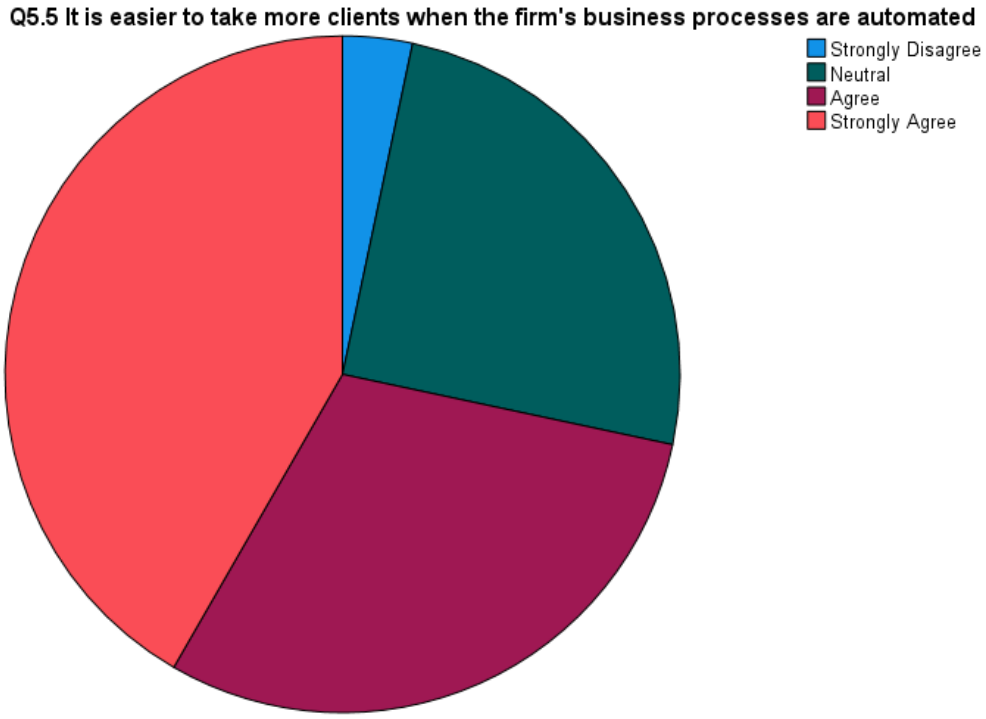

Figure 4.16: Automation enables accounting firms to take on more clients

Source: Research data

It is evident from the pie chart above that majority of the respondents either agreed or strongly agreed that accounting firms can take on more clients if they automate their business processes. A quarter of the respondents chose to be neutral in their responses. The results show that automation enables accounting firms to service more clients.

4.2.6 Drawbacks of automation

Q6.1 Automation is costly to develop and implement

Table 4.29 : Automation is costly to develop and implement

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Strongly Disagree	3	5.0	5.0	5.0
	Disagree	7	11.7	11.7	16.7
	Neutral	10	16.7	16.7	33.3
	Agree	23	38.3	38.3	71.7
	Strongly Agree	17	28.3	28.3	100.0
	Total	60	100.0	100.0	

Source: Research data

From the responses tabulated above, 66,7% (28.3% strongly agree and 38.3% agree) of the respondents believe that automation is costly to implement; 11.7% of the respondents were neutral, and 5% strongly disagreed that automation is expensive to develop and implement. The results show that the automation of processes is costly to implement. Jabłoński and Ziębicki (2019:33) add that the development of automation technologies is capital intensive, but automated solutions usually have a low marginal cost compared to manual systems where wages are involved. Additionally, hardware and software costs are decreasing, making automated solutions more competitive than manual labour. Thus, the initial outlay in automated systems may be expensive, but in the long run, businesses can save costs as wage costs are reduced as repetitive tasks are taken over by automated processes.

Q6.2 Automation leads to clients doing their work independently

Table 4.30: Automation leads to clients doing their own work

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	7	11.7	11.7	11.7
	Disagree	20	33.3	33.3	45.0
	Neutral	16	26.7	26.7	71.7
	Agree	10	16.7	16.7	88.3
	Strongly Agree	7	11.7	11.7	100.0
	Total	60	100.0	100.0	

Source: Research data

The discovery of automation by accounting firms leads to the loss of clients. From the study, as tabulated above, only 28.3% of the respondents believe that automation can lead to clients performing work independently; 45% of the respondents do not believe that automation can lead to clients doing some of the work independently, while 26.7% are neutral. The inference from the study's results is that automation does not lead to the loss of clients, as 45% of the respondents disagreed. Taipaleenmäki and Ikäheimo (2013:342) argue that companies' automation of transaction processing results in less demand for outsourced accounting skills. However, the study showed that accounting firms do not lose business because of automation.

Q6.3 Automation leads to the closure of accounting firms

Table 4.31: Automation leads to the closure of accounting firms

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Strongly Disagree	14	23.3	23.7	23.7
	Disagree	23	38.3	39.0	62.7
	Neutral	10	16.7	16.9	79.7
	Agree	9	15.0	15.3	94.9
	Strongly Agree	3	5.0	5.1	100.0
	Total	59	98.3	100.0	
Missing	System	1	1.7		
Total		60	100.0		

Source: Research data

From the table above, a minority of respondents, 20.4% (strongly agree and agree), believe somehow that automation leads to the closure of accounting firms. In comparison, 62.7% (strongly agree and disagree) do not believe that automation leads to the closure of accounting firms; 16.9% of the respondents are neutral. The inference from the study's results is that automation does not lead to the closure of accounting firms, as per the popular view. The literature points to the replacement of consultancy firms with technology, which was not confirmed in this study. Taipaleenmäki and Ikäheimo (2013:342) argue that former clients may in-source the accounting function if consultants are no longer indispensable.

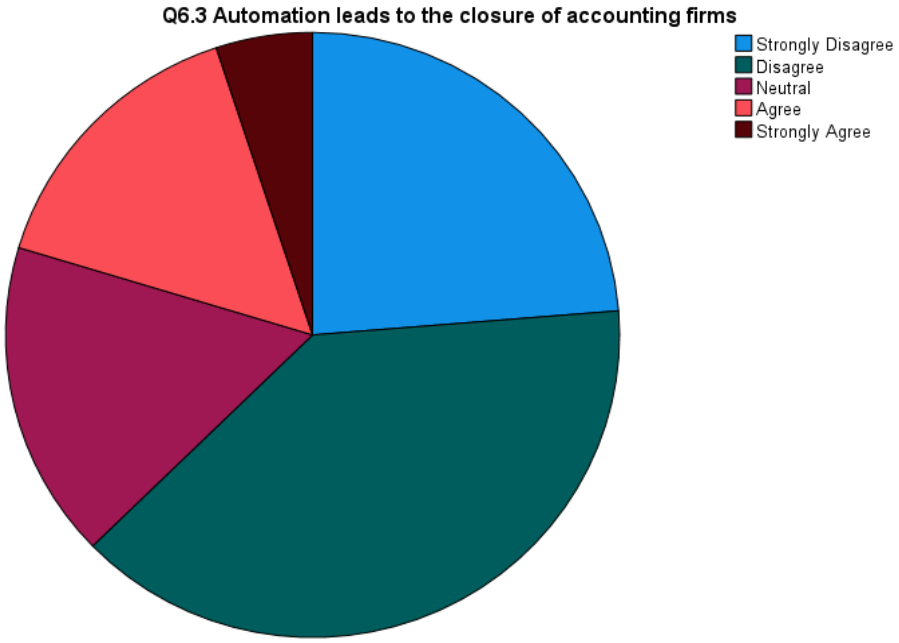

Figure 4.17: Automation leads to the closure of accounting firms

Source: Research data

The pie chart above clearly indicates that the respondents do not see automation as a reason accounting firms may be closed. The inference, therefore, is that automation does not lead to the closure of accounting firms.

Q6.4 Automation compromises the data security of clients

Table 4.32: Automation compromises the data security of clients

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Strongly Disagree	10	16.7	16.7	16.7
	Disagree	19	31.7	31.7	48.3
	Neutral	14	23.3	23.3	71.7
	Agree	12	20.0	20.0	91.7
	Strongly Agree	5	8.3	8.3	100.0
	Total	60	100.0	100.0	

Source: Research data

From the table above, 48.3% of the respondents disagree (disagree and strongly disagree) that automation compromises the security of the accounting firms' clients' data; 23.3% are neutral, while 28.3% agree that automated processes can compromise clients' data. The inference from the results is that the fear of compromising client data security is not that much among the employees of accounting firms. Egiyi and Chukwuani (2021:34) note that some accounting firm clients may be reluctant to adopt the automation of accounting processes due to data protection and transparency issues. Thus, although literature hints that the security of the client data can be compromised in automated environments, the results of this study do not agree with that view.

4.3 Qualitative data analysis

Ten interviews were conducted. The presentation of the qualitative results is in the form of those extracted from the qualitative data obtained during the qualitative data collection stage of the study. The participants in the study granted consent to be interviewed and to be recorded. The recorded interviews were then transcribed. In the qualitative stage of data collection, semi-structured interviews were used to explore the relationship between the automation of business processes and business successes in accounting firms in South Africa. Thematic analysis was used to analyse the data that was obtained from the semi-structured interviews. The thematic analysis was chosen because it allows for sound data reliability and helps to gain an in-depth understanding of the topic under discussion. An inductive approach was used in identifying the themes and patterns of meanings across the collected data. Verbatim participant quotations have also been included as part of the analysis. This assists in maintaining data integrity and the ethical status of the study. The qualitative data was analysed by adopting the six steps prescribed by Braun and Clarke (2006:87) when conducting thematic data analysis, namely:

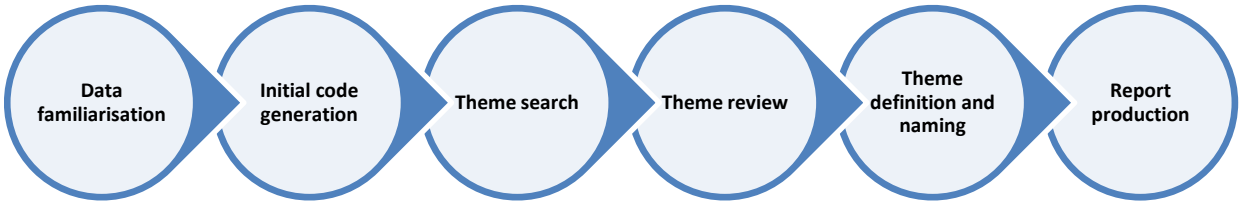

Figure 4.18: Thematic data analysis

Source: Adapted from Braun and Clarke (2006:87)

4.3.1 Demographics for the research participants

Table 4.33: Demographic information of Interview Participants

Q1(a)(i) Job Position					
		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Bachelor's degree	2	20.0	20.0	20.0
	Honour's degree	8	80.0	80.0	100.0
	Total	10	100.0	100.0	
Q1(a)(ii) Years of experience in the accounting field					
		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	2-5 years	2	20.0	20.0	20.0
	6-10 years	4	40.0	40.0	60.0
	11-15 years	3	30.0	30.0	90.0
	16-20 years	1	10.0	10.0	100.0
	Total	10	100.0	100.0	
Q1(b)Please indicate the total revenue of your firm per year					
		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	0 to R35 million	4	40.0	40.0	40.0
	Over R35 million but below R85 million	1	10.0	10.0	50.0

	Over R85 million	5	50.0	50.0	100.0
	Total	10	100.0	100.0	
Q1(c) Please indicate the total number of full-time employees in your firm					
		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	0 to 50	3	30.0	30.0	30.0
	51 to 250	2	20.0	20.0	50.0
	More than 250	5	50.0	50.0	100.0
	Total	10	100.0	100.0	

Source: **Research data**

Table 4.33 above presents the demographical information of the participants in the study. From the frequency tables above, all the participants in the interview hold a tertiary qualification, with 80% of them holding an honours degree; 80% of the participants have more than five years of experience in an accounting/audit firm environment, while the other 20% have two and five years of experience. The study, therefore, benefitted from the experienced participants, as 80% have more than six years of experience, and only 20% have two to five years of experience. The inference is that all the participants had adequate experience to provide insightful and reliable information. The results are not surprising because the study targeted individuals in management and other senior positions; 50% of the participants work for big audit firms employing more than 250 employees and earning more than R85 million in annual revenue; 20% of the participants work for medium-sized firms, while 30% of the participants in the interview work for small firms. The business classification into small, medium and large is per *Government Gazette* No. 42304 of 2019. According to Jabłoński and Ziębicki (2019:33), automation of business processes is usually capital-intensive and is implemented more by large businesses than smaller firms. Big accounting firms are likelier to have more automated processes because they afford them compared to smaller firms. The inference is that the respondents' experience differs depending on the size of the accounting firm they work for.

Table 4.34: Summary of demographic information of participants

Serial #	Code	Position	Size of the firm in terms of revenue	Number of years of experience	Highest Qualification
1.	Interviewee 1	Senior Manager	Big	8	Honours Degree + CA(SA)
2.	Interviewee 2	Audit Manager	Medium	8	Honours + CA(SA)
3.	Interviewee 3	Audit Manager	Small	6	Honours Degree
4.	Interviewee 4	Audit Senior	Big	2	Bachelor's degree
5.	Interviewee 5	Audit Senior	Big	3	Bachelor's Degree
6.	Interviewee 6	Audit Manager	Big	7	Honours Degree
7.	Interviewee 7	Audit Manager	Small	12	Honours Degree + CA(SA)
8.	Interviewee 8	Audit Manager	Small	11	Honours + CA(SA)
9.	Interviewee 9	Senior Manager	Big	17	Honours Degree + CA(SA)
10	Interviewee 10	Senior Manager	Small	11	Honours + CA(SA)

Source: Research data

Table 4.34 above is a summary of the demographic information of the participants. The participants who took part in the interviews for the study were purposely selected individuals. The participants were selected based on their roles in accounting firms' management. A purposeful or non-probabilistic sampling technique was used to select appropriate participants

who would provide insights into the relationship between the automation of business processes of accounting firms and their successes. Each participant was assigned a code between one and 10 and a means of identifying them to maintain anonymity and confidentiality. The participants have worked for the accounting firms in a senior role for at least two years which is considered adequate to provide insightful and reliable information. All the participants had tertiary qualifications in the field of accounting. The composition of the participants was diverse to allow for the collection of data relating to the relationship between the automation of business processes of accounting firms and their successes from different perspectives, thereby enriching the data collected. The participants were drawn from small, medium, and big accounting firms.

4.3.2 Discussion of the qualitative data

The study focuses on the relationship between the automation of business processes and the successes of accounting firms in South Africa. The researcher set out to evaluate the relationship between the automation of business processes and the successes of accounting firms in South Africa. This section describes the themes and sub-themes as captured in the table below. In addition, quotes extracted from the interviews are included to clarify meanings in respect of the transcribed data from the findings. The quotations cited were presented as narrated by the interviewees so that data is not manipulated. This allows for the maintenance of integrity. Additionally, the data analysed was validated regarding the literature. The data was collected from individuals holding senior positions in accounting firms. The participants were assigned codes to maintain anonymity in line with ethical requirements. The qualitative data analysis involves a discussion of the themes that emerge from the collected data and moved to the detailed analysis of the sub-themes. The table below summarises the themes and sub-themes as determined from the analysis.

The link between themes and research objectives

The main objective of the study was to explore the relationship between the automation of business processes and business successes in accounting firms in South Africa. Four specific research objectives were derived from the main objective. The collected data satisfied the requirements of the main research objective and the specific research objectives. The table below highlights the link between the specific research objectives generated to address the overall research aim.

Table 4.35: Themes and research objectives

Theme	Sub-Theme	Research objective
Theme 1: Business processes where accounting firms may deploy automation	1. Prominent candidates for automation (General) 2. Business processes automated by accounting firms	Objective 1: To investigate the business processes where accounting firms may deploy automation
Theme 2: Benefits of automation of business processes for accounting firms	1. Benefits of automating business processes in accounting firms (General) 2. Benefits that have accrued to accounting firms because of automation (Practical)	Objective 2: To explore the benefits accruing to accounting firms by automating business processes
Theme 3: Attitude of accounting firms' employees towards automation	1. Displacement of workers by technology 2. Accounting roles that can be displaced by technology 3. Improvement of the life of employees through automation	Objective 3: To assess the attitude of accounting firms' employees towards implementing automation
Theme 4: Automation of business processes of accounting firms and their success	1. Automation leads to the success of accounting firms 2. Ways in which automation leads to the success of accounting firms	Objective 4: To investigate if automation of business processes and business success improve metrics like productivity, efficiency, service offering and revenue
Theme 5: Drawbacks of automation in accounting firms	1. Disadvantages of automation 2. Security of clients' data in automated environments	Objective 5: To explore the drawbacks of automation in accounting firms

Source: Research data

The table below presents a summary of the thematic analysis that was obtained from open-coding themes.

Table 4.36: Themes and sub-themes from the thematic analysis

Description	Common themes	The research objective aligned with
Business processes where accounting firms may deploy automation		
Prominent candidates for automation (General)	• Running of operations of accounting firms • Allocating human resources to jobs and projects • IT audits • Risk assessments and the pulling of audit samples • Record billable hours for time spent providing a service to the client • Leave management automation where the leave application and approval • Logging and processing mileage to clients for auditors • Perform repetitive tasks • Capturing accounting transactions • Producing financial statements and management accounts • Payroll processing • Tax and other compliance work • Analysis of data • Producing reports after the inputting of data, including big data • Analyse financial statements, revenue, expenditure, and other financial elements • Generation of invoices and debtors; account statements, • Bank reconciliations and day-to-day calculations	Objective 1
Business processes automated by accounting firms	• Audit process • Allocating human resources to projects and • Managing the accounting firm's payroll, including leave management • Billing of clients by audit firms • Process accounting transactions for their client companies • Payroll processing for clients, • Preparation of financial statements, • Information sharing with clients, • Data analysis and testing	Objective 1

Benefits of automation of business processes for accounting firms		
Benefits of automating business processes in accounting firms (General)	• Higher efficiency and better delivery of services • Higher productivity. • saving time, • Better delivery for clients • Improvement of the quality of services • Do things quicker and when they are supposed to be done (timeliness), including timeous billing • Shortens the time to execute processes and tasks • Efficiency and saving of time happen for routine transactions • Meet client deadlines • Reduction of human errors • Improves customer satisfaction • The staff of accounting firms left to perform better and higher-level tasks • Reduces operating costs • Reduction of loss of information and leaving an audit trail • Diverse skills for employees of accounting firms as they need to learn IT skills to adapt	Objective 2 Objective 4
Benefits that have accrued to accounting firms because of automation (Practical)	• Efficiency • Accuracy in processing information • Fewer human errors • Faster processing of transactions, • Ability to service more prominent and more clients • Better compliance with laws and regulations • Increased revenues and profits. • Better public image for accounting firms • Consistency processing and less variability in service provision	Objective 2 Objective 4
The attitude of accounting firms' employees towards automation		
Displacement of workers by technology	• Human intervention is still needed in accounting and auditing environments • Technology assists the work of accountants rather than completely taking it over • Certain tasks that automation can complete, like routine and repetitive tasks, can take over	Objective 3

	• The perception out there that the jobs of accountants can be taken by technology • Employees in the accounting and auditing space need to reskill to work with technology	
Accounting roles that can be displaced by technology	• Certain tasks in accounting could be replaced by technology • Repetitive tasks and data capturing can be automated • Lower-order tasks are replaceable • Employees are left to focus on important tasks like judgement, estimation and analysis rather than monotonous, repetitive tasks • Humans are also needed to review computer output • Services like advisory might not be completely automated because they vary from client to client	Objective 3
Improvement of the life of employees through automation	• eliminating tedious, repetitive tasks • achievement of higher productivity which improves employees' morale • fewer errors and less work • Quicker completion of tasks motivates employees • Remote working • Manual records and paper tedious • training is required before deploying automation	Objective 3
Automation of business processes of accounting firms and their success		
Automation leads to the success of accounting firms	• The success of accounting firms	Objective 4 Objective 2
Ways in which automation leads to the success of accounting firms	• Higher productivity and efficiency • Improved quality of work • Better efficiency • Happy Clients • Client retention • Quality service • Fewer errors • Ability to take on more clients and service more prominent clients • Lower operating costs • Improved employee morale	Objective 4 Objective 2
Drawbacks of automation in accounting firms		

Disadvantages of automation	• Higher cost of automation • The takeover of many responsibilities • errors in the programming of systems are more widespread than errors committed in a manual environment • Depending on the technology, automated systems and third parties • Testing and malfunction of systems • Training needs • Security of automated systems	Objective 5
Security of client's data in automated environments	• Better security in automated environments • Investing in the security of systems like backups, firewalls, and access controls • Strong IT Department	Objective 5

Source: Research data

4.3.3 Theme 1: Business processes where accounting firms may deploy automation

The analysis provides insight into business processes that are prominent candidates for automation in accounting firms. It has been deduced from the analysis that there are various business processes where automation may be applied. The findings are as follows:

4.3.3.1 Prominent candidates of automation:

The analysis of the study's results provided insight into the areas where automation of business processes can be deployed.

In confirmation, the following common themes concerning the use of automation to run the operations of the audit firm are recorded verbatim:

Interviewee 2 stated:

> *Automation could be used for every new audit job; the system looks at the auditing staff's interests and matches other criteria like experience and qualifications needed in allocating jobs to audit staff. Automation can also be used in the billing of clients.*

Interviewee 1 concurred with the use of automation in allocating audit staff when they said:

> *Automation can be used to allocate work to the staff and billing of clients.*

Interview 6 agreed with the applicability of automation in the operations of accounting firms:

> *Automation could be used to record billable hours for time spent providing a service to the client. The hours would then be used for billing the client, which can also be automated.*

Interview 3 had the following to say on automation in the operations of audit firms:

Accounting firms may also use Leave management automation where the leave application and approval are made on a system rather than paper and manual application.

Interview 8 added to the use of automation in running operations of the audit firms*:*

Since most employees of audit firms travel to client sites for audit and advisory services, their travel could be logged on a system and processed by an automated system. Automation can be used to manage to leave application and approval.

In terms application of automation in providing services to its clients, participants were quoted as saying:

Interviewee 7 said:

Bank statements can now be uploaded to an accounting system, and transactions will be automatically recorded in the general ledger. Human involvement will only be required to map the transactions to the correct accounts.

Interviewee 8 agreed when they said:

The bank statement is uploaded into the accounting system, and the transactions are automatically captured.

Interviewee 10 concurred, saying:

Source documents can be scanned, and transactions automatically captured.

Interviewee 9 also shared the same sentiments:

Automation may be used to capture accounting transactions and produce the general ledger and trial balance.

Regarding the preparation of financial statements, Interviewee 7 said:

Instead of drafting financial statements manually, a system can create a complete set of financial statements or management accounts with minimal human intervention.

Interviewee 10 indicated the following in terms of the deployment of automation in services provided to clients of audit firms:

Automation can be used to generate invoices and account statements, bank reconciliations, and day-to-day calculations. Automation can also be used for payroll processing, financial statements preparation and data analysis, including big data.

Interviewee 9 concurred with most of the views of interviewee 9, saying:

Automation can be used in the production of reports and as an analysis tool. Automated systems could produce reports after the inputting of data. The data inputted include big data. Automation may also analyse financial statements, revenue, expenditure, and other elements.

On payroll processing, interviewee 4 said:

When automation is used in payroll processing, the result will be the production of payslips, tax returns, and tax certificates for employees of client companies.

Thus, the inference is that automation may be deployed in the following areas:

- running the accounting firms' business operations
- services offered by accounting firms to their clients
- allocate human resources to jobs and projects
- IT audits
- risk assessments and the pulling of the audit sample
- record billable hours for time spent providing a service to the client
- billing the audit client
- leave management
- travel claim
- performance of repetitive tasks
- capturing accounting transactions
- produce financial statements and management accounts
- in payroll processing
- tax, and other compliance work
- automation as an analysis tool and production of reports
- invoices and debtors' statements account generation

According to Jurubita (2017:658), the importance of automation of the business process includes gathering and capturing data speedily and boosting critical data storage. Kokina and Davenport (2017:119) explain that applying automation in auditing makes it easier to understand risk assessment. Mason *et al.* (2001:127) support this view when they say automation in auditing results in better quality audits at a fraction of the cost. Rozario *et al.* (2019) add that automation in the accounting and auditing field applies to specific tasks like preparing working papers, testing in auditing, and performing statistical calculations. He further explains that auditors are efficient and effective if they concentrate on higher-risk sections while automated processes perform routine tasks. Qiu (2016:5) argues that processing accounting transactions manually is time-consuming. He adds that the slow manual process impacts decision-making because the final reports and other output may be produced late. The author suggests that the solution to this problem is the implementation of automation in accounting. Al-Laith and Ghani (2012:12) discuss e-accounting. They see this form of accounting as a system that uses computer technology for accounting work in organisations. E-accounting is used to record, review, track and assess organisational

financial data. E-accounting results in reliable and accurate data. Winshuttle (2019:5) expresses that automation helps process creditors, debtors, journal entries and inventory management. One can infer that this is because these are also routine or repetitive tasks or business processes. The above findings are a confirmation of the views of the literature view. Winshuttle (2019:5) observes when he says that automation helps process payroll records and employee data management.

4.3.3.2 Business processes automated by respondents' accounting firms

The analysis of the results provided the areas in which the study's participants have experienced automation in their accounting firms. In terms of business processes, automated the participants had this to say:

Interview 1:

> *Automation can be used for billing clients, invoicing clients, audit working papers and analysis of information in auditing.*

Interviewee 2:

> *Automation is useful in resource allocations to projects, billing clients and capturing transactions.*

Interviewee 3:

> *Automation can be deployed in payroll processing, leave management, bank reconciliations and transaction processing.*

Interviewee 4:

> *We are using automation for leave management, payroll processing, financial statements preparation and sharing information with clients.*

Interviewee 9:

> *We have implemented automation for repetitive tasks, automated calculations, financial statements preparation and capturing accounting transactions.*

Interviewee 10:

> *Automation is useful in our firm for payroll processing, capturing accounting transactions, audit sampling, analytics of big data and financial statements preparation.*

In conclusion, the inference is that the business processes automated by participants in the study include:

- audit process by their accounting firms
- allocating human resources to projects

- managing the accounting firm's payroll
- management of employees' leave by accounting firms
- billing of clients by audit firms
- processing accounting transactions for accounting firms' client companies
- accounting transactions processing and capturing for client companies
- payroll processing for client companies
- preparation of financial statements
- information sharing with clients; and
- data analysis and testing.

4.3.4 Theme 2: Benefits of automation of business processes for accounting firms

The analysis established several benefits associated with automating the business processes of accounting firms. Participants provided several general benefits of automating business processes for accounting firms.

4.3.4.1 General benefits of automation in accounting firms

On the benefits of automation, participants had this to say:

Interviewee 7 said:

> *Automation allows us to do things quicker and when they are supposed to be done (timeliness), including timeous billing.*

Interview 9 said:

> *Automation shortens the time to execute processes and tasks, and efficiency and saving of time happen for routine transactions like capturing transactions by just uploading the bank statement into an accounting system.*

Interviewee 2 said:

> *Automation enables us to meet client deadlines, and records produced by automated systems are more accurate. Automation leads to happy clients, which improves customer satisfaction. Automation also results in enhancement of the confidence of clients with accounting firms.*

Interviewee 9 concurred with interviewee 2 when they said:

> *Automation results in the better public image for accounting firms due to meeting deadlines and client expectations.*

Interviewee 5

> *Automation results in fewer human errors compared to a manual environment.*

Interviewee 7 concurs with interview 5 when they say:

Automation reduces human errors.

On creating time for employees to perform more cognitive tasks, Interviewee 7 said:

Staff of accounting firms perform better and higher-level tasks and spend more time on analysis than routine tasks.

Interviewee 6 concurred with the above statement when they said:

Automated systems allow staff to concentrate on higher-level tasks like cognitive and analytical tasks rather than the performance of routine tasks.

Interviewee 8 agrees with the above, saying:

Employees are, therefore, able to focus on better tasks rather than boring capturing tasks.

On lowering operating costs, interviewees said:

Interviewee 8 said:

Automation reduces operating costs as fewer employees are needed for routine tasks.

Interviewee 3:

Accounting firms do not need to pay for idle time as in mostly manual environments.

Interviewee 10 said"

L*ower operating costs might be achieved by using less experienced or less qualified staff to input data into systems rather than more experienced and highly skilled teams in manual environments.*

Interviewee 6 said:

Automated systems have fewer audit overruns because employees do not spend more time on tasks than budgeted as they can complete tasks quicker.

The other benefits mentioned by participants include:

Interviewee 3:

Reduction of loss of information and leaving an audit trail.

Interviewee 8 agrees with interviewee 3 when he says:

Automated processes have a better audit trail.

Interviewee 9:

Computerised systems also enable accounting firms to process vast amounts of information (big data) and leads to diverse skills for employees of accounting firms as they need to learn IT skills to adapt to the changing landscape.

Interviewee 10:

There is consistency in processing information in automated processes and less variability in the services provided to the clients.

In conclusion, the inference is that the significant benefits resulting from the automation of business processes of accounting firms include:

- higher efficiency
- better delivery of services
- higher productivity
- automation saves time
- better delivery for clients
- improvement of the quality of services
- quicker execution of tasks
- reduction of human errors
- leaves employees to perform higher-level tasks
- reduces operating costs
- information is secure
- audit trail
- big data processing
- diversifying the skill set of employees

The findings are in line with the views obtained in the literature study. Chan and Vasarhelyi (2011:155) postulate that automation saves the time and labour needed to complete tasks. Manson *et al.* (2001:127) support these views when they say automation in auditing results in better quality audits at a fraction of the cost. According to Jabłoński and Ziębicki (2019:38), automation reduces operating costs mainly from lower headcount in employment. Egiyi and Chukwuani (2021:33) report several benefits associated with automation, including non-stop performance that talks to no limitation on working hours. Automated processes can run 24/7/365, increasing productivity to unimaginable levels in manual systems. The authors also mention the advantage of consistency and reduced errors in work. Automated systems produce error-free data, reduce output variability, and reduce operating costs, mainly from lower headcount in employment. According to Jabłoński and Ziębicki (2019:38), operations are performed and completed speedily with automation. According to Soni *et al.* (2020), automation saves time and money by automating repetitive tasks and procedures and tasks. Automation also leads to operational efficiencies and increased productivity. In the end, this gives an organisation a competitive advantage. Khakurel (2018) explains that automation replaces the unskilled workforce with exponential increases in productivity.

4.3.4.2 Specific benefits realised by accounting firms

The analysis established that most of the participants repeated the benefits outlined in the general benefits above as benefits they have realised in their accounting firms because of the automation of business processes of accounting firms.

Some of the views captured verbatim by the participants include:

Interviewee 10:

> *Automation saves time processing transactions, eliminates routine tasks, saves costs by saving time, reduces human errors and leads to consistency in operations.*

Interviewee 9 said:

> *Automation lessens the time needed to process tasks, reduces human errors, shortens time to execute, processes vast amounts of data, is accurate and enables accounting firms to service many clients. Automation leads to better public image and ability to service many clients, increasing revenue generated by accounting firms.*

Interviewee 2:

> *Automation results in efficiency in operations. It assists in meeting client deadlines, which leads to happy clients. It also reduces human errors and leads to more accurate financial records.*

Interviewee 1:

> *Automation results in higher productivity, less human errors and also less operating costs.*

Interviewee 6:

> *Automation results in timeous billing of clients, higher profits, more time to concentrate on analysis rather than routine tasks.*

Interviewee 5:

> *Automation results in better productivity, less human resources needed, less human errors and ability to expand client base and service bigger clients and accuracy in processing.*

The inference from the above responses is that the major benefits of automation to accounting firms employing the participants of the study can be summarised below:

- accuracy in processing information
- efficiency
- fewer human errors
- faster processing of transactions

- ability to service more prominent and more clients
- better compliance with laws and regulations
- increased revenues and profits
- better public image for accounting firms
- consistency in processing transactions and operations and less variability in service provision

The findings do not differ from the views of the authors studied in the literature review. According to Choi and Baker (2017:23), automation may result in several benefits to the business, including lower production costs, the potential for better quality, and more profits. Jabłoński and Ziębicki (2019:38) believe that automation reduces human errors and improves efficiency. Wang and Huynh (2012:13) note that automated accounting systems can process vast transactions with high speed, accuracy and efficiency. Jabłoński and Ziębicki (2019:38) say that automation can process big data (diverse and extensive information), which assists in identifying, standardising, and analysing important information at the level of the entire enterprise. Wang and Huynh (2012:13) point out that organisations that use automated accounting systems potentially gain greater insight into the day-to-day company processes and better exposure to essential details. Jabłoński and Ziębicki (2019:38) observe that automation improves quality and customer satisfaction by processing information in real-time, 24/7, including peak hours. Automation improves compliance with legislative requirements like tax and the companies act. Ionescu and Prichici (2013:284-286) summarise the benefits of automation as better productivity, cost-effectiveness and relocation of employees to concentrate on business development. Warren *et al.* (2015:402) observe that automated systems can analyse massive data which humans cannot comprehend. The author adds that automation has an overall effect of increased efficiency in time and costs. Automation also leads to a significant reduction in errors.

4.3.5 Theme 3: The attitude of accounting firms' employees towards automation

4.3.5.1 Does technology replace workers?

The analysis revealed several aspects of the accounting firms' employees' attitudes towards automation. The sub-themes are summarised below:

- human intervention is still needed in accounting and auditing environments
- technology assists the work of accountants rather than completely taking it over
- only certain tasks, like routine and repetitive tasks, that machines can take over

- the perception out there that the jobs of accountants can be taken by technology
- employees in the accounting and auditing space need to reskill to work with technology
- training is required before deploying automation.

Interviewee 1:

> *It's still long before automation takes over all the accounting and auditing tasks because accountants are needed in reasoning.*

Interviewee 2:

> *There could just be some perception out there that the jobs of accountants can be taken by technology, but some tasks still need human intervention, like mapping accounting transactions when a bank statement has been automatically loaded into an accounting system.*

Interviewee 8:

> *Technology assists the work of accountants rather than completely taking it over. It can only replace certain tasks machines can do, like routine and repetitive tasks can take over.*

Interviewee 5:

> *Employees in the accounting and auditing space need to reskill to work with technology.*

Interviewee 9:

> *The risk of technology taking over the jobs is real, especially on routine and repetitive tasks. Employees are encouraged to reskill to be able to work with technology. This assists in increasing the employees' skill base. Humans still needed to interpret ever-changing accounting standards and review and analyse computer output. Additionally, advisory services differ from client to client and are difficult to automate.*

The inference from the above responses is that certain tasks, like repetitive tasks, are replaceable by automation. However, there are other tasks that automation cannot complete where human intervention and cognitive ability are needed. Kowalkiewicz et al. (2017:52) point out that automation replaces knowledge-intensive tasks. The benefit is freeing humans from performing routine tasks and concentrating on higher-order tasks like decision-making, problem-solving and high-level analysis. The authors add that technology assists firms in focusing on higher-order tasks while machines complete common tasks.

4.3.5.2 Are accounting roles replaceable by automation?

The participants had this to say regarding accounting roles taken over by technology:

Interviewee 1:

> *Accountants still needed in the reasoning of information which the machines cannot do.*

Interviewee 5:

> *Not all tasks in accounting could be replaced by technology. There are things which machines cannot still do.*

Interviewee 3:

> *Only repetitive tasks and data capturing can be automated.*

Interviewee 10:

> *It depends on the level of the task. Lower-order tasks are replaceable, while higher-order tasks like analysis and interpretation need human intervention. Employees are left to focus on important tasks like judgement, estimation and analysis rather than monotonous, repetitive tasks.*

Interviewee 9:

> *Humans are also needed to review computer output and apply their minds to everchanging accounting standards. Services like advisory might not be completely automated because they vary from client to client.*

The above results show that automation can easily take over routine accounting tasks like capturing and processing accounting transactions. However, there are other tasks like analysis and interpretation where human reasoning and judgement are needed.

The views of the participants are in line with the authors in the literature study. Goos and Manning (2007:118) speak of job polarisation, which is when routine tasks are automated, resulting in demand for professions that cannot be automated. Sampson (2021:123) further says that automation can substitute human workers with computers in performing manual tasks and transferring humans to non-routine tasks where complex cognitive ability and problem-solving are needed. Peruffo *et al.* (2017:8) support this when they say future jobs will be a combination of technical tasks and non-routine work where workers are focused more on problem-solving, communication with each other and finding ways to be flexible and adapting to changes. The World Economic Forum (2016), cited in Egiyi and Chukwuani (2021:34), also adds that routine jobs, middle-skilled, white-collar jobs like data-capturing staff, accounts and payroll staff and auditors will be demanded less soon. Ross and Weinberg (2017), quoted in Egiyi and Chukwuani (2021:34), estimate that 43% of jobs in the finance sector will be automated. Peruffo *et al.* (2017:8) support this when they say future jobs will be a combination of technical tasks and non-routine work where workers are focused more on problem-solving, communication with each other and finding ways to be flexible and adapting to changes.

4.3.5.3 Improvement of the life of employees through automation

The verbatim quotations of the participants on whether automation makes the lives of employees better or worse:

Interviewee 1:

> *Automation improves employees' lives by eliminating tedious, repetitive tasks. It also leads to higher productivity, improving employees' morale.*

Interviewee 2:

> *Automation results in fewer errors and higher efficiency, which motivates workers.*

Interviewee 3:

> *Automation eliminates repetitive tasks which are boring.*

Interviewee 4:

> *Automation allows for remote working, and work can be done any time rather than restricted to specific times of the day.*

Interviewee 5:

> *Automation also leads to fewer errors and less admin work. Accountants can input data and pull reports and just focus on analysis.*

Interviewee 7:

> *Automation eliminates paper-based working papers in auditing, which are tedious and allows electronic filing, which does not need physical space.*

Interviewee 8:

> *Automation leads to quicker completion of tasks, motivating employees and improving their morale. It reduces the pressure of work on employees.*

Interviewee 10:

> *Employees freed from performing repetitive and boring work which results in motivated employees.*

In conclusion, the following points are inferred from the results of the study in terms of making the life of the employees better or worse with the introduction of automation in processing accounting transactions:

- eliminating tedious, repetitive tasks
- achievement of higher productivity, which improves employees' morale
- fewer errors and less work
- quicker completion of tasks motivates employees
- remote working
- manual records and paper tedious
- training is required before deploying automation

According to Jabłoński and Ziębicki (2019:33), automation alters an accounting professional's work. It eliminates most routine tasks and leaves room for more strategic tasks, interactions with stakeholders, drawing conclusions based on analysis of information produced by automated systems, and general improvement of business performance. Rogers (2010:15) states that automation benefits are financial, social well-being, convenience, and general satisfaction.

4.3.6 Theme 4: Automation of business processes of accounting firms and their success

The analysis of the study shows that all the participants indicated that automation leads to accounting firms' success. The reasons provided by the participants for success are provided in the section below.

4.3.6.1 Does automation of business processes of accounting firms lead to their success?

The analysis of the study results provided insight as to whether automation of business processes of accounting results in their success. Additionally, the study results provide specific reasons for accounting firms' success due to automation.

The verbatim responses of the participants are detailed below:

Interviewee 1:

Higher productivity and efficiency resulting from automation lead to accounting firms' success automation results in improved quality of work. With automation, accounting firms can take more clients.

Interviewee 2:

> *Better efficiency will also lead to happy clients, which concerns client retention. Related to efficiency is fewer human errors, which also concerns quality service. Accounting firms can also take in more clients because of automation.*

Interviewee 3:

> *Automation saves costs and improves the quality of their output which leads to the success of accounting firms.*

Interviewee 4:

> *Automation leads to efficiency and cutting costs and capacity to take on more clients.*

Interviewee 6:

Automation allows accounting firms to service bigger clients, save time and costs and increase their revenue and profits.

Interviewee 7:

Automation enables accounting firms to achieve efficiency, which leads to success.

Interview 8:

Automation allows accounting firms to produce quality reports, offer better and quick service which lead to more and happy clients.

Interviewee 9:

Automation results in much more work done accurately, reduce unnecessary expenses, and eliminates repetitive and boring work. Automation also improves the morale of employees.

Interviewee 10:

With automation, time is saved to do other things. It also allows accepting and servicing different clients as technology allows us to do more. Technology makes business more profitable and increases revenue and profits while bringing down costs.

Thus, the critical aspects of this theme include the following:

- higher productivity and efficiency
- improved quality of work
- better efficiency
- happy clients
- client retention
- quality service
- fewer errors
- ability to take on more clients and service more prominent clients
- lower operating costs
- improved employee morale

The participants' views in the study are aligned with the literature view. Automation increases the scalability of operations (Jabłoński & Ziębicki, 2019:38). Automation allows employees to concentrate on processes that create value rather than routine or standard tasks. Soni *et al.* (2020) observe that automation enhances operational efficiencies and productivity, minimising waste from the process, giving the business a competitive advantage and maximising sales. According to Choi and Baker (2017:23), automation may result in several benefits to the business, including lower production costs, the potential for better quality, and more profits. Soni *et al.* (2020) concluded that businesses that correctly deploy technology and automation have realised savings in time and money by automating repetitive procedures and tasks. Manyika *et al.* (2017:8-9) state that automation has several economic benefits, including

increased profit, throughput, and productivity. According to Jabłoński and Ziębicki (2019:33), automated solutions usually have a low marginal cost compared to manual systems where wages are involved. According to Jabłoński and Ziębicki (2019:38), operations are performed and completed speedily with automation. The inference from the literature study is that if work is completed faster, capacity is increased to take on more clients.

4.3.7 Drawbacks of automation in accounting firms

4.3.7.1 Disadvantages of automation

The analysis of the study revealed some drawbacks of automation in accounting firms. The sub-themes which emerged out of the study are indicated below:

- higher cost of automation
- the takeover of many responsibilities
- errors in the programming of systems are more widespread than errors committed in a manual environment
- depending on the technology, automated systems and third parties
- testing and malfunction of systems
- training needs
- security of automated systems

The views of the participants are recorded verbatim below:

Interview 1:

> *Automation may result in less sense of responsibility as the machines take over most tasks.*

Interview 5 agreed with Interview 1 above when they said:

> *Automation results in too much reliance on machines and little interaction with the data, which makes most things learnt in universities redundant.*

Interview 7 concurs with the above views and comments when he says:

> *With automation, there is too much reliance on systems and less application of the accountants' skills.*

Interview 2 raised a few concerns with automated systems:

Automation reduces job security and is costly to implement. Security in automated systems might be an issue, and errors committed by automated processes are more pervasive and costly than errors in a manual environment.

Interviewee 3:

Automation results in too much reliance on third parties like technology service providers and less control when systems develop problems. Automated systems are costly to implement and maintain, resulting in losses to accounting firms if a proper cost-benefit analysis is not performed. Errors in automated environments are difficult to resolve, and less control on errors as processing happens in the background.

Interviewee 4:

Automated systems are hard to understand, costly to secure, and errors are sometimes overlooked.

Interviewee 6:

Automated systems work well with trained staff, and there are frustrations at the beginning when the system is introduced and costly to secure the system.

Interviewee 8:

There is a need for ability and skills to use the system. It also costs money to buy and maintain the systems. Cybersecurity issues exist, and the system must constantly update to avoid redundancy.

Interview 9:

Errors in automated systems are overlooked and easily spread. Errors can cost accounting firms and lead to penalties. Technology demotivates employees from fear of losing jobs. Automated systems bring security issues, risk system crushing, downtime, and service blackouts.

Interviewee 10:

There is a need to train the staff to use the system, and a cost-benefit analysis is needed. Otherwise, system costs may cause losses to the accounting firms. Furthermore, internally developed systems take time to be tested and be ready for use.

In summary, the participants' main concerns are too much reliance on systems, staff training to be able to use the systems, pervasiveness of potential errors in automated systems, too much reliance on systems, risk and cost of security.

4.3.7.2 Security of client's data in automated environments

The analysis of the participants' views revealed that the security of client data is better in automated systems than in manual systems. The main sub-themes obtained are summarised below:

The verbatim citing of the participants in the study are listed below:

Interview 1:

There is better security when automated systems are in place because fewer people handle the data.

Interviewee 2:

Data is safe because there are always mitigating measures available.

Interviewee 3:

There is better security because there are controls and security measures in place for most systems.

Interviewee 4:

Automated systems are safe, and accounting firms are advised to invest in security.

Interviewee 5:

The data is safe as the IT department assists with security, and employees are trained on data security to pick unsafe and suspicious emails.

Interviewee 6:

There is better security because, with proper security, data can be recovered when backups are made.

Interviewee 7

There is always a cybersecurity risk, but safeguards are usually in place in the form of firewalls, access controls, passwords and antivirus software.

Interviewee 8:

Automated systems are safe, but security should be in place to safeguard the information and backups to recover the information in case of system crashes.

Interview 9:

There is always never enough security because there are risks like hacking. Accounting firms should invest in security, including firewalls.

Interviewee 10:

Good controls usually come with technology rather than manual systems. We encounter different risks rather than increased risks in automated systems. IT systems should have sufficient security like firewalls, access controls and passwords.

The inference from the above responses of the participants is that there is better security in automated environments than in manual environments. Furthermore, accounting firms need to invest in the security of automated systems like backups, firewalls, and access controls. Additionally, a strong IT department is required once most processes are automated.

Cybersecurity issues are confirmed by Egiyi and Chukwuani (2021:34), who note that some accounting firm clients may be reluctant to adopt the automation of accounting processes due to data protection and transparency issues. From the study, it has been revealed that the security risks in automated systems can be significantly reduced by investment in various types of security. The study also revealed that automated systems are more secure than manual systems in protecting the data and information of the clients of audit firms.

4.4 Chapter Summary

4.4.1 Summary of key findings from the quantitative study

The main areas where automation can be deployed, according to the study results, are repetitive and routine tasks, including payroll processing, accounting transactions processing, financial statements and management accounts preparation. However, humans are still needed in accounting firms' business operations, especially where analysis, interpretation and cognitive ability are needed. The benefits include better efficiency, better delivery of services, employees concentrating on better and higher-level tasks, lower operating costs for accounting firms, fewer human errors and automation enabling accounting firms to take on more clients and bigger clients. Although some respondents view automation as a cause of unemployment, some believe that automation does not take away jobs. Automation leads to employees of accounting firms performing better tasks. The study also revealed that employees support changes like automation if the automation's effect is explained to them. The study also confirmed that employees do not generally accept change. The study also confirmed that the full cooperation of employees is needed to implement new technology and automation. The study also revealed that routine accounting tasks are susceptible to automation. The result of the study confirms that automation leads to accounting firms' success. Automation enables accounting firms to offer a broader range of services and enables accounting firms to take more clients. The study also revealed that automation increases accounting firms' revenue while reducing costs. The main disadvantages of automation include the higher cost of buying, developing and maintaining automated systems. The study found that automation does not lead to clients doing their work or closing accounting firms. The study also revealed that automation does not compromise the security of the data and information of the clients

4.4.2 Summary of key findings from the qualitative study

The study revealed that automation is applicable in accounting firms to perform certain operations like resource allocation, billing of clients, payroll processing, and automating the business processes followed in offering services to the clients of audit firms. Automation is also very useful in servicing the clients of accounting firms for business processes, as identified by the quantitative study above. The study confirmed most benefits listed under the qualitative study. Additional benefits mentioned by participants include a better public image for accounting firms, consistency in applying audit procedures, and less variability in service provision. Participants also indicated that technology, including automation of business processes, assists the work of accountants and auditors rather than replacing them with machines. Most interview participants stated that accountants needed to reskill and acquire IT skills to operate and work with automated systems. Human beings are still needed for processes like analysis, interpretation, and making judgements – staff of accounting firms perform cognitive and analytical tasks. Automation improves accounting firms' success due to efficiency, faster processing, reduced costs, and capacity to service more and bigger clients. The main disadvantages of automation include the higher cost of buying, developing and maintaining automated systems. There is a reduced sense of responsibility by employees of accounting firms as most tasks are relegated to processing by automated systems. High dependency on technology may be detrimental to accounting firms' business operations, especially when systems are down; security concerns like cybersecurity issues if IT controls are not robust. Automation works properly with well-trained staff. There is, therefore, a need for training employees to use the systems correctly. Errors in programming and working of automated systems cause more significant damage than errors in a manual environment as the mistakes are more pervasive, affecting several transactions and processes

CHAPTER 5 DISCUSSION OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

In this chapter, the researcher outlines the conclusions drawn from this study and answers the research questions. The researcher will also make recommendations based on the findings of the study. The chapter follows the discussions and interpretations of results from the previous chapter. The chapter concludes with the quantitative and qualitative results of the study. The chapter identifies the major contributions to the body of knowledge by exploring the success of accounting firms because of the automation of their business processes.

5.2 Research problem – revisited

According to Gotthardt *et al.* (2020:90), "the implementation of automation in accounting firms is still in its infancy, and accounting firms are still far from utilising the vast opportunities provided by automation". Thus, the inference is that accounting firms have not automated most of their business processes, and there is minimal deployment of automation in their business processes. The study seeks to study the relationship between accounting firms' automation of business processes vis-à-vis their success.

5.3 Research questions and objectives – revisited

The study aimed to explore the relationship between business-process automation and business successes in accounting firms in South Africa. The research questions were formulated from the problem statement summarised in section 5.2 above.

Table 5.1: Research questions matched with research objectives

Aim: To explore the relationship between the automation of business processes and business successes in accounting firms in South Africa	
Research question	Research objective
RQ1 Which business processes can the accounting firms deploy automation in?	**Obj1** To investigate the business processes where accounting firms may deploy automation
RQ2 What benefits can accrue to accounting firms by automating business processes?	**Obj2** To explore the benefits accruing to accounting firms by automating business processes.
RQ3 What is the attitude of the accounting firms' employees towards automation?	**Obj3** To assess the attitude of accounting firms' employees towards implementing automation.
RQ4 Can automation of business processes of accounting firms improve metrics like productivity, efficiency, service offering and revenue?	**Obj4**. To investigate if automation of business processes improves metrics like productivity, efficiency, service offering and revenue.
RQ5 What are the disadvantages of automation for accounting firms?	**Obj5** To explore the drawbacks of automation in accounting firms.

Source: Own Source

Table 5.1 above provides an outline of the study's research questions which are matched with their research objectives.

Table 5.2: Research questions answered and objectives addressed

Quantitative	Qualitative	Objective	Research Question	Answers
Section 2: Business processes where automation is applicable	Section 2: Business processes where automation is applicable	Obj1 To investigate the business processes where accounting firms may deploy automation	RQ1 Which business processes can the accounting firms deploy automation in?	Automation applies to business processes like payroll processing, transaction processing, preparing financial statements, auditing and, to a lesser extent, managing debtors and creditors and accounting reconciliations.
Section 3: Benefits of automation for accounting firms	Section 3: Benefits of automation for accounting firms	Obj2 To explore the benefits accruing to accounting firms by automating business processes.	RQ2 What benefits can accrue to accounting firms by automating business processes?	Automation benefits through lowering operating costs, reducing human errors, improving efficiency, speedy processing transactions, processing big data and compliance.
Section 4: Attitude of employees to automation	Section 4: Attitude of employees to automation	Obj3 To assess the attitude of accounting firms' employees towards implementing automation.	RQ3 What is the attitude of the accounting firms' employees towards automation?	Accounting firms' employees know that routine and repetitive tasks are replaceable by automation. However, automation assists employees in taking care of cognitive tasks rather than time-consuming and mundane tasks. Automation will not take over all the tasks for accountants. The perception exists that

Quantitative	Qualitative	Objective	Research Question	Answers
				automation can replace humans, and there is a need to reskill to qualify for new skills demanded in automated environments.
Section 5: Automation and business success	Section 5: Automation and business success	Obj4 To investigate if automation of business processes and business success improve metrics like productivity, efficiency, service offering and revenue.	RQ4 What matrix can be used to measure the relationship between the automation of business processes and business success for accounting firms?	Automation leads to higher productivity, better efficiency, good quality of work, ability to service more clients, higher revenue, higher profits, lower operating costs, and high employee morale.
Section 6: Drawbacks of automation	Section 6: Drawbacks of automation	Obj5 To explore the drawbacks of automation in accounting firms.	RQ5 What are the disadvantages of automation for accounting firms?	The main disadvantages of automation identified include the cost of implementation, pervasive errors in case of programming errors, replacement of humans and only working with proper training and input of data.

Source: **Research Data**

Table 5.2 above provides brief summarised answers to the research questions. The answers came from quantitative and qualitative studies, as detailed in Chapter 4.

5.4 Conclusions from the quantitative study

5.4.1 Business processes where accounting firms may deploy automation

The business processes that received the most votes in the questionnaire include payroll processing, transaction capturing and processing, financial statements preparation and auditing. Automation is also applicable to managing debtors and creditors and accounting reconciliations but to a lesser extent. The conclusion is aligned with the views of Shim and Yang (2018:144), who argue that technology does not easily replace cognitive occupations. However, routine tasks are still prominent candidates for automation as it is more efficient.

5.4.2 Benefits can accrue to accounting firms by automating business processes

The quantitative study provided insight into the top benefits of automating the business processes of accounting firms. These benefits include better efficiency, better delivery of services, employees concentrating on better and higher-level tasks, lower operating costs for accounting firms, and fewer human errors and automation enabling accounting firms to take on more clients and bigger clients. The conclusion is aligned with the views expressed in the literature review. Egiyi and Chukwuani (2021:33) report several benefits associated with automation, including non-stop performance that talks to no limitation on working hours. Automated processes can run 24/7/365, increasing productivity to unimaginable levels in manual systems. The authors also mention the advantage of consistency and reduced errors in work. Automated systems produce error-free data and reduce output variability and operating costs, mainly from lower headcount in employment. According to Jabłoński and Ziębicki (2019:38), operations are performed and completed speedily with automation. Thus, automation allows for quick processing of financial data where books can be closed daily rather than waiting for up to two weeks after month-end to close the month when accounting tasks are completed manually. Reduction in human work involved with completing tasks also translates to saving in costs of the accounting firms. Error rates for automated systems are close to zero because they follow programmed rules, which makes them never fatigued and they rarely make mistakes. Automated systems comply with rules while also being consistent. Automation allows accounting firms to work smart rather than working hard.

5.4.3 The attitude of accounting firms' employees towards automation

The questionnaire results give a better insight into the attitude of employees towards automation. The perception is still there that automation leads to replacing humans with machines (automation). Although some respondents view automation as a cause of unemployment, some believe that automation does not take away jobs. The result of the study confirms that automation leads to employees of accounting firms performing better tasks. The study also revealed that employees support changes like automation of business processes if the automation's effect is explained to them. The study also confirmed that employees do not accept change. The study also confirmed that the full cooperation of employees is needed to implement new technology, like the introduction of automated business processes in accounting firms. The study also revealed that most routine accounting tasks are susceptible to automation. The findings align with the views of Goos and Manning (2007:118) when they explain that accountants are most prone to the effects of automation as they are part of routine tasks. Frey and Osborn (2017:265) also explain that employers now need employees with rare cognitive skills and high levels of education. Employees with less cognitive skills are replaceable by technology. Ross and Weinberg (2017) estimate that 43% of jobs in the finance sector will be automated.

5.4.4 Automation and business success

The result of the study confirms that automation enables accounting firms to offer a broader range of services and enables accounting firms to take more clients. The study also revealed that automation increases accounting firms' revenue while reducing costs. Automation also enhances the morale of employees. Jabłoński and Ziębicki (2019:38) explain that automation improved quality and customer satisfaction as information processing is done in real-time, 24/7, including peak hours. Jabłoński and Ziębicki (2019:38) add that operations are performed and completed speedily with automation. The inference from the literature study is that if work is completed faster, capacity is increased to take on more clients. Rogers (2010:15) states that automation benefits are financial, social well-being, convenience, and general satisfaction. It can be inferred from this that automation positively influences employee morale. Thus, automation results in customer advocacy, enhanced revenue and better retention of clients. The personnel of accounting firms are freed up to concentrate on better activities like interpreting data, supporting decision-making, servicing customers and developing the business. Automation also allows accounting firms to pursue growth without hiring more employees, which allows scalability in accounting firms. The low staff costs also lead to low operating costs for accounting firms.

5.4.5 Disadvantages of automation for accounting firms

The results of the study revealed the drawbacks of automation in accounting firms. The main disadvantages of empirical research include the higher cost of buying, developing and maintaining automated systems. The study found that automation does not lead to clients doing their work or the closure of accounting firms. The study also revealed that automation does not compromise the security of the data and information for the clients. Jabłoński and Ziębicki (2019:33) observe that automation technologies' development is capital-intensive, but automated solutions usually have a low marginal cost compared to manual systems where wages are involved.

5.5 Conclusions from the qualitative study

5.5.1 Business processes where accounting firms may deploy automation

Automation is applicable in accounting firms to perform certain operations of the audit firm, like resource allocation, billing of clients, and payroll processing, and to automate the business processes followed in offering services to the clients of audit firms. Automation is also very useful in servicing the clients of accounting firms for business processes like payroll processing, transaction capturing and processing, financial statements preparation and auditing.

5.5.2 Benefits that accrue to accounting firms by automating business processes

The qualitative study provided several benefits of automating the business processes of accounting firms. These benefits include efficiency, accuracy in processing information, fewer human errors, faster processing of transactions, the ability to service more prominent clients, better compliance with laws and regulations, and increased revenues and profits. Other benefits mentioned by participants include a better public image for accounting firms, consistency in applying audit procedures, and less variability in service provision. Wang and Huynh (2012:13) note that automated accounting systems can process vast transactions with high speed, accuracy and efficiency. According to Jabłoński and Ziębicki (2019:38), automation can process big data (diverse and extensive information), which assists in identifying, standardising, and analysing significant information at the level of the entire enterprise. Thus, automated systems rarely make errors if they are correctly programmed. Automated systems are consistent and compliant. Once they are instructed, automated systems execute instructions reliably, reducing risks. Automated systems operate following

fed regulations and standards. Therefore, compliance is improved. Automation eliminates tasks that add less value and frees employees from rising work pressure.

5.5.3 The attitude of accounting firms' employees towards automation

The result of the qualitative study gives a better insight into the attitude of employees towards automation. The mood can be summarised in the following statements. Most of the respondents in the study believe that human intervention is still needed to perform inevitable business processes in the accounting firms' space. Participants also indicated that technology, including automation of business processes, assists the work of accountants and auditors rather than replacing them with machines. Most interview participants stated that accountants needed to reskill and acquire IT skills to operate and work with automated systems. Human beings are still required for processes like analysis, interpretation, and making judgements – staff of accounting firms perform cognitive and analytical tasks. Repetitive and other administrative routine tasks will be replaced by machines and the jobs associated with these tasks. Automation frees accounting firms' employees to perform better than tedious tasks, enhancing their motivation levels. Employees do not generally accept change but will support changes if the effect of the change is fully explained to them. There is fear of loss of jobs to technology. Still, most participants in the research indicated that technology could create new jobs, especially if employees of accounting firms upskill and reskill themselves. Shim and Yang (2018:144) argue that technology does not easily replace cognitive occupations, but routine tasks are prominent candidates for carrying them out more efficiently using technology (automation). Sampson (2021:123) further says that automation can substitute human workers with computers in performing manual tasks and transferring humans to non-routine tasks where complex cognitive ability and problem-solving are needed. Peruffo *et al.* (2017:8) support this when they say future jobs will be a combination of technical tasks and non-routine work where workers are focused more on problem-solving, communication with each other and finding ways to be flexible and adapting to changes. According to Jabłoński and Ziębicki (2019:33), automation alters an accounting professional's work, eliminating most routine tasks. It leaves room for more strategic tasks, interactions with stakeholders, conclusions based on analysis of information produced by automated systems, and general improvement of business performance. The World Economic Forum (2016), cited in Egiyi and Chukwuani (2021:34), also adds that routine jobs, middle-skilled, white-collar jobs like data-capturing staff, accounts and payroll staff and auditors will be in less demand soon.

5.5.4 Automation and business success

The qualitative study results give a better insight into automation and business success. Various matrixes can be used to measure the relationship between the automation of business processes and business success for accounting firms. From the interaction with participants and respondents in this study, the success of the accounting firms is measured through more clients, higher revenue, higher efficiency in providing services, happy and satisfied clients, and motivated employees. Automation improves most of these metrics due to efficiency, faster processing, reduced costs, and capacity to service more and bigger clients. According to Choi and Baker (2017:23), automation may result in several benefits to the business, including lower production costs, the potential for better quality, and more profits. Soni *et al.* (2020) concluded that businesses that correctly deploy technology and automation have realised savings in time and money by automating repetitive procedures and tasks. Manyika *et al.* (2017:8-9) argue that automation has several economic benefits, including increased profit, increased throughput, and productivity. Thus, automation results in increased production using the same number of employees as the employees are freed from performing non-value-adding tasks and concentrating on cognitive tasks like data interpretation, decision-making support, customer service and business development. Automation also results in customer advocacy, enhanced revenue and better retention of customers.

5.5.5 Disadvantages of automation for accounting firms

The results of the study revealed the drawbacks of automation in accounting firms. The main disadvantages of empirical research include the higher cost of buying, developing and maintaining automated systems. There is a reduced sense of responsibility by employees of accounting firms as most tasks are relegated to processing by automated systems. High dependency on technology may be detrimental to accounting firms' business operations, especially when systems are down. There are security concerns like cybersecurity issues if IT controls are not robust. Automation works properly with well-trained staff. There is, therefore, a need for training employees to use the systems correctly. Errors in programming and working of automated systems cause more significant damage than errors in a manual environment as the mistakes are more pervasive, affecting several transactions and processes. Jabłoński and Ziębicki (2019:33) point out that the development of automation technologies is capital-intensive, but automated solutions usually have a low marginal cost compared to manual systems where wages are involved

5.6 Limitations of the study

Studies always present limitations that affect the research process. The limitations encountered in this study are presented in this section. The limitations include:

i. The qualitative data depended on the participants' experience, perceptions and judgement of the subject matter. All this is subjective and restrictive to generalise the results correctly.
ii. Automation is vast, and this study may not contain all possible aspects. In this regard, future studies may need to be undertaken on other aspects of automation.

5.7 Recommendations for future research

Future research may be conducted to understand technology's overall effect on employment and whether jobs increase or decrease.

5.8 Conclusion

This chapter concluded the study and provided a summary of the study as a whole. The study addressed all the research objectives. Some of the study's key findings are that there are several business processes of accounting firms which can be automated, especially those around routine and repetitive tasks like payroll, transaction capturing and processing and financial statements preparation. The benefits include efficiency, accuracy in processing information, fewer human errors, faster processing of transactions, the ability to service more prominent clients, better compliance with laws and regulations, and increased revenues and profits. Staff are relieved from repetitive tasks and concentrate on higher-order tasks where analysis, interpretation and cognitive ability are needed. The study also revealed that its advantages outweigh the drawbacks of automation. The other critical finding is that there is a direct relationship between the automation of business processes of accounting firms and their success. The success of accounting firms is made possible through more clients, higher revenue, higher efficiency in providing services, happy and satisfied clients, and motivated employees. Automation improves most of these metrics due to efficiency, faster processing, reduced costs, and capacity to service more and more prominent clients. Thus, there is a relationship between automation and business success in accounting firms.

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ANNEXURE A: DATA COLLECTION TOOL - RESEARCH QUESTIONNAIRE

QUESTIONNAIRE

To be completed by senior employees of accounting firms

INSTRUCTIONS

You are kindly requested to take about 25 minutes of your time to answer questions in this questionnaire. The questionnaire comprises six questions with an average of 5 sub-parts on your perception of automation of business processes and business successes in accounting firms of South Africa.

Respondents Demographic Information

For each question below, please put an "X" in the brackets to the immediate right of your preferred answer (as shown on the right) [**X**]. If your answer to a question is not in the options provided, write it in the space to the right of "Other *(Please specify)*". Please answer all questions.

1.1 Please state your highest qualification

Certificate or equivalent [ ]

Diploma [ ]

Bachelor's degree [ ]

Honours Degree [ ]

Master's Degree [ ]

Doctoral Degree [ ]

Other *(Please specify)*_____

1.2 Job Position

Supervisor [ ] Audit Senior [ ]

Manager [ ] Director/Partner [ ]

Sole Proprietor [ ] Other *(Please specify)*_____

1.3 Years of experience in the accounting field:

Less than 2 years [ ] 2-5 years [ ] 6-10 years [ ]

11-15 years [ ] 16-20 years [ ] 21-25 years [ ]

More than 25 years [ ]

1.4 Please indicate the total revenue of your firm per year:

0 to R35 million [ ] Over R35 million but below R85 million [ ]

Over R85 million [ ]

1.5 Please indicate total number of full time employees in your firm:

0 to 50 [ ] 51 to 250 [ ] More than 250 [ ]

2	**To what extent would you agree or disagree with each of the following statements on a scale ranging from Strongly Agree = 5, Agree = 4, Neutral = 3, Disagree = 2 to Strongly Disagree = 1. (Please simply put a "circle" on a number representing your preferred answer. If you make a mistake, put an "X" across the circle and choose another answer.)**					
	Business Processes where automation is applicable					
2.1	Payroll Processing	1	2	3	4	5
2.2	Accounting Transactions capturing and processing	1	2	3	4	5
2.3	Managing Debtors and Creditors	1	2	3	4	5
2.4	Accounting Reconciliations	1	2	3	4	5
2.5	Financial Statements Preparation	1	2	3	4	5
2.6	Auditing	1	2	3	4	5
3	**To what extent would you agree or disagree with each of the following statements on a scale ranging from Strongly Agree = 5, Agree = 4, Neutral = 3, Disagree = 2 to Strongly Disagree = 1. (Please simply put a "circle" on a number representing your preferred answer. If you make a mistake, put an "X" across the circle and choose another answer.)**					
	Benefits of automation for Accounting Firms					
3.1	Lower operating Costs	1	2	3	4	5
3.2	Less human errors and improved efficiency	1	2	3	4	5
3.3	Better quality work	1	2	3	4	5
3.4	Speedy performance of operations and completion	1	2	3	4	5
3.5	Processing of big data	1	2	3	4	5
3.6	Improved compliance with relevant legislation	1	2	3	4	5
4	**To what extent would you agree or disagree with each of the following statements on a scale ranging from Strongly Agree = 5, Agree = 4, Neutral = 3, Disagree = 2 to Strongly Disagree = 1. (Please simply put a "circle" on a number representing your preferred answer. If you make a mistake, put an "X" across the circle and choose another answer.)**					
	Attitude of employees to automation					
4.1	Automation leads to unemployment	1	2	3	4	5

4.2	Automation leads to employees performing better tasks	1	2	3	4	5
4.3	Employees support automation if its effect on them is clarified	1	2	3	4	5
4.4	Employees generally accept change	1	2	3	4	5
4.5	Full cooperation of employees is needed to properly implement new technology	1	2	3	4	5
4.6	Most accounting tasks are susceptible to automation	1	2	3	4	5
5	**To what extent would you agree or disagree with each of the following statements on a scale ranging from Strongly Agree = 5, Agree = 4, Neutral = 3, Disagree = 2 to Strongly Disagree = 1. (Please simply put a "circle" on a number representing your preferred answer. If you make a mistake, put an "X" across the circle and choose another answer.)**					
	Automation and business success					
5.1	Automation broadens the service offering of firms	1	2	3	4	5
5.2	Automation leads to growth in a firm's revenue	1	2	3	4	5
5.3	Automation increases profits by reducing costs	1	2	3	4	5
5.4	Automation improves the morale of employees	1	2	3	4	5
5.5	It is easier to take more clients when the firm's business processes are automated	1	2	3	4	5
6	**To what extent would you agree or disagree with each of the following statements on a scale ranging from Strongly Agree = 5, Agree = 4, Neutral = 3, Disagree = 2 to Strongly Disagree = 1. (Please simply put a "circle" on a number representing your preferred answer. If you make a mistake, put an "X" across the circle and choose another answer.)**					
	Drawbacks of automation					
6.1	Automation is too costly to develop and implement	1	2	3	4	5
6.2	Automation leads to clients doing work on their own	1	2	3	4	5
6.3	Automation leads to the closure of accounting firms	1	2	3	4	5
6.4	Automation compromises data security of clients	1	2	3	4	5

ANNEXURE B: DATA COLLECTION TOOL: RESEARCH INTERVIEW GUIDE

Research Interview Guide

BY

PAGIAS VANHUVAONE MASTER OF BUSINESS ADMINISTRATION (MBA) STUDENT (NORTH-WEST UNIVERSITY – POTCHEFSTROOM CAMPUS)

TOP MANAGEMENT INTERVIEW

The interview guide is part of the Master's in Business Administration study that explores the automation of business processes and business successes in accounting firms in South Africa.

INSTRUCTIONS

You are kindly requested to take 30 to 45 minutes of your time to answer questions in this face-to-face interview. You will first be asked questions related to demographic information, and after that, your perception of automation of business processes and business successes in accounting firms of South Africa. Your responses will be treated with utmost confidence.

Section One: Demographic factors of respondents: Educational Level, Age, Gender, Years of Experience.

a) What is your Educational Level, Years of Experience in the accounting field?

b) Please indicate the total revenue of your firm per year:

0 to R35 million [ ] Over R35 million but below R85 million [ ]

Over R85 million [ ]

c) Please indicate the total number of full-time employees in your firm:

0 to 50 [ ] 51 to 250 [ ] More than 250 [ ]

Section Two: Business processes where accounting firms may deploy automation.

a) What business processes are prominent candidates for automation in accounting firms?

b) What are the business processes you have automated in your accounting firm?

Section Three: Benefits of automation of business processes for accounting firms.

a) Tell me what you think are the general benefits of automating business processes for accounting firms?
b) What benefits have accrued to your accounting firm because of adopting automation of business processes?

Section Four: Attitude of accounting firms' employees towards automation.

a) What is your perception of automation of business processes in accounting firms regarding the displacement of workers with technology?
b) Do you think accounting roles can be replaced by technology?
c) In your opinion, do you think automation of business processes of accounting firms makes the life of its employees better or worse?

Section Five: Automation of business processes of accounting firms and their business success.

a) Do you think automation of business processes of accounting firms leads to the success of accounting firms?
b) How does the automation of accounting firms' business processes lead to the success of accounting firms?

Section Six: Drawbacks of automation in accounting firms

a) What are some of the disadvantages of automation of business processes in accounting firms?
b) What is your opinion on the security of data when automated systems process transactions in accounting firms rather than manual systems?

********Thank you*******

ANNEXURE C: ETHICAL CLEARANCE FROM NORTH - WEST UNIVERSITY

NORTH-WEST UNIVERSITY
NOORDWES-UNIVERSITEIT
YUNIBESITI YA BOKONE-BOPHIRIMA

Private Bag X1290, Potchefstroom
South Africa 2520

Tel: 018 299-1111/2222
Fax: 018 299-4910
Web: http://www.nwu.ac.za

Senate Committee for Research Ethics
Tel: 018 299-4849
Email: nkosinathi.machine@nwu.ac.za

25 April 2022

ETHICS APPROVAL LETTER OF STUDY

Based on approval by the **Economic and Management Sciences Research Ethics Committee (EMS-REC)** on 22/04/2022, the Economic and Management Sciences Research Ethics Committee hereby **approves** your study as indicated below. This implies that the North-West University Senate Committee for Research Ethics (NWU-RERC) grants its permission that, provided the special conditions specified below are met and pending any other authorisation that may be necessary, the study may be initiated, using the ethics number below.

Study title: Exploring the automation of business processes and business successes in accounting firms of South Africa
Study Leader/Supervisor (Principal Investigator)/Researcher: Prof W Musvoto - MBA
Student: Vanhuvaone, P (40514986)

Ethics number:

N	W	U	-	0	0	6	0	5	-	2	2	-	A	4
Institution				Study Number						Year			Status	

Status: S = Submission; R = Re-Submission; P = Provisional Authorisation; A = Authorisation

Application Type:
Commencement date: 25/04/2022 **Risk:** Low
Expiry date: 25/04/2023
Approval of the study is initially provided for a year, after which continuation of the study is dependent on receipt and review of the annual (or as otherwise stipulated) monitoring report and the concomitant issuing of a letter of continuation.

Special in process conditions of the research for approval (if applicable):

-

General conditions:

While this ethics approval is subject to all declarations, undertakings and agreements incorporated and signed in the application form, the following general terms and conditions will apply:

- *The study leader/supervisor (principle investigator)/researcher must report in the prescribed format to the EMS-REC:*
  - *annually (or as otherwise requested) on the monitoring of the study, whereby a letter of continuation will be provided, and upon completion of the study; and*
  - *without any delay in case of any adverse event or incident (or any matter that interrupts sound ethical principles) during the course of the study.*
- *The approval applies strictly to the proposal as stipulated in the application form. Should any amendments to the proposal be deemed necessary during the course of the study, the study leader/researcher must apply for approval of these amendments at the EMS-REC, prior to implementation. Should there be any deviations from the study proposal without the necessary approval of such amendments, the ethics approval is immediately and automatically forfeited.*
- *Annually a number of studies may be randomly selected for an external audit.*
- *The date of approval indicates the first date that the study may be started.*
  n the interest of ethical responsibility, the NWU-SCRE and EMS-REC reserves the right to:
  - *request access to any information or data at any time during the course or after completion of the study;*
  - *to ask further questions, seek additional information, require further modification or monitor the conduct of your research or the informed consent process;*

- *withdraw or postpone approval if:*
  - *any unethical principles or practices of the study are revealed or suspected;*
  - *it becomes apparent that any relevant information was withheld from the EMS-REC or that information has been false or misrepresented;*
  - *submission of the annual (or otherwise stipulated) monitoring report, the required amendments, or reporting of adverse events or incidents was not done in a timely manner and accurately; and / or*
  - *new institutional rules, national legislation or international conventions deem it necessary.*
- *Please note that the ethics approval of this application is subject to the Covid-19 protocols.*

The EMS-REC would like to remain at your service as scientist and researcher, and wishes you well with your study. Please do not hesitate to contact the EMS-REC or the NWU-SCRE for any further enquiries or requests for assistance.

Yours sincerely,

Mark Rathbone

Digitally signed by Mark Rathbone
DN: cn=Mark Rathbone, o=North-West University, ou=Business management, email=mark.rathbone@nwu.ac.za, c=ZA
Date: 2022.04.25 17:01:28 +02'00'

Prof Mark Rathbone
Chairperson: NWU Economic and Management Sciences Research Ethics Committee

ANNEXURE D: INFORMED CONSENT FORM

INFORMED CONSENT TO PARTICIPATE IN A SURVEY

My name is Pagias Vanhuvaone, and I am an MBA student at the NWU Business School, North-West University. This study aims to explore the relationship between automation of business processes and business successes in accounting firms in South Africa. This study forms part of a mini dissertation to be submitted in partial fulfilment of the Master of Business Administration requirements at the North-West University. The Master of Business Administration is an internationally accredited degree that requires adherence to strict ethical standards as a prerequisite to conducting this research.

You were selected as a possible participant/respondent in this study because you are a senior employee/management/owner of an accounting firm who was randomly picked and considered trustworthy in giving information on the automation of business processes and business successes. The results of this study will be contained in a dissertation.

1. PURPOSE OF THE STUDY

This study aims to explore the automation of business processes and business successes in accounting firms of South Africa.

2. PROCEDURES

You are kindly requested to participate in this study whereby you complete the questionnaire in the first phase of this study and return it to the researcher. You may also be asked to participate in the second phase of the study, where you will be interviewed. During the individual interviews, audio recording will be used.

3. POTENTIAL RISKS AND DISCOMFORTS

The results will only be used for this study. The participants will remain anonymous; hence, the results will not be associated with any person or company's names. The researcher will use letters as pseudonyms.

4. POTENTIAL BENEFITS TO SUBJECTS AND/OR SOCIETY

The participants will benefit from this research because the outcomes of this study will assist their accounting firms. This can improve their business continuity, competitiveness, growth and performance. The participant will learn about the automation of business processes and business success by participating in this study. However, if there is considerable success in accounting firms, both the government and society will be uplifted through economic development. There will also be employment creation, which may assist in alleviating poverty.

5. PAYMENT FOR PARTICIPATION

The participants will not receive any form of payment because they are keen to understand the impact of automation of business processes on business success. The participants will not be forced to participate in this study.

6. CONFIDENTIALITY

Any information obtained in connection with this study and that can be identified with the participants will remain confidential and be disclosed only with the participants' permission or as required by law. Confidentiality will be maintained by signing the voluntary informed consent form immediately before the study commences. In this study, individual confidentiality will be upheld using unmarked questionnaires and interview schedules. Each participant will be assigned a code and then identified with that code. The data will be safeguarded on the researcher's laptop, and the passwords will be continually changed to make accessibility impossible. The information will only be available to the Business School, North-West University. The results will be published for educational purposes at the Business School, North-West University, but the names of participants will not be given because of the requirement of anonymity in this study. This research will involve audio-recorded activities, and before recording, the researcher will request the participant's permission. The participants have the right to deny this request.

7. PARTICIPATION AND WITHDRAWAL

You may withdraw to participate in this study at any time. The researcher may remove you from this research if circumstances warrant such an act.

8. APPROVAL OF THE STUDY AND THE IDENTIFICATION OF RESEARCHER

The study has been approved by the Scientific Committee of the NWU Business School.
Ethical clearance has been obtained by the Faculty of Economic and Management Sciences Ethics Committee (EMS-REC). The following ethical clearance number is allocated: NWU-00605-22-A4.

If you need to ask any questions about this study, please feel free to conduct the research personnel at the Business School, North-West University: Principal Researcher, Promoter, Co-Researcher (s).
If you need to contact the researcher and the promoter, their details are as follows:

1) Principal researcher: Pagias Vanhuvaone

   Mobile number: +27 76 663 1993

2) Promotor: Professor Wedzerai Musvoto

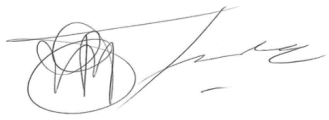
Phone number: +27 18 389 2088
Mobile number: +27 60 356 0137

9. RIGHTS OF RESEARCH SUBJECTS

Please note that you may withdraw your consent at any time and discontinue without being penalised. You are not waiving any legal claims, rights or remedies because you participate in this research. If you have any questions regarding your rights as a research subject, contact Dr Lekunze (Research Manager) on +27 18 3892437 /2827 at the Business School, North-West University.

Your input is of great value to this research, and I appreciate your help in providing this information.

Sincerely,



PAGIAS VANHIVAONE
NWU Business School
North-West University, Potchefstroom

ANNEXURE E: PLAGIARISM TURNITIN REPORT

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ANNEXURE F: CONFIRMATION CERTIFICATE FROM THE EDITOR

Van Schalkwyk Editorial Services

Email: arayofhope1@gmail.com

LinkedIn profile: https://www.linkedin.com/in/ar%C3%A9-van-schalkwyk-0214202a/

18/11/2022

DECLARATION OF PROFESSIONAL EDIT

Exploring the relationship between automation of business processes and business successes in accounting firms of South Africa.

by

Pagias Vanhuvaone

I declare that I have edited this mini dissertation. My involvement was restricted to language usage and spelling, completeness and consistency, reference style, and formatting of headings, captions and tables of contents. I did no structural rewriting of the content and did not influence the academic content in any way.

Mr Aré van Schalkwyk

BA (Languages)

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