



APPLIED RESEARCH PROJECT

"Influence of digital transformation on employment prospects in the South African logistics sector".

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Abstract

The study explores in detail about the influence of digital transformation on employment prospects for the South African logistic sector. Globally, different AI technologies, big data and digital technologies are used to revolutionize logistic operations. Under these points, the research examines in detail about the potential effects of these changes on skill requirement, job role, and overall employment opportunities in logistic industry of South Africa. To conduct this research quantitative research approach is applied. For this, a survey was conducted with professionals in the sector to gain reliable data on workforce changes, technology adoption, and skill requirement. Based on this, the results showed that digital transformation is helpful to increase the demand for highly skilled workers, particularly in various areas like digital logistic management, and data analytics in which there are some concerns regarding job displacement present because of automation. Furthermore, the study also highlights the importance of workforce upskilling and reskilling initiatives with the requirements for government policies to provide reliable support for enhancing digital skills. Secondly, it discusses the role of educational institutions for preparing workers regarding emerging digital roles. The required findings suggest that a balanced approach to digitalization is extremely important, including targeted training programs and transparent communication for ensuring the workforce of logistic sectors can easily adapt with ongoing technological advancements.

Keywords: South African logistics, Digital transformation, automation, employment prospects, skill development, technological adoption, workforce reskilling, logistics management, data analytics, job displacement.

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CHAPTER 1. INTRODUCTION AND CONTEXTUAL BACKGROUND

1.1. Introduction

With the advancement of digital technologies, the industries are reshaping globally, and logistics sectors are upgrading too upgrading. For South Africa, the role of logistic industry is extremely critical to facilitate trade and support economic growth (Andersson & Movin, 2018). Therefore, it is extremely important to understand how digital transformation is helpful to put influence on the future of this sector based on employment (Bartlett & Hadden, 2016). According to this, various technologies include data analytics, artificial intelligence are adopted by this industry for enhancing efficiency, streamline logistic operations, and minimizing the cost (Ustundag & Cevikcan, 2017). Secondly, the impact of such advancements on employment and workforce dynamics perspectives various questions are raised. Hence, the main aim of this study is to explore in detail about how logistic sector in South Africa is adopting digital transformation, and how these changes can put impact on employment opportunities like skill requirements, and job roles (Cennamo & Dagnino, 2020).

1.2. Background of the study

According to these points, Digital transformation is related to the integration of digital technologies into various areas of business that fundamentally change how companies operate and deliver value to customers. However, in the logistics industry, digital transformation means that such technologies like IoT, automation, AI, and blockchain are used to enhance supply chain visibility, manage inventory, and optimize routes with high efficiency (Dhawan & Bhalla, 2022). As technology has increased globally, the companies are following digital transformation for enhancing competitiveness level and respond to increasing demands for transparency and efficiency. For South Africa, logistics is considered a vital industry because of strategic geographic position of the company. The reason is that this country is serving as a main gate way to the rest of the African continent. Secondly, adopting digital transformation in logistics also brings the potential for labour displacement because various tasks traditionally performed by workers may be automated (Dhawan & Bhalla, 2022).

On the other hand, the best point is that through digitalization, there is a huge chance for creating new job opportunities with certain set of skills based on workforce requirements (Bartlett &

Hadden, 2016). Moreover, the study focusing on the logistic sector of South Africa in which various issues like skill shortages, unemployment, and economic inequality are prevalent. Through understanding how digital transformation is affecting employment in this sector it will become simple to gain insights into broader economic impacts and guide strategies for workforce development and skill training (Tawaststjerna & Olander, 2021).

1.3.Problem Statement

Digital transformation is revolutionizing the global logistics industry, offering substantial benefits in terms of operational efficiency, cost reduction, and service optimization (Ustundag & Cevikcan, 2017). However, alongside these advancements, employment prospects in South Africa's logistics sector are facing significant disruptions. The increasing adoption of automation, artificial intelligence (AI), and other digital technologies is reshaping workforce structures, leading to reduced demand for low-skill jobs while simultaneously creating new technology-driven roles.

A major concern is the displacement of workers engaged in manual and repetitive tasks, such as warehouse operations, freight handling, and administrative logistics. Automation and algorithmic-driven supply chain solutions are reducing the necessity for human intervention, raising urgent questions about job security and workforce transition strategies. Understanding which job roles are most at risk, and identifying emerging employment opportunities, is crucial for workforce sustainability and sectoral resilience (Bygstad & Øvrelid, 2021).

Further compounding the issue is the growing misalignment between traditional skillsets and the competencies required for digitally integrated logistics operations. The emergence of data analytics, AI-driven decision-making, and blockchain-driven supply chain management necessitate advanced technical skills. Many workers lack the necessary expertise to transition into new roles, exacerbating the skill gap and leading to employment vulnerabilities. Therefore, addressing the gap between existing workforce capabilities and evolving industry demands is fundamental to ensuring long-term employability and sectoral growth (Cennamo & Dagnino, 2020).

Existing studies highlight the transformative role of digital technologies in logistics, emphasizing efficiency gains and cost benefits (Ustundag & Cevikcan, 2017). Research has demonstrated how automation reduces operational costs while increasing service reliability, enabling firms to optimize supply chain processes. However, studies also underscore workforce displacement concerns, with automation increasingly replacing low-skill labour (Bygstad & Øvrelid, 2021).

Furthermore, literature recognizes the emergence of new employment opportunities stemming from technological adoption. Digital roles such as supply chain data analysts, AI-driven process managers, and blockchain specialists are gaining prominence. However, there is limited clarity on how quickly traditional workers can transition into these new job roles, as skill gaps persist (Cennamo & Giovanni Battista Dagnino, 2020).

This study aims to analyze the impact of digital transformation on South Africa's logistics sector, focusing on job displacement, emerging opportunities, and required skillsets. It aims to provide practical recommendations for workforce sustainability, ensuring technological advancements contribute to industry growth without exacerbating employment vulnerabilities, and to bridge the competency gap.

1.4. Statement of Purpose

The study aims to investigate in detail about the impact of digital transformation on job roles, job opportunities and skill requirements in the logistic sector of South Africa. Therefore, the research will explore in detail how digitalization, automation, and technology adoption influence the demand for certain job roles, overall employment trends in the industry, and development of new skills, and employment trends in the industry. Therefore, the main goal of this research is to provide insights into how logistic companies can effectively manage workforce transition to minimize disruption level and promote sustainable employment in a digitally transformed industry.

1.5. Research Question

How does digital transformation affect employment prospects in the South African logistics sector, particularly in terms of job displacement, emerging roles, and required skill adaptations?

1.6. Research Objectives

The research objectives required are given below:

1. To analyze in detail how logistic sector of South Africa is evolving because of digital transformation
2. To investigate in detail about the impact of technological advancement on employment opportunities in the logistic sector.
3. To find new developments applied in logistics digitalization and assess their effects on skill requirements and workforce development.

1.7. Rationale of the Study

This study examines the impact of digital transformation on South Africa's economy, particularly in logistics. It highlights the high unemployment rate and skills gap, which can be significantly impacted by technology adoption. The insights gained can help logistic companies prepare for shifts, identify necessary skills, develop strategies, and plan workforce reskilling (Sibiya, 2023). The study provides valuable insights for logistic companies, assisting in identifying necessary skills, developing strategies for job displacement, and planning workforce reskilling, and highlighting the impact of digital transformation on employment in South Africa (Verhoef & Broekhuizen, 2021).

1.8. Delimitation of the Study

As the study is based on the logistics sector in South Africa and its focus is on the impact and adoption of digital technologies on employment. Furthermore, this study will not expand to other regions or sectors because of industry-specific and economic factors in South Africa are central to the analysis. Secondly, the study depends on required available data from different sources, acknowledging that some data may be incomplete or outdated. However, the focus is on the current digital transformation demands and trends with their anticipated short-term impacts on the logistic industry, rather than showing a long-term predictive analysis. Moreover, this study also employs a quantitative research design that includes questionnaire taken from various stakeholders and other members linked with logistic sector.

1.9. Assumptions

These are given assumptions underpin this study

1. **Industry Adoption Rate:** It is assumed that the logistic sector of South Africa will continue to adapt digital technologies at a proper pace that aligns with current global trends.
2. **Economic Stability:** The study also assumes that South Africa will maintain improving and stable economic condition for supporting digital transformation in logistic sector.
3. **Skill Development Program:** The study assumes that there will be a proper workforce available to equip workers with the latest digital skills required in the evolving logistic industry.
4. **Supportive Regulatory Environment:** The study also assumes a regulatory framework in which digitalization and innovation is encouraged within the logistic sector.
5. **Competitive Pressure:** The study assumes that industry competition will drive companies to invest heavily in digital technologies for enhancing efficiency level and remain competitive.
6. **Global Influence:** The study assumes that automation trends and global digitalization will continue to influence on the logistic sector trajectory of South Africa.
7. **Technology Impact on Job Roles:** It is assumed that the impact of technology is different on job roles, that lead towards creating high-skill areas and displacement for low-skill roles in logistics.

1.10. Summary

In this chapter, there is brief overview about the research topic by highlighting about the main impact of digital transformation on employment rate on logistic sector of South Africa. The chapter provides statements of purpose, problem statement, research objectives, and rationale to establish a clear framework of the study. Secondly, the research is motivated by showing the need to understand how digitalization is influencing skill requirements and job roles in an industry with required implications for economic and workforce planning development. The assumptions and delimitations for this study are designed to define the context and scope of the study by focusing on the short-term impact of technology adoption in logistics.

CHAPTER 2. LITERATURE REVIEW

2.1.Introduction

This chapter examines the impact of digital transformation on South Africa's logistics sector, highlighting the challenges and opportunities it presents. The integration of automation, AI, big data analytics, and IoT technologies has led to job displacement and job creation, with some roles becoming obsolete and others emerging with new opportunities. The shift requires a workforce equipped with skills such as data literacy, technological proficiency, problem-solving abilities, and adaptability. The South African logistics sector faces unique challenges, including infrastructure deficits and skill gaps, which hinder the adoption of new technologies.

To mitigate potential negative impacts, strategies such as partnerships between educational institutions and industry players, government-led training initiatives, and corporate investment in employee development programs must be explored. The chapter also discusses theoretical frameworks related to technology-induced employment change, such as Schumpeter's theory of creative destruction, and the conceptual framework employed in this study. By synthesizing these elements, the chapter aims to provide a nuanced understanding of how digital transformation influences employment prospects in the South African logistics sector.

2.2.Conceptualizing Digital Transformation

Scope and Definition of Digital Transformation

Based on one research, the author provided comprehensive information about digital transformation and how it can integrate different technologies into various aspects of business operations (Gkrimpizi & Vassilios, 2024). Hence, it shows substantial changes in how business operates in a competitive environment. Such transformation is not only considering how business compete and operate in highly competitive market but shifts in operational strategy, organizational reconstructing, and redefining customer engagement level (Gkrimpizi & Vassilios, 2024).

The next study showed that digital transformation requires not only technology adaptation but also skill upgrades with cultural shift for making organization-wide evolution (Gkrimpizi & Vassilios, 2024).

Components of Digital Transformation

In another research, the author showed that digital transformation is consisted of key technological components that drive efficiency and innovation (Mapingire & Smuts, 2022). As automation is replacing the manual processes with automated systems and increased accuracy and speed. On the other hand, artificial intelligence enabling data analysis and decision-making according to real-time information that significantly enhances logistic functions like demand forecasting (Mapingire & Smuts, 2022). Although IoT is also increasing tracking and monitoring of assets properly by providing a lot of transparency throughout supply chains (Mapingire & Smuts, 2022). The next vital component is big data and analytics that allow organizations to derive various insights from large volumes of data and help to optimize operations. Lastly, blockchain technology is introducing secure and transparent record keeping that is extremely valuable for logistics because it ensures transaction and tracking (Mapingire & Smuts, 2022).

Relevance of Digital Transformation to Logistics Globally and in South Africa

Due to increase in technology, digital transformation is also redefining logistics and enabling companies to increase supply chain visibility level, improve customer satisfaction, and optimize route planning by using advanced tracking systems. Such companies that are present in developed markets are rapidly adopting digital tools for streamlining logistics operations, increasing responsiveness, and minimize cost (Sibiya, 2023). In South Africa, the dependence on digital transformation is also growing because companies are seeking to modernize amid regional challenges like skill gap, and infrastructural constraints. Furthermore, the logistic sector of South Africa is playing a vital role in the economy, and it must adopt digital transformation to remain competitive in local and international market (Sibiya, 2023).

2.3.Digital Transformation in the Logistics Sector

Overview of logistics Processes and Digital Applications

According to this, one author had provided comprehensive detail about the overview of logistic processes and their digital applications (Trushkina & Dzwigol, 2022). This industry consists of a range of processes. These processes include warehousing, inventory management, distribution, and transportation (Trushkina & Dzwigol, 2022). Hence, digital applications are highly integral to these processing, minimizing errors, and improving efficiency level. For instance, automated warehousing systems can streamline inventory handling and different IoT devices are highly helpful to track fleet movement and monitor asset conditions properly. Based on these different digital applications present in logistics are involved in enabling data-driven decision-making and real-time response capabilities that are extremely important to manage risks and customer demands (Trushkina & Dzwigol, 2022).

Global Trends in Logistics Digitalization

In one paper, the author described in detail global trends in digital adoption. Based on advancement in automation, AI and cloud computing (Nitsche & Straube, 2023). Due to increment of technology, smart logistics are increased too in which IoT, and predictive analysis are used for efficient asset management that reflects an increasing trend (Nitsche & Straube, 2023). The author showed that logistic companies are prioritizing investments in route optimization tools for minimizing fuel costs and enhancing deliver accuracy levels. Lastly, blockchain technology is gaining a lot of traction to enhance security and transparency in international shipping and cross-broader transaction (Nitsche & Straube, 2023).

Key Technologies for Transforming Logistics

In one research, the author discussed different key technologies applied in logistics transformation (Rajan, 2024). The author showed that in warehousing and distribution centers automation is widely used. This automation is obtained by robots and automated systems to enhance productivity by handling repetitive tasks. As robotics are highly useful in inventory system because they can pick and maintain inventory (Rajan, 2024). Also, fleet management

systems are powered by GPS and by IoT route planning is optimized with minimized operational cost. Lastly, in route optimization software, AI minimizes travel distance, enhances sustainability, and fuel consumption (Rajan, 2024).

Case Studies/ Examples of Digital Transformation in Logistics

In another research, the author had provided information about some companies and their transformation in logistics (Umaganthan, 2019). In one case study, Amazon is using digital transformation in logistics by using robotics and automation in its distribution centers in which robots facilitate order picking and sorting the inventory (Umaganthan, 2019). The next example is related to SmartSensor technology of DHL that monitors various environmental conditions like humidity and temperature during transit and ensures quality control for perishable goods. Lastly in South Africa, IoT-enable fleet management system is enabled in imperial logistics for monitoring routes and minimize costs. As it is showing regional example regarding digital innovation in logistics (Umaganthan, 2019).

Impact of Digital Transformation in Employment

According to this, one study showed the automation and digitalization impact on employment and often minimizing demand for low-skilled individuals, as it is creating new job opportunities for high-skilled positions (Meena & Parimalaran, 2020). As logistic sector is highly affected because a lot of traditional roles like warehousing and delivery tasks are increasingly automated (Meena & Parimalaran, 2020). Lastly, digital transformation also creates the latest job roles that require digital proficiency like data analysts, robotics engineers, and IT specialists (Meena & Parimalaran, 2020).

Skill Requirements in the Digital Age

Due to the increase in technology, logistics are adopting digital technologies. Therefore, in one research the author mentioned about shift in skill requirements with greater demand for tech-savvy professionals who can maintain, operate, and troubleshoot digital systems (Klus & Müller, 2020). The required skills in machine learning, data analytics, and system integration

is extremely important (Klus & Müller, 2020). This shift also demands workforce skilled in digital competencies with traditional logistic knowledge that can be helpful for company to attain talented people in regions with skill gaps (Klus & Müller, 2020).

Job Displacement vs. Job Creation

In one research, the author presented a debate on whether digital transformation is creating or displacing jobs. The author showed that digitalization can easily eliminate low-skill jobs but generating high-skill roles (Santos & Barbero, 2023). Moreover, the author explained it with an example related to warehouse automation. Due to this, there will be no requirement of low-skilled individuals, only high-skilled individuals are required to maintain robots and data analysts (Santos & Barbero, 2023). Secondly, there are some emerging opportunities present in logistics including cybersecurity, IT management and data analyst. However, it is important to maintain a balance between job displacement can create contingent on workforce adaptability and reskilling initiatives (Santos & Barbero, 2023).

Overview of Digital Skills and Competencies Required in Logistics

According to one research the author showed that digital logistics require the workforce to adapt in new competencies include high proficiency in operating warehouse management system, understanding IoT applications, and basic programming skills (Koh & Yuen, 2022). Furthermore, data analytics skills are important too because it enables logistics employees to interpret trends and make informed decisions effectively (Koh & Yuen, 2022). Although, knowledge regarding cybersecurity protocols is important too because logistics companies are managing large sensitive data (Koh & Yuen, 2022).

2.4. Logistic Sector of South Africa

Overview of logistic Industry in South Africa

In one article, the author discussed about the logistic sector of South Africa. It is facilitating the national economy of the company by facilitating trade and connecting regional markets. As it is consisted of roads, air, rail, and port infrastructure with some vital key players including

Bidvest, Imperial Logistics, and Transnet (Iltmann, 2018). Moreover, logistics accounts for vital portion of GDP of South Africa and it plays a vital role as a gateway to Africa (Iltmann, 2018). The next point is that the logistic sector of South Africa is also facing a huge challenge because operational cost is increased with infrastructure limitations that impact its global competitiveness level (Iltmann, 2018).

Challenges and Opportunities Unique to the South African Context (infrastructure, skill gap)

In another paper, the author discussed about some challenges faced by South African logistic sector (Havenga & Simpson, 2014). These challenges include skill shortages, infrastructure constraints, and economic inequality. Secondly, this sector also struggles with poor road conditions, limited digital literacy, and hampering technology adoption (Havenga & Simpson, 2014). Another point is that digital transformation also presents a lot of opportunities for the companies particularly related to enhancing route efficiency and minimizing operational cost. Moreover, the regional position of South Africa is unique, and it is providing competitive advantage that can be increased with digital innovation (Havenga & Simpson, 2014).

Current level of Technology adoption in South African Logistics

Currently, the level of technology adoption is active in South Africa. As one research had provided valuable information regarding technology adoption in this country (Jansen & Rensburg, 2015). The level of technology adoption is increasing but still limited compared with global standards. However, some larger logistics companies like Barloworld and Imperial Logistics have adopted IoT technologies for managing fleet. Furthermore, some smaller companies face problems with the costs and skills required for digitalization (Jansen & Rensburg, 2015). For future of South Africa, the adoption of advanced technologies like blockchain and AI still nascent largely because of high cost linked with the lack of digitally skilled workforce (Jansen & Rensburg, 2015).

2.5.Impact of Digital Transformation on Employment in South Africa

In another article, the author provided some vital facts about the impact of digital transformation on employment. As there is a huge job shift observed in different sectors of South Africa because automation has replaced some low-skill positions and creating high demand for digitally skilled roles (Andersson & Movin, 2018). Some big sectors like finance and manufacturing have shown a gradual reduction in routine tasks because there is a comprehensive increase in tech-oriented jobs. Further, there is still a huge concern regarding the workforce of South Africa is still present because there is low number of positions that lead towards gap in workforce readiness (Andersson & Movin, 2018).

Workforce Readiness and Skill Shortage in the South African Context

In one research, the author mentioned that the skill gap is still a critical barrier to digital transformation in South Africa for the logistics sector (Hanelt, Bohnsack, Marz, & Marante, 2021). There are a lot of workers who don't have much technical skills for emerging tasks and there is low level access for upskilling and reskilling opportunities. To overcome this problem, some educational institutions in South Africa are working hard but their progress is slow that can affect the overall workforce readiness for digital jobs in logistics (Bartlett & Hadden, 2016).

2.6.Workforce Deployment and Skill for Digital logistics

Requirement of Skills and Competencies for logistics in a Digitalized Environment

In one research, the author had redefined the main skills required for logistics. This skill set is necessary for employees to main competitive and productive (Rajan, 2024). Moreover, based on traditional logistics skills, it is important for employees to possess digital competencies that allow them to use new technologies effectively, optimize digital tools, and interpret data (Vial, 2021). Also, the author mentioned various skills required for logistics include proficiency in automated warehouse management systems, data analytics, and familiarity with Internet of Things application that is supporting real-time monitoring of fleet movement and inventory (Barr, 2017).

The next point mentioned by the author is related to the demand for soft skills in the logistics sector. Due to technological advancement, the demand for soft skills is increasing. It means employees can solve complex problems, maintain adaptability, and make quick decisions in constantly evolving digital environment (Verhoef & Broekhuizen, 2021). Also, communication and teamwork skills also played a vital role because logistics become highly interconnected across global supply chains. It shows that it is important for employees to collaborate across various technological platforms (Bygstad & Øvrelid, 2021).

Approaches to Workforce Reskilling and Upskilling

In this paper, the author mentioned that reskilling and upskilling are extremely important strategies to help the workforce to adapt with the latest technological changes in logistics. The focus of reskilling is to focus on new skills for employees who are at the risk of automation and upskilling is increasing the competencies of current roles to leverage latest technologies (Bauder & Seliya, 2017). Secondly, companies are resolving this problem by implementing a blend of on-the-job training, collaborative learning platforms, and digital skills workforce. For example, there are a lot of logistics companies investing in obtaining skills related to internal learning management systems and offering some personalized training modules for software applications and digital tools (Daniyan, 2022).

Another point mentioned by the author is related to “Just-in-time” learning approach. This approach is highly common in organizations and allows employees to acquire skills related to specific tasks (Cennamo & Dagnino, 2020).

Role of Educational Institutional and Vocational Training in Preparing the Workforce

In another research, the author showed how educational institutions and vocational training centers play a vital role in equipping future logistics employees with required digital skills. For enhancing future logistics skills with automation, a lot of technical colleges and universities revised their supply chain management programs by including latest courses on data analytics (Andersson & Movin, 2018). Although vocational institution centers enhance their focus on hands-on digital skill training by collaborating with logistics companies (Hanelt, Bohnsack, Marz, & Marante, 2021).

Secondly, some initiatives like the National Skills Development Strategy in South Africa are also promoting digital and technical skill development (Verhoef & Broekhuizen, 2021). Based on this, government takes various initiatives to work on training and fill the logistics skill gaps by technical vocational education and training institutions (Verhoef & Broekhuizen, 2021).

2.7.Theoretical Frameworks on Technological and Employment Change

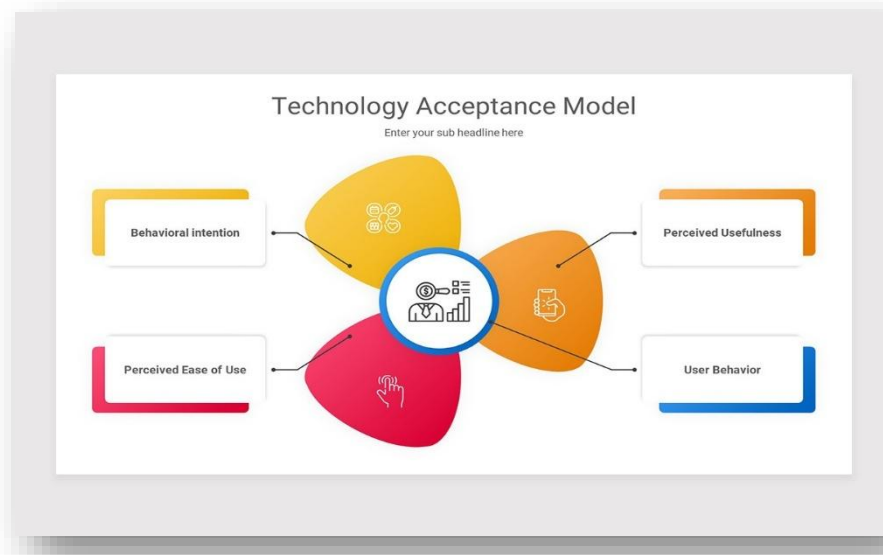
Overview of Relevant Theories

According to one research, the author had discussed the two main theories for explaining the interaction between technology and employment (Umaganthan, 2019). These technologies include Skill-Biased Technological Change, and Technological Acceptance Model. Based on this technology acceptance model suggests that perceived usefulness and ease of use is significantly influencing employees for adoption and acceptance of new technologies. This model is highly relevant to logistics because it can easily predict the likelihood of adaptability in the workforce impacting the efficiency and workforce (Reinartz, 2018).

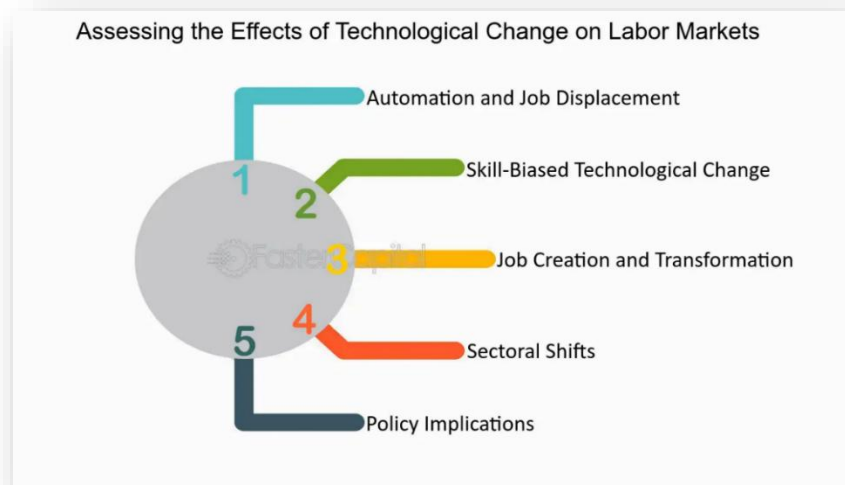
On the other hand, the skill-biased theory shows that technological advancement only favors high-skill workers that lead towards high skill gap in which low-skill workers face problems and high risk of job displacement (Rajan, 2024).

Applicability of these theories to the logistics sector

For the logistic sector, TAM theory provides comprehensive insights into different factors influencing technology adoption by employees. It means if logistics employees are considering digital technologies easy to use, and useful, then they can easily adopt these technologies for enhancing productivity and create latest operational efficiencies (Rêgo & Jayantilal, 2022). Due to lack of skills, the employees also face problems with technological adoption that show digital transformation initiatives may face setbacks and slow down digital adaptation in the industry (Bartlett & Hadden, 2016).



Furthermore, the Skill Biased theory is related to logistic companies of South Africa. The reason behind it is that it highlights widening skill gap (Devi, 2022). For employees in the logistics sector digital transformation is extremely important but with marginalizing and technical skills. Due to this, there is a growing divide between high-skill jobs because for fleet management and data analyst, low skill jobs are highly vulnerable (Daniyan, 2022).



Assessing the Effects of Technological Change on Labour Markets - Labour Market Dynamics in CGE Models: Exploring the Interactions

Frameworks to Guide the Interpretation of Job Displacement and Creating in Response to Digitalization

In one research, the author showed that both SBTC and TAM frameworks are helpful to interpret the dynamics of creation in logistics and job displacement (Sibiya, 2023). As digital tools and automation are decreasing the need for routine manual jobs because they are creating new job roles for technical skills and digital literacy (Rajan, 2024). On the other hand, TAM is explaining that employees are required to adopt new roles with technology advancement showing increasing disparity between high-skill and low-skill jobs with digital transformation (Dhawan & Bhalla, 2022).

2.8. Conceptual Framework for the Study

Outline of the main Phases in Digital Transformation as Applied for the Study

For analyzing in detail about the effects of digital transformation on employment in logistics. Based on this, the study will adopt conceptual frameworks that include Technology Selection, Needs Assessment, Pilot Testing, Implementation Planning, Monitoring & Optimization, and Complete Deployment (Daher & Kleib, 2023).

1. **Needs Assessment:** It identifies the main pain points present in the logistics process that digital transformation can address like inefficiencies in transportation and inventory management (Hanelt, Bohnsack, Marz, & Marante, 2021).
2. **Technology Selection:** It involves evaluating various digital tools like AI and IoT that can easily resolve identified issues linked with the specific requirements of the logistics sectors (Daniyan, 2022).
3. **Implementation Planning:** It focuses on developing a structured approach for integrating these technologies into existing logistics workflows. It provides brief details about changes in skills and job needed (Anderviren, 2015).
4. **Pilot Testing:** To conduct small-scale trials for measuring the effectiveness level of the digital tools to assess the workforce adaptability to latest technology (Rajan, 2024).

5. **Complete Deployment:** It contains complete installation of different digital technologies across the logistics network, with combining different training programs to enhance employees (Barr, 2017).
6. **Monitoring and Optimization:** It focuses on continuous tracking of performance indicators and makes required adjustments for enhancing efficiency and adapting to the latest challenges (Reinartz, 2018).

CHAPTER 3. RESEARCH METHODOLOGY

3.1.Introduction

In this chapter there is brief information about the research methodology for this research by examining in detail the influence of digital transformation on employment in South Africa's Logistics Sector. The methodology deployed for this research is quantitative because of its ability to systematically measure variables, test hypothesis, and analyze relationships based on study objectives. Through focusing on measurable data, the study is aiming on empirical understanding about how technological advancement impacts skill requirements, job roles, and employment prospects in logistic sector (Ames & Claire, 2019).

3.2.Research Design

For conducting research, quantitative research design was chosen, and it is well-suited for accessing trends, patterns, and relationships within large datasets. Secondly, this approach is also allowing for objective data collection with statistical analysis (Bartlett & Hadden, 2016). Hence, it will become simple for researchers to measure the impact of digital transformation on employment variables for the logistic sectors. The objectives and hypotheses of the study are guiding about the selection of variables with the development of structured questionnaires that will be used to collect data from representative sample within the industry. Furthermore, Quantitative research is also reliable because through this it will become simple to examine potential causations, correlations and provide detail insights into employment trends linked with digital technology adoption (Barr, 2017).

3.3.Data Collection Methods

For this research, the data collection method was structured around a survey-based approach. To conduct this research, a structured questionnaire has been designed that is consisted of closed-ended questions for capturing data on different dimensions of employment and digital transformation (Bauder & Seliya, 2017). It includes different levels of technology adoption, anticipated job changes, skill requirements, and employment training programs. Further, quantitative research approach is reliable to use for large data samples, and surveys will be distributed through online platforms for maximizing responses across diverse logistics firms ranging from small to large corporations (Daher & Kleib, 2023).

3.4.Population

In study's population there are managers, employees, and business owners linked with the logistic sector of South Africa. This research targeted individuals linked with all operations with high impact on digital transformation. It means the employees are not only linked with fleet operators, warehouse managers, IT specialists, working in the logistics department of companies. Hence, the population is selected from various ranges of organizations from small to large enterprises within logistic field (Daher & Kleib, 2023).

3.5.Sample

The required sample size selected for this study is based on the requirement of achieving high statistical power that can provide some meaningful insights. Therefore, 200 respondents will be selected for this study to allow for sufficient representation across various job roles, company sizes, and experience level in the logistics sector (Daher & Kleib, 2023). This sample size is reliable to maintain balance between representatives and feasibility and ensure that the findings can be generalized to a broader population in the industry (Daniyan, 2022).

3.6.Sampling method

For ensuring adequate representation across various segments, probability sampling methods were selected. This method ensures adequate representation across various segments in the logistics sectors. Secondly, this sampling method is applied through categorizing potential respondents based on company size, job role, and level of technology adoption (Dhawan & Bhalla, 2022). Secondly, this method is useful to apply because it minimizes bias and ensures each subgroup is proportionately represented in the sample that increases overall validity of the study. Also, stratified sampling provides highly precise insights into how digital transformation is affecting specific segments in the logistic sector (Devi, 2022).

3.7.Research Instrument

The main research instrument used for this study is a structured questionnaire. This questionnaire is designed with closed-ended questions for ease of statistical analysis, and quantification. Secondly, the questionnaire also contains various sectors focusing on digital transformation components that include AI, IoT, automation, and related workforce impact

(Ulukan & Ulukan, 2021). Moreover, the required topics addressed include skill requirements, technology adoption levels, training opportunities, job role changes, and skill requirements. This questionnaire was designed for following required practices for survey research and ensure relevance, clarity, and neutrality in question phases. A pilot test was conducted too with a small group of respondents to refine questions and ensure validity and reliability before distributing them to the full sample (Trubetskaya & McDermott, 2023).

3.8.Data Analysis Strategies and Interpretation

For data analysis, SPSS software application was used. This software was reliable to use because it allows efficient handling and analysis of the quantitative data collected. It includes descriptive statistics by including standard deviation, means, and medians for summarizing required trends regarding technology adoption and employment (Patel & Patel, 2021).

3.9.Limitations

There are also some limitations that can impact this study. The first one is related to dependence on self-reported data. This issue can introduce response bias because respondents are providing socially desirable answers rather than accurate responses (Mackey & Gass., 2015). The second limitation is that the survey approach is limiting in-depth exploration of participant's perception and experiences that are enriched by qualitative insights. The third limitation is that data collection is only limited to South Africa, so it is not possible to provide generalizable results to other regions with different technological and economic contexts. Lastly, as the level of technology adoption is evolving with time. Therefore, the cross-sectional design of the study is not properly capturing the long-term impacts of digital transformation on employment (Li & Verhagen, 2020).

3.10. Reliability of the Instrument

The study will employ standardized methods for data collection and analysis, including test-retest reliability, internal consistency using Cronbach's alpha, inter-rater reliability through cross-verification of interviews , and structured surveys with clear, well-defined questions for repeatability.

3.11. Validity of Instrument

Ensuring questionnaires and interviews comprehensively cover all relevant aspects of digital transformation and employment impacts in the logistics sector. Expert reviews will validate the relevance of the questions before implementation. Using established frameworks and theories (such as those by Ustundag & Cevikcan, 2017) to ensure survey items effectively measure digital transformation's effects on employment. Comparing survey responses with industry employment trends and official labour market reports to confirm the accuracy of collected data.

3.12. Ethical Consideration

Ethical consideration is also important for this research process. Participants must be informed about the purpose of the research. Also, their consent was gained before data collection. For maintaining confidentiality, all responses were anonymized, and data was securely stored and only accessible to research members. Secondly, respondents can withdraw from the research at any time they want without any incentives to avoid any form of coercion (Bartlett & Hadden, 2016).

3.13. Summary

This chapter has outlined the required research methodology selected for this study. Hence, quantitative research methodology is applied, and the study is aiming to collect empirical data by using structured questionnaire distributed to a representative sample in the logistic sector. Also, stratified random sampling method is select that ensure diverse representation and statistical analysis is required for detailed examination about the main variables regarding employment and technology adoption. Also, reliability, validity and ethical consideration will enhance the strength of this research. It also presents some limitations regarding generalizability, response biases, and data collection methods that provide a foundation for comprehensive analysis.

CHAPTER 4. RESEARCH FINDINGS

4.1.Introduction

The logistics sector in South Africa is undergoing significant transformation due to the rapid advancement of digital technologies. This study investigates the impact of digital transformation on employment prospects in this critical industry, which is vital for economic growth and job creation. According to Umaganthan (2019), two primary theories explain the interaction between technology and employment: Skill-Biased Technological Change (SBTC) and the Technological Acceptance Model (TAM). SBTC suggests that technological advancements favour skilled workers over unskilled labour, leading to a growing divide between those with the necessary skills to leverage these technologies and those without. TAM emphasizes perceived ease of use and usefulness as critical factors influencing technology adoption. An online survey was conducted with 200 respondents from various demographics within the South African logistics sector. The findings will provide valuable insights into how digital transformation is reshaping employment dynamics in South Africa's logistics sector.

4.2.Demographic Analysis

Below is the demographic analysis for the 200 respondents, compiled from data provided by the three logistics companies approached:

Company	Staff Complement	No. Respondents
Company A	1330	95
Company B	1150	58
Company C	960	47

Age of Respondents

The workforce is predominantly composed of younger to middle-aged individuals, with 80% of respondents in the third age group (36-45), indicating greater adaptability to technological changes.

Table 1: Age group of respondents of the study

Frequency	Percent	Valid Percent	Cumulative Percent
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18–25	27	13.5	13.5	13.5
26–35	80	40.0	40.0	53.5
36–45	53	26.5	26.5	80.0
46–55	26	13.0	13.0	93.0
56+	14	7.0	7.0	100.0
Total	200	100.0	100.0	

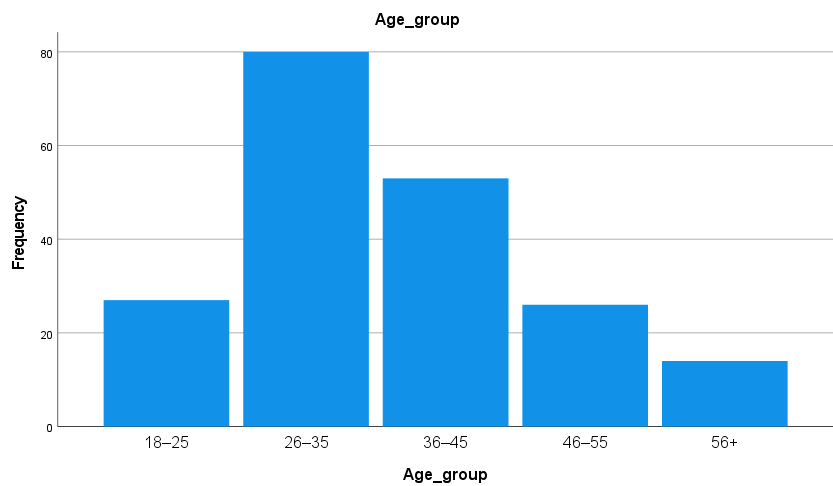


Figure 1: Bar chart for age group of respondents

Education Level of Respondents

The South African logistics sector faces skill gaps due to only 20% of respondents holding high school diplomas. Upskilling initiatives are needed to enhance digital literacy among lower-educated workers. Higher education provides an advantage for roles requiring advanced analytical capabilities and strategic thinking. Collaboration between educational institutions and industry stakeholders is crucial for future workforce development (Gkrimpizi & Vassilios, 2024).

Table 2: Education Level of Respondents

		Frequen cy	Percen t	Valid Percent	Cumulative Percent
Valid	High school	40	20.0	20.0	20.0

Diploma/Certificate	53	26.5	26.5	46.5
Bachelor's degree	80	40.0	40.0	86.5
Postgraduate degree	27	13.5	13.5	100.0
Total	200	100.0	100.0	

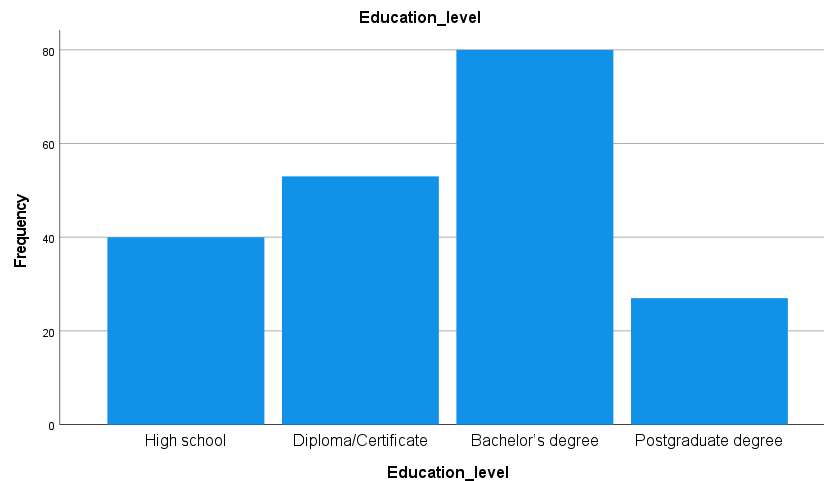


Figure 2: Bar chart for Education level of respondents

Role at Company, Logistics Sector

A study on the impact of digital transformation on South African logistics sector employment revealed that 33.5% of respondents are in operations, with 67 out of 200 identifying as such. Management (26.5%) is the second-largest group, with 53 respondents in management roles. IT/Technical Support (20%) is crucial for implementing digital tools and systems, while fleet management (20%) is vital for optimizing vehicle utilization, route planning, and maintenance scheduling. These roles are essential for guiding organizations through digital transformation initiatives and fostering an adaptive corporate culture.

Table 3: Role at Company of respondents

	Frequency	Percent	Valid Percent	Cumulative Percent
Operations	67	33.5	33.5	33.5

Valid	Management	53	26.5	26.5	60.0
	IT/Technical Support	40	20.0	20.0	80.0
	Fleet Management	40	20.0	20.0	100.0
	Total	200	100.0	100.0	

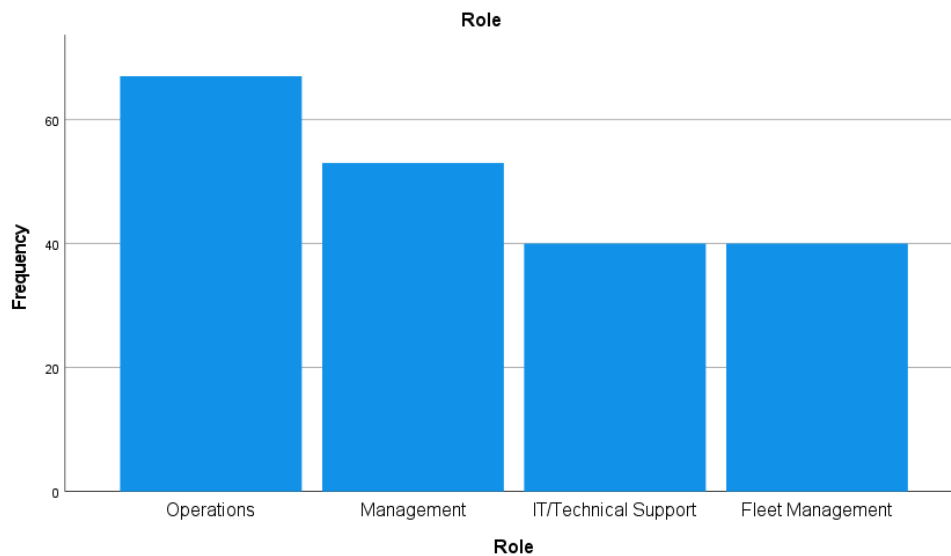


Figure 3: Bar chart for Job role of respondents

Organizational size of the Respondents

Digital transformation in the South African logistics sector presents both opportunities and challenges. Organizational size significantly influences these changes, with larger firms benefiting from increased efficiency and job creation due to their investment in technology and training. Stakeholders must collaborate on strategies to support small businesses in adapting to technological changes and fostering skill development.

Table 4: Organizational size of the Respondents

Frequency	Percent	Valid Percent	Cumulative Percent

Valid	Small	40	20.0	20.0	20.0
	Medium	80	40.0	40.0	60.0
	large	80	40.0	40.0	100.0
	Total	200	100.0	100.0	

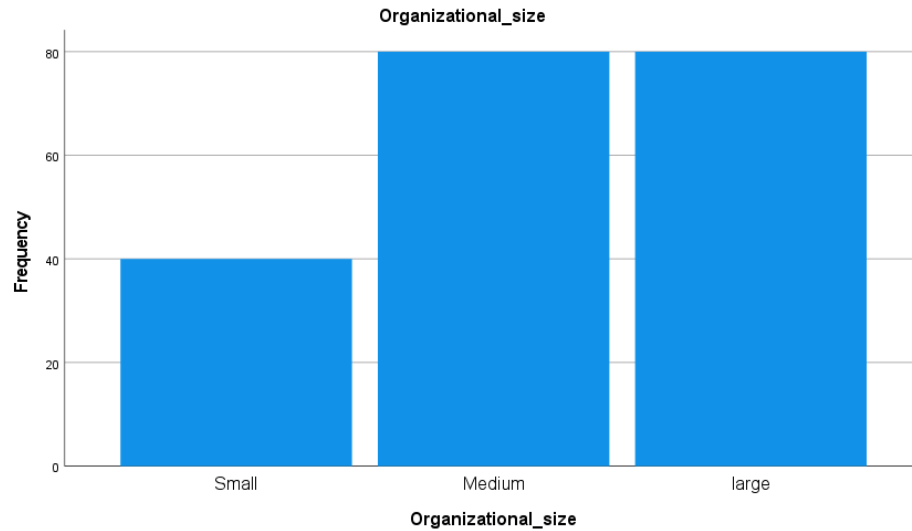


Figure 4: Bar chart for Organizational Size of respondents

Experience of Individuals

Digital transformation in the South African logistics sector is transforming business operations, requiring employees with specific skills to compete effectively. This includes automation, AI, and data analytics, which may lead to job displacement for those with less than three years of experience. However, it also creates new opportunities in tech-driven roles like data analysts and IT specialists. Adaptability and continuous learning are crucial for employees with extensive experience. Employment prospects improve for those who embrace digital skills development, while smaller firms may face challenges and job losses. Larger firms are more likely to benefit from increased efficiency and job creation (Sibiya, 2023)

Table 5: Experience of Individuals of respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1–3 years	53	26.5	26.5	26.5
	4–6 years	53	26.5	26.5	53.0
	7–10 years	40	20.0	20.0	73.0
	More than 10 years	40	20.0	20.0	93.0
	less than 1 year	14	7.0	7.0	100.0
	Total	200	100.0	100.0	

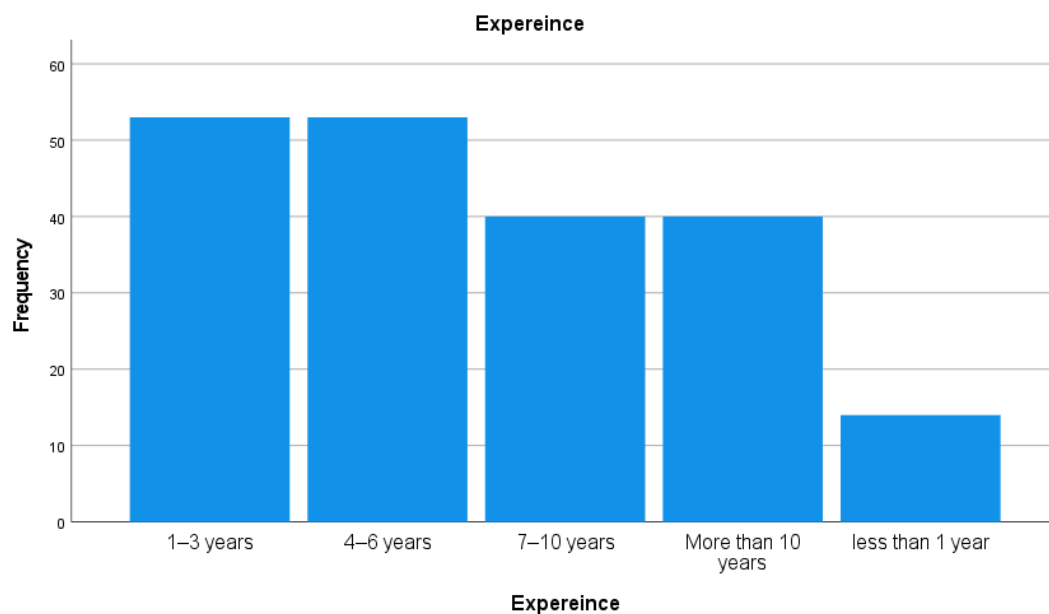


Figure 5: Bar chart for age group of respondents

Primary Area for Work

While automation and technological advancements may lead to a decline in traditional roles, new opportunities requiring advanced skills in technology and data management are likely to emerge across all four primary areas of work identified: distribution (20%), supply chain management (20%), warehousing (26.5%), and transportation (33.5%). These changes have a significant impact on employment prospects for the South African logistics sector.

Table 6: Primary Area for Work for respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Warehousing	53	26.5	26.5	26.5
	Transportation	67	33.5	33.5	60.0
	Distribution	40	20.0	20.0	80.0
	Supply Chain Management	40	20.0	20.0	100.0
	Total	200	100.0	100.0	

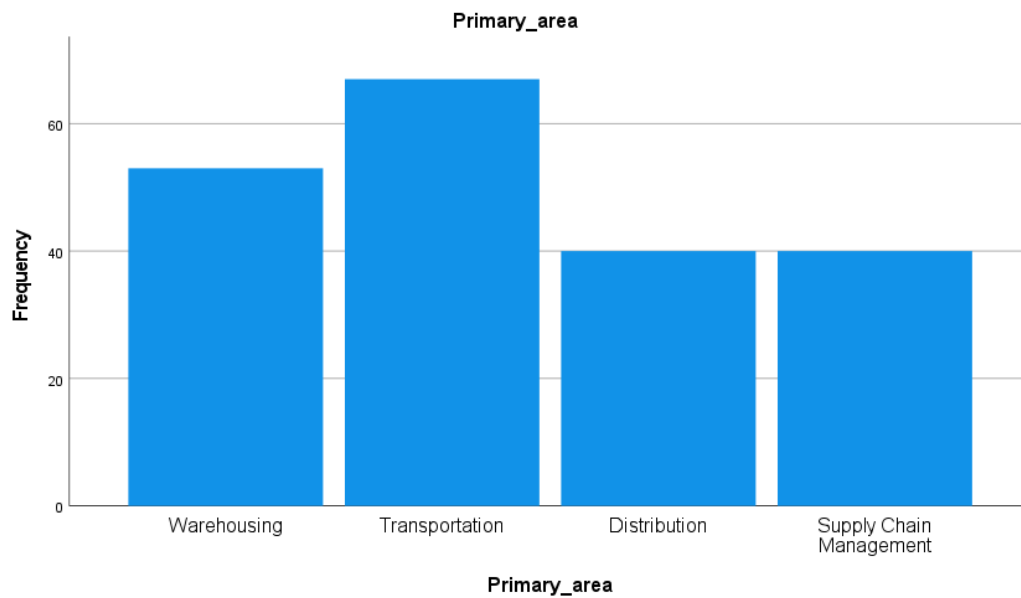


Figure 6: Bar chart for Primary area of respondents

4.3. Survey Questionnaire Results

4.3.1. How familiar are you with digital technologies (e.g., automation, AI, IoT) in logistics?

Digital transformation in the logistics sector involves the integration of digital technology into all business areas, transforming operations and value delivery. In South Africa, 40% of respondents

are very familiar with digital technologies, while 33.5% are somewhat familiar. However, a smaller segment, 6.5%, is neutral, and 13% is not very familiar. This lack of familiarity could hinder their ability to adapt to changes in the logistics landscape. Over 73% of respondents have some level of familiarity with digital technologies. This varies in employment prospects, with those familiar with automation, AI, and IoT being more competitive. However, there is a need for targeted training programs and upskilling to remain competitive. Digital transformation also poses job displacement risks for those who lack familiarity with emerging technologies (Sibiya, 2023). Future workforce requirements will increasingly favour candidates with both technical and soft skills.

Table 7: Survey Results for question 4.1.1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very familiar	80	40.0	40.0	40.0
	Somewhat familiar	67	33.5	33.5	73.5
	Neutral	13	6.5	6.5	80.0
	Not very familiar	26	13.0	13.0	93.0
	Not familiar at all	14	7.0	7.0	100.0
	Total	200	100.0	100.0	

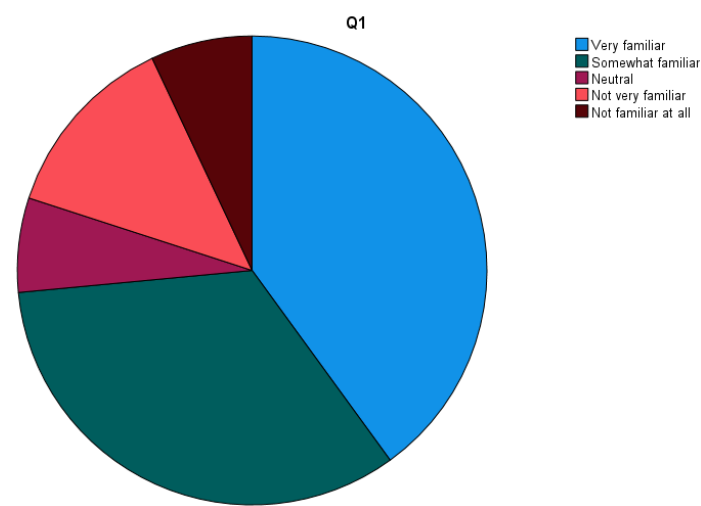


Figure 7: Pie chart for Question 4.1.1 response to survey questionnaire

4.1.2. Does your organization currently use digital technologies in its logistics operations?

- All things considered, the trend toward greater use of digital technologies in the logistics industry in South Africa suggests a change in the nature of work.
- To stay competitive in the job market, workers will need to adjust by learning new skills related to emerging technologies.
- Employers should fund training initiatives to assist current staff members in advancing into positions requiring technological expertise.

Table 8: Survey Results for question 4.1.2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes, extensively	39	19.5	19.5	19.5
	Yes, moderately	94	47.0	47.0	66.5
	Yes, minimally	27	13.5	13.5	80.0
	No, but planning to implement	26	13.0	13.0	93.0
	No	14	7.0	7.0	100.0
Total		200	100.0	100.0	

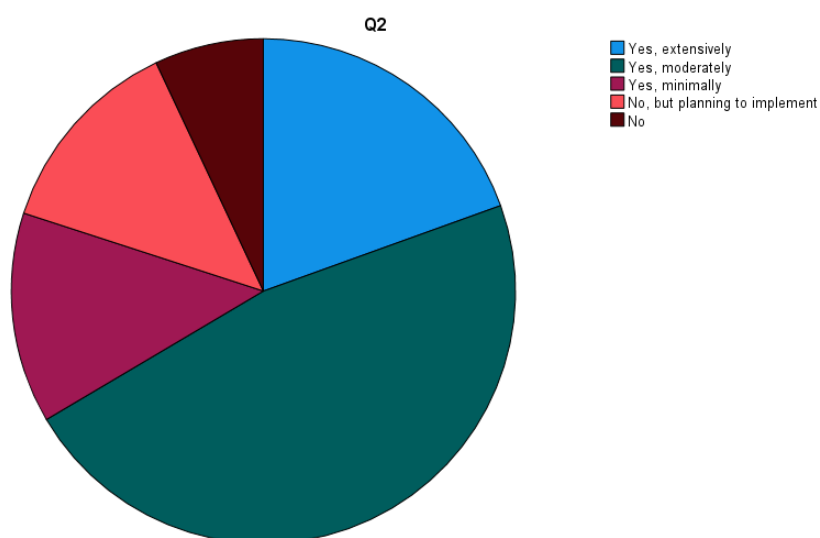


Figure 8: Pie chart for Question 4.1.2 response from survey questionnaire

4.1.3. How has digital transformation impacted your job role?

A sizable percentage (60%) say their job roles have changed significantly or somewhat. Very few people feel that these changes have no impact at all. Employees in this industry must constantly adjust to new technology, according to this analysis, which may have ramifications for training and development programs meant to better prepare the workforce for upcoming difficulties.

Table 9: Survey Results for question 4.1.3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Significant impact (job role changed entirely)	27	13.5	13.5	13.5
	Moderate impact (some changes to job role)	93	46.5	46.5	60.0
	Minor impact (few changes)	53	26.5	26.5	86.5
	No impact	27	13.5	13.5	100.0
	Total	200	100.0	100.0	

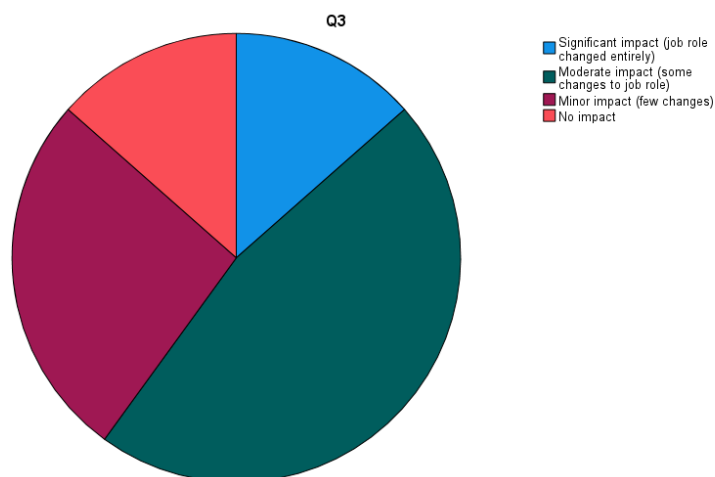


Figure 9: Pie chart for Question 4.1.3 response from survey questionnaire

4.1.4 Do you feel that digital transformation has created new job opportunities within your organization?

With 73% of respondents recognizing its impact on improving employment prospects through improved skills and operational efficiencies, digital transformation has had a positive impact on job roles in the South African logistics sector. For some workers, though, there are worries about possible job displacement.

Table 10: Survey Results for question 4.1.4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	80	40.0	40.0	40.0
	Agree	66	33.0	33.0	73.0
	Neutral	14	7.0	7.0	80.0
	Disagree	40	20.0	20.0	100.0
	Total	200	100.0	100.0	

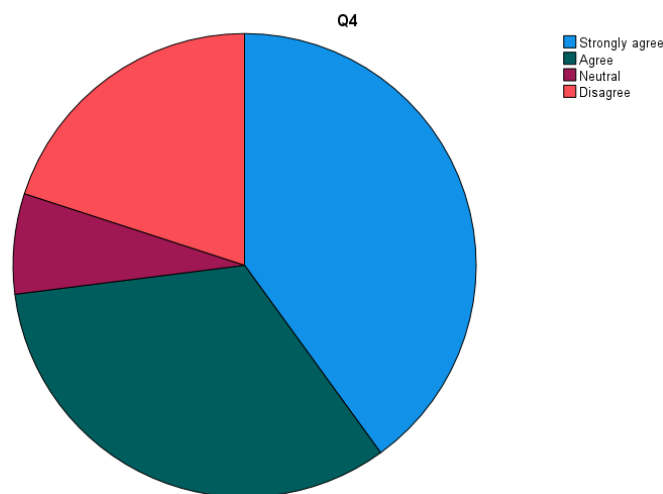


Figure 10: Pie chart for Question 4.1.4 response from survey questionnaire

4.1.5. To what extent has digital transformation increased the skills required for your role?

More than 86% of respondents acknowledged some degree of increased skill requirements as a result of these changes, indicating that digital transformation has significantly increased the skills required for roles within the South African logistics sector, according to this quantitative analysis.

Table 11: Survey Results for question 4.1.5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Significantly	80	40.0	40.0	40.0
	Moderately	93	46.5	46.5	86.5
	Slightly	13	6.5	6.5	93.0
	Not at all	14	7.0	7.0	100.0
	Total	200	100.0	100.0	

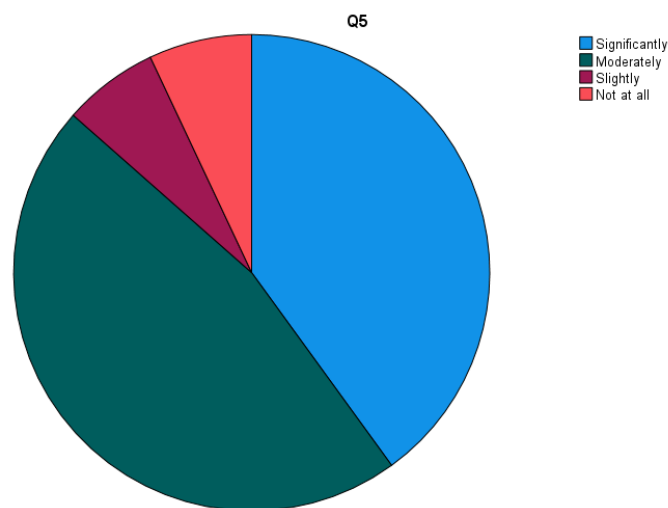


Figure 11: Pie chart for Question 4.1.5 response from survey questionnaire

4.1.6. Does your organization provide training programs for digital skills?

According to the data, the South African logistics industry is showing a positive trend toward offering training in digital skills, which is crucial for enhancing job opportunities in the face of

continuous efforts to transform the industry. To guarantee that all organizations give thorough and consistent training programs top priority, there is still opportunity for improvement.

Table 12: Survey Results for question 4.1.6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes, regularly	66	33.0	33.0	33.0
	Yes, occasionally	94	47.0	47.0	80.0
	Rarely	13	6.5	6.5	86.5
	No	27	13.5	13.5	100.0
	Total	200	100.0	100.0	

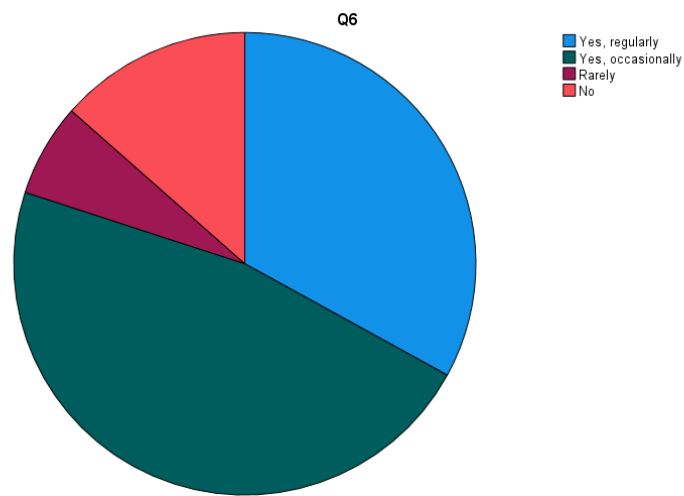


Figure 12: Pie chart for Question 4.1.6 response from survey questionnaire

4.1.7. How concerned are you about job displacement due to automation?

According to the quantitative study, 80% of workers in the logistics industry in South Africa reported some level of concern about job displacement brought on by automation. This calls for proactive steps in policy creation and workforce development to guarantee that workers are prepared for upcoming changes brought on by digital transformation (Meena & Parimalaran, 2020).

Table 13: Survey Results for question 4.1.7

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very concerned	53	26.5	26.5	26.5
	Somewhat concerned	107	53.5	53.5	80.0
	Neutral	40	20.0	20.0	100.0
	Total	200	100.0	100.0	

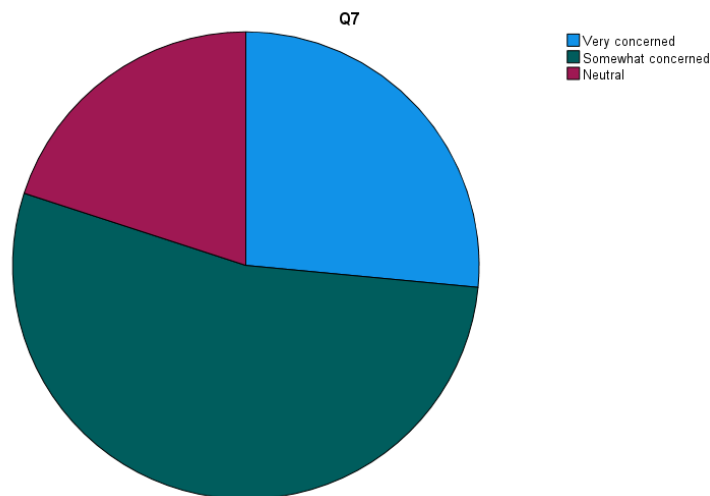


Figure 13: Pie chart for Question 4.1.7 response from survey questionnaire

4.1.8. Do you believe that digital transformation improves overall efficiency in logistics operations?

The vast majority of respondents view digital transformation favourably as a means of improving operational efficiency in logistics operations, indicating that it will probably result in both opportunities and difficulties for employment in this industry going forward (Iittmann, 2018).

Table 14: Survey Results for question 4.1.8

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	93	46.5	46.5	46.5
	Agree	80	40.0	40.0	86.5
	Neutral	13	6.5	6.5	93.0
	Disagree	14	7.0	7.0	100.0
	Total	20	100.0	100.0	

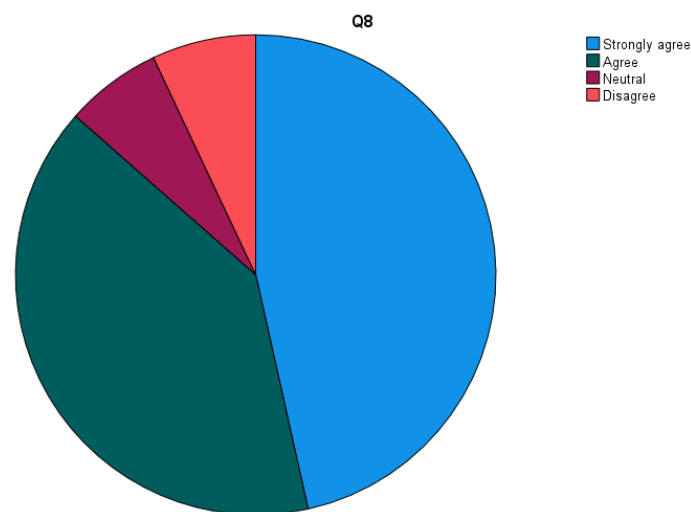


Figure 14: Pie chart for Question 4.1.8 response from survey questionnaire

4.1.9. What level of support does your organization receive from government programs to enhance digital skills?

There is still opportunity for improvement, especially in terms of awareness and accessibility of these programs, which have a direct impact on job prospects through skill development and adaptability, even though organizations in South Africa's logistics sector report a significant amount of moderate support.

Table 15: Survey Results for question 4.1.9

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Moderate support	93	46.5	46.5	46.5
	Minimal support	54	27.0	27.0	73.5
	No support	26	13.0	13.0	86.5
	Not aware of any support	27	13.5	13.5	100.0
	Total	200	100.0	100.0	

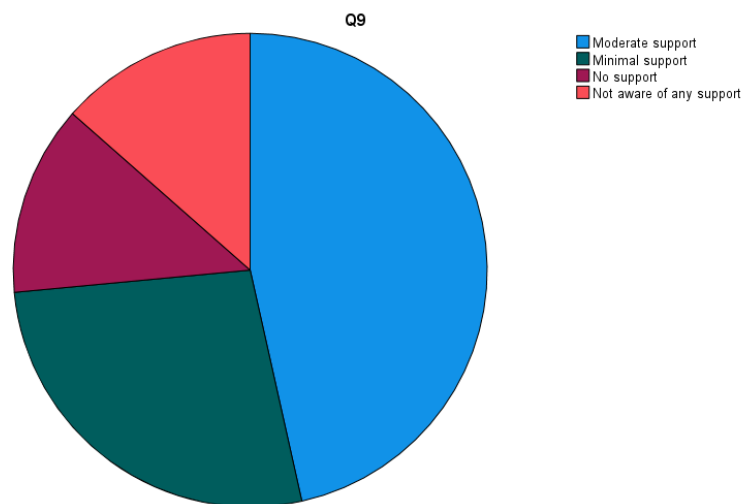


Figure 15: Pie chart for Question 4.1.9 response from survey questionnaire

4.4.Summary

The South African logistics sector's workforce composition is analyzed through demographic factors such as age distribution, educational background, job roles, and experience level. The survey revealed a diverse workforce, with both younger professionals and experienced individuals. A significant portion of respondents held degrees or certifications relevant to logistics and supply chain management, indicating a trend towards higher qualifications. The survey also assessed how familiarity with technology correlates with acceptance and adaptation to new tools. This study provides a nuanced understanding of current trends and future implications for workforce development in the South African logistics sector.

CHAPTER 5. DISCUSSION OF THE FINDINGS

5.1. Introduction

In this section, the study examines the survey findings from Chapter 4, which offer important new information about how the digital transformation is affecting jobs and skills in South Africa's logistics industry. According to the results of Ulukan & Ulukan's (2021) study, technological advancements present a complex landscape with both opportunities and challenges. According to Stich & Zeller (2020), these findings not only show the particular impacts on workforce dynamics but also show a larger trend of technology adoption in the logistics sector. We hope to gain insight into how digital transformation is changing the skills needed in this crucial industry and what that means for future employment trends by analysing the survey results.

5.2. Null Hypothesis: Skills-Biased Technological Change Theory increases demand for skilled labour.

Null Hypothesis (H₀)

Digital transformation has no significant impact on employment prospects in the South African logistics sector, and job displacement, emerging roles, and skill adaptations remain unchanged despite the technological changes. The fact behind it is that a lot of respondents are highlighting the importance of competencies like digital fleet management, data analysis, and automated process handling (Ted Saarikko, 2020). But this does not indicate challenges in skills adaptations or lack of skills.

This result is supporting the Skill-Biased Technological Change Theory that is suggesting that technology sometimes increases demand for skilled labour through minimizing demand for routine manual tasks (Bygstad & Øvrelid, 2021). Secondly, the respondents also showed that traditional tasks depended on manual processes like order fulfilment, and inventory management. However, now these tasks are upgraded or reshaped through automation that introduced a remarkable shift and change their focus towards technical and analytical skills (Daher & Kleib, 2023). All these findings are also consistent with existing literature that is showing a shift towards highly skill-

intensive position within logistics because of technological advancement (Rêgo & Jayantilal, 2022).

5.3.Benefits of Skill-Biased Technological Change

Increased productivity, higher wages for skilled workers, the creation of jobs in high-skilled industries, improved innovation that spurs economic growth, increased global competitiveness, and more opportunities for social mobility are just a few advantages of skill-biased technological change.

5.4.Alternative Hypothesis (H₁): Technology Acceptance Model main driver of technology adoption

Digital transformation significantly affects employment prospects in the South African logistics sector, leading to job displacement, the emergence of new technology-driven roles, and skills adaptation requirements for the workforce.

Furthermore, the survey responses show a perceived efficiency boost by applying digital transformation because majority of respondents are recognizing improved productivity and streamlined operations in the logistic sector (Daher & Kleib, 2023). Therefore, the results are aligned with the Technology Acceptance Model because it shows perceived usefulness is considered a main driver of technological adoption. Based on this, logistics professionals are taking digital tools like automated warehousing, route optimization software, and real-time tracking software to enhance efficiency of the system that supports acceptance of these technologies (Bygstad & Øvrelid, 2021).

Under these points, the responses also showed significant concerns about job displacement because of automation. There are a lot of respondents expressed uncertainty about their long-term job security because their roles are exchanged by automation tasks (Chen & Jaw, 2016). However, this concern is also well-documented in literature based on digital transformation particularly in logistics in which various tasks like scheduling and manual order picking were increasingly automated with ease (Daniyan, 2022). According to this, the Creative Destructive Theory offers a point because it explains digitalization can displace a lot of jobs and create various new roles that require high technical tasks like IT coordinators and data analysts in logistics. (Sibiya, 2023)

Beside these shifts, the responses also show limited support for digital skill training. Therefore, it presents a huge barrier to successful adoption of digital technologies in the logistics sector (Hanelt, Bohnsack, Marz, & Marante, 2021). Based on these points, the respondents also showed that training opportunities are unevenly distributed because small organizations faced a lot of problems to allocate resources for upskilling programs (Dremel & Wulf, 2017). All these findings are showing a critical gap present in the workforce readiness level for digital transformation and it is consistent with studies that focus on the importance of reskilling initiatives for preparing employees with changing demands in the digitalized sector (Didier Bonnet, 2020).

The logistic sector of South Africa adds a lot of complexity because respondents showed various challenge related to infrastructure and government support that are not much unique to the region. All these factors can potentially hinder the rate of digital adaption and can increase skill gaps when they are not addressed properly through policy interventions and targeted support for SMEs around the globe and in South Africa (Daher & Kleib, 2023).

5.5.Summary

The study examines the influence of digital transformation on employment prospects in the South African logistics sector, focusing on its implications for job displacement, emerging roles, and workforce skill adaptations. It contrasts two theoretical perspectives—Skill-Biased Technological Change Theory and the Technology Acceptance Model—to evaluate how digital advancements impact labour dynamics.

Null Hypothesis (H₀): Skill-Biased Technological Change Theory

The Skill-Biased Technological Change Theory suggests that technology increases demand for skilled labour while reducing reliance on routine manual tasks. The study found that many respondents emphasized competencies such as digital fleet management, data analytics, and automated process handling (Ted Saarikko, 2020), but this shift does not necessarily indicate difficulties in skill adaptation. Traditional logistics tasks—such as order fulfilment and inventory management—have transitioned into automation-driven processes, requiring a higher level of technical and analytical expertise (Daher & Kleib, 2023). These findings align with literature

highlighting a shift toward highly skill-intensive positions due to technological advancements (Rêgo & Jayantilal, 2022).

Alternative Hypothesis (H₁): Technology Acceptance Model

The Technology Acceptance Model posits that perceived usefulness is a primary driver of digital adoption. The study found that logistics professionals acknowledge improved efficiency with digital transformation, reinforcing the industry's acceptance of technologies such as automated warehousing, route optimization software, and real-time tracking (Bygstad & Øvrelid, 2021).

Challenges Identified:

- Job displacement concerns: Many workers fear long-term job insecurity due to automation replacing traditional roles (Chen & Jaw, 2016).
- Creative Destructive Theory perspective: While digitalization eliminates certain jobs, it also creates new technical roles such as IT coordinators and data analysts (Sibiya, 2023).
- Limited support for digital skill training: Respondents highlighted barriers to upskilling initiatives, particularly for small firms that struggle to allocate resources for workforce development (Hanelt et al., 2021; Dremel & Wulf, 2017).
- Workforce readiness gap: Literature consistently emphasizes the need for reskilling programs to prepare employees for digital transformation (Didier Bonnet, 2020).

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Respondents noted additional complexities such as infrastructure limitations and inadequate government support, which hinder the rate of digital adoption and exacerbate skill gaps (Daher & Kleib, 2023). Policy interventions and targeted support for SMEs will be essential to ensure equitable workforce development.

CHAPTER 6. CONCLUSIONS AND RECOMMENDATIONS

6.1. Conclusion

The study highlights the profound impact of digital transformation on employment prospects in South Africa's logistics sector, revealing both opportunities and challenges. While technological advancements such as automation, AI, and data analytics significantly improve efficiency and cost-effectiveness, they also pose risks of job displacement, particularly for low-skilled workers. The Skill-Biased Technological Change Theory suggests a growing demand for skilled labour, reinforcing the importance of technical and analytical capabilities in the modern logistics industry. Meanwhile, the Technology Acceptance Model demonstrates that perceived usefulness drives digital adoption, with professionals leveraging digital tools for productivity enhancement.

However, despite the emergence of new high-skilled roles, workforce adaptation remains uneven, as small firms struggle to implement upskilling programs and employees face limited training opportunities. Additionally, infrastructure limitations and insufficient government support further hinder the pace of digital adoption, widening the skill gap and creating employment vulnerabilities.

Thus, strategic interventions are necessary to ensure a balanced transition into a digitally driven logistics sector, minimizing job losses while fostering workforce adaptability.

6.2.Recommendations

To address these challenges and leverage digital transformation for positive employment outcomes, the following recommendations should be considered:

6.2.1. Workforce Upskilling and Reskilling Initiatives

- Develop targeted digital training programs focused on AI, automation, and data analytics to enhance workforce adaptability.
- Establish public-private partnerships between logistics firms and educational institutions to offer certified skill development programs.
- Implement government-backed incentives for companies investing in employee reskilling, particularly for SMEs.

6.2.2. Policy Support and Infrastructure Development

- Strengthen government policies to support SMEs in digital adoption through funding and training subsidies.
- Improve technological infrastructure, such as broadband connectivity and smart logistics platforms, to facilitate seamless digital integration.
- Promote inclusive digital transformation policies to ensure lower-skilled workers are not left behind.

6.2.3. Job Transition and Employment Safeguards

- Identify vulnerable job roles and create structured transition pathways into emerging technology-driven positions.
- Encourage companies to adopt hybrid automation strategies, blending human labour with digital tools to prevent mass job displacement.
- Develop sector-specific employment frameworks to balance automation benefits with workforce sustainability.

6.2.4. Industry Collaboration and Knowledge Sharing

- Facilitate collaborative research between industry experts, policymakers, and academic institutions to track employment trends and forecast future workforce needs.
- Host regular industry forums to discuss best practices for digital adaptation and employment strategies.
- Encourage knowledge-sharing platforms to assist businesses in adopting digital transformation while supporting workforce development.

By implementing these recommendations, South Africa's logistics sector can mitigate employment risks, capitalize on emerging job opportunities, and ensure long-term workforce resilience in a digital era. The study can be researched further.

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