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The Analysis of Logistics Strategies to Reduce Product Damage During Transportation: A Case of Takealot

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Abstract

Takealot South Africa is a leading e-commerce company that relies heavily on efficient logistics to move products and information between suppliers and consumers. Efficient logistics strategies are crucial for ensuring the safe transportation of goods at Takealot. Despite some improvements in packaging, handling, and transportation technologies, damage rates remain high, especially for fragile or high-value products. This research aims to explore and analyse the key factors contributing to product damage and to propose actionable solutions to minimise these damages. Furthermore, innovative product approaches can be integrated into Takealot's logistics strategies to reduce product damage during transportation. The study adopted a quantitative approach, collecting primary data through a structured questionnaire distributed to 71 employees from Takealot's Gauteng Main Distribution centre and at some pickup points around Johannesburg. Findings show that the main factors influencing product damage at Takealot, from most to least, are: overloading or improper stacking of packages, inadequate packaging, insufficient training of logistics staff during loading and unloading, poor road conditions, and limited use of tracking or monitoring tools. There are gaps and inconsistencies identified in the training of delivery drivers, especially third-party logistics drivers, as well as in inspection processes. Concerns about long-term customer satisfaction were also identified. The adoption of modern technologies like real-time monitoring, automation, and cloud-based management systems has become one of the central innovations that can increase visibility, responsiveness, and reduce damage in logistics processes.

1. Introduction

Logistics penetrates organisational boundaries to manage the synchronisation of material and information movements between sources and consumers (Gomes et al., 2023). Any efficient supply chain operation between the source and end-user depends on logistics for both the effective movement and the efficient delivery of information and products. Takealot, being the country's number one e-commerce company, plays a massive role in this changing landscape.

Focus has shifted to increased consumer purchasing habits, placing a great deal of demand on reliable and efficient logistics systems.

Businesses are forced to rethink and modify their business strategies, particularly in the logistics and supply chain departments, given the rise of e-commerce, to ensure customer satisfaction, gain a competitive advantage, and reduce costs (Gomes et al., 2023). The COVID-19 pandemic has undoubtedly impacted e-commerce growth, bringing new challenges to the logistics department. Many organisational operations underwent significant changes due to logistics activities that have operated for extended periods. Business leadership now considers logistics a vital operational issue that demands complex management by top minds to address its critical challenges. Most studies on logistics originated in contributions from marketing departments, as well as from operational, financial, and corporate strategic divisions.

The exchange of production surpluses between people utilises logistics, which operates as both an ancient economic practice and a contemporary managerial concept, leading to stock and warehouse management through transport operations (Munyaka & Yadavalli, 2022). Over the past decade, customer satisfaction has declined significantly. Products that are damaged during transportation affect operational efficiency, quality, supply chain disruptions, operational costs, customer satisfaction, and productivity. Common hazards that usually occur during the shipment of products include vibrations, shocks, accidents, handling, modes of transport and routes, and maintenance inconsistencies. Why are innovative strategies essential in the logistics department, one would ask?

Despite old strategies being integrated into new systems, technological advancements have made it challenging to apply techniques from decades ago. Until now, little importance has been given to sustainable demands; they were nonexistent, and there was minimal attention to prioritising eco-friendly practices. Decades ago, there were no disruptions to the economy as destabilising as the Coronavirus pandemic (2020-2021). As of late, climate-related conditions, in particular the floods that have been affecting Durban since 2022, have destabilised many supply chains, and some companies have relocated their business operations (Mbandlwa, 2024). The importance of innovative strategies has grown in recent years because companies need to demonstrate that, under any circumstances, they can withstand disruptions by demonstrating heterogeneity in their supply chains and contingency planning.

By implementing innovative logistics strategies, a company can enhance its competitive advantage and reduce the risk of inefficiency. The competitive advantage now derives from providing better end-customer service than competitors. E-commerce retailers mastered the exploitation of emerging technologies that advanced rapidly. Logistics strategies emphasise a key focus on enhancing a specific aspect of the supply chain network. The most common logistics strategies used by e-commerce companies include Inventory Management, Demand Forecasting, Transportation, Warehousing, Order Fulfilment, and Reverse Logistics. This paper will investigate the strategies most suitable for Takealot, essential to the company's sustained success and to improving the e-commerce delivery experience in the country.

1.1 Problem statement

Efficient logistics strategies are essential for ensuring the safe transportation of goods. However, the e-commerce industry continues to experience significant losses due to damage of goods during transit, leading to financial setbacks, customer dissatisfaction, and supply chain inefficiencies (Munyaka & Yadavalli, 2022). Despite improvements in packaging, handling, and transportation technologies, damage rates remain high, particularly in industries dealing with fragile or high-value products. The logistics strategies currently adopted by companies fail to adequately explain the magnitude of this problem, resulting in accelerated product damage during transportation. South Africa had twenty-seven million e-commerce users in 2022 (Xin, 2025). The number of e-commerce users in South Africa is anticipated to reach thirty-seven million by 2029 (Xin, 2025). The number of damaged products supplied by e-commerce retailers worldwide stands at 40%. With e-commerce use increasing across population groups, companies need to evolve and grow as their clientele grows. These statistics show that a large share of the population prefers online shopping to in-store shopping. Damaged products not only affect costs but also result in operational inefficiencies, low quality, supply chain disruptions, customer dissatisfaction, returns, and re-shipments. This research aims to investigate the factors that contribute to product damage in transit and to examine innovative approaches that can be integrated into e-commerce services' logistics strategies to reduce product damage during transportation.

1.2 Significance of the Study

This study will help logistics coordinators, supply chain professionals, transportation personnel, packers, and handlers understand why logistics strategies are a critical component in reducing damage to fragile goods and, in turn, reducing product returns and customer complaints. The adoption of innovative and effective strategies will improve the

company's supply chain by decreasing operational inefficiencies, increasing product quality, minimising supply chain disruptions, improving customer satisfaction, and reducing returns and re-shipments. It will also gain dedicated support from the company by accessing, collecting, and converting data into well-informed recommendations.

2. Related literature review

2.1 Current logistics strategies in local e-commerce companies

E-commerce logistics approaches from local businesses have undergone significant changes as customers demand new practices in line with technological advancements. The emergence of e-commerce created a new retail model that requires distribution systems built to satisfy varying, immediate customer needs (Rodrigue, 2020). The need for dedicated facilities emerged to address detailed order fulfilment requirements, particularly during last-mile shipping, due to our reliance on physical delivery systems. Home deliveries require distribution and retailing strategies to function together effectively and improve delivery efficiency, especially for Takealot.

2.1.1 Extensive Distribution Network

E-commerce businesses should carefully select distribution centre locations based on transportation costs and customer responsiveness parameters (Kostikov et al., 2021); placing a distribution centre in a province where most of the customers respond to the products that are being sold online. Takealot has three large distribution centres strategically located in the three busiest provinces in the country to enhance delivery speed and reach almost any region of South Africa. Each centre can ship up to 45000 units per day. These major distribution centres are strategically located in areas with easy access to key transport routes. These distribution centres also supply products to neighbouring provinces and towns, depending on which is closest. The efficiency of optimal routing and load securing procedures is a strong point, as these transportation methods help firms manage geographical dispersion by reducing delivery times and maintaining product integrity.

2.1.2 In-house logistics and delivery fleets

The research conducted by previous scholars builds on this foundation by demonstrating how stakeholder collaboration supports sustainable municipal logistics operations (Taiwo, 2021). The study examines fleet management systems from a centralised perspective while also highlighting the challenges posed by urban logistics, such as urban congestion and pollution. Takealot has employed over 4,000 delivery drivers since 2013 and completed over 1.6 million deliveries per month. In-house delivery allows Takealot to control the delivery process much better.

2.1.3 Use of independent contractors for last-mile delivery

It is crucial to emphasise the importance of third-party logistics (3PLs) partnerships for e-commerce companies, providing them with access to local expertise and scalable infrastructure to support growth in South African online marketplaces (Van Der Westhuizen & Niemann, 2022). Takealot, like many other e-commerce companies, uses 3PLs to overcome the challenges posed by poorly linked transportation systems and limited warehouse capacity while learning about new automated distribution facilities. This strategy creates an adaptive supply chain that maintains efficient cost management while increasing customer satisfaction by ensuring prompt order delivery. This has contributed to the economy by creating more jobs for citizens. Takealot, which utilises 3PLs for delivery, overlooks the fact that some of these drivers may not be well-trained to handle customers. Drivers are said to be hostile towards customers, and late or missed deliveries are standard. Since the company launched same-day deliveries, some customers have been unhappy with the service they received. Orders have not arrived the same day, and to add to the frustration, there is no proper communication with affected customers. Such acts increase customer dissatisfaction, which means Takealot will receive an influx of customer complaints.

2.2 Causes of Fragile Product Damage During Transportation

Supply chain management and logistics researchers show significant interest in exploring factors that lead to damage to fragile products during transit (Rust et al., 2024). A deep understanding of this issue is essential for minimising transport losses while improving operational effectiveness. A specific analysis of the literature identifies contributors to product damage across three main categories: handling processes, packaging systems, and advanced technical safety methods.

It is essential to note that appropriate packaging methods, combined with secure protocols, reduce the likelihood of product damage during transit (Singh et al., 2014). According to reports, the difficulties involved in distributing pallets and transporting products together in transportation containers are not addressed by the current international pre-

shipment testing criteria. The authors noted that the National Motor Freight Classification (NMFC) establishes fundamental packing guidelines that serve as the basis for the safety of shipping items. Shippers must adhere to established protocols to avoid complications in damage-related claims, which illustrates how freight categorisation and packaging techniques impact the risk of product damage.

According to Rust et al. (2024), poor road conditions, theft and truck hijackings, inadequate road infrastructure, and unroadworthy trucks are among the reasons products get damaged in transit. Many authors have supported this idea over the years, and theft and hijackings led companies like Takealot to remove their branding from the exteriors of their delivery trucks and vans (Rust et al., 2024).

Hoffmann et al. (2020) researched container transport pressures to advance the ongoing debate. Shipping movements, along with defective container stacking procedures, create additional risks that harm loaded cargo during transportation, according to their studies. Research indicates that most shipping operations fail to provide vertical protection for their cargo containers, leading to potential shifting and subsequent damage. The authors highlight human errors and environmental factors as negative factors that require a thorough understanding to strengthen security and container-handling procedures (Hoffmann et al., 2020).

The research of Tkaczyk et al., 2021 focused on developing methods for palletised cargo preparation and security. Significant supply chain losses result from improper packaging practices, as companies either rush shipments or fail to focus on them. According to their research, they evaluated the financial challenges posed by inadequate security methods by developing an optimal stretch film selection strategy that delivered enhanced cargo protection at reduced cost. The findings demonstrate how effective packaging methods, combined with secure techniques, reduce transportation damage and protect products throughout delivery (Tkaczyk et al., 2021).

According to Magdalena & Klopott (2021), human error continues to be a primary contributing cause of pharmaceutical transportation deficits and a significant source of loss. The vulnerabilities introduced by human error persist despite technological advancements and improved container labelling methods because these weaknesses exceed the reach of technology. Every location change in complex supply chains increases the risk of errors, as inexperienced staff members join the distribution process at each point (Magdalena & Klopott, 2021). These employees may be less experienced or lacking proper procedures or knowledge of fragile packaging requirements. The shipping process becomes more difficult to maintain standard handling procedures when different handlers are involved. Practical solutions to human error in pharmaceutical logistics require training enhancements for individuals, as well as control systems that reduce supply chain variability. The unpredictable nature of human behaviour demands continued monitoring and adaptive strategies, as new technological solutions show promise for lowering pharmaceutical shipment errors.

The existing research papers demonstrate that handling procedures, together with packaging and technological interventions, reveal the intricate nature of damage to fragile products during transportation. All research finds valuable insights that confirm the need for an integrated approach to address transportation challenges for fragile products.

2.3 Technology and Automation in Damage Prevention During Logistics Transportation

People increasingly focus their academic research on how the integration of automation technology affects logistics transportation while seeking to prevent damage (Sun et al., 2022). Various logistics experts, recognise the importance of implementing sustainable practices in logistics systems. Through systematic study, researchers document the value of implementing Industry 4.0 technologies to achieve improved logistics operational sustainability across financial, environmental, and social outcomes (Gupta et al., 2022). Within the transformation process, structural resistance often emerges, according to their study, but companies can achieve technological adoption success by handling internal and external obstacles. E-commerce organisations seeking to improve their logistics can use this thorough research to learn about the benefits and challenges of implementing technology. Gupta et al. (2022) developed an investigation of cargo loss prevention methods in logistics systems by implementing cost-effective impact sensors. The collected data provides real-time analysis that improves business output and satisfies clients. Even so, the researchers acknowledge the technical challenges posed by the need for IoT expertise to optimise the parameters of the monitor ring devices. The large gap between logistics operations readiness and technological developments becomes apparent regarding the preparedness of logistics companies. Other group of logistics experts examined the required competencies for digital-age success among logistics professionals (Koh & Yuen, 2022). Logistics management needs digital thinking abilities,

coupled with machine learning and Internet of Things capabilities, to effectively make decisions and solve problems. The complexity of technological adoption is most evident in their focus on cybersecurity awareness, as logistics professionals must protect their systems and learn new tools.

The research by Jahin et al. (2023) explored the critical implications of artificial intelligence for supply chain risk assessment, including its effects on risk reduction and predictive capabilities. The systematic evaluation revealed that operational resilience demands robust risk management approaches, particularly in response to changing hazards. The implementation of AI systems will substantially enhance logistics operations' ability to prevent damage (Jahin et al., 2023). Recent studies demonstrate that technological integration offers vital benefits for e-commerce logistics in South Africa, where markets are highly complex. (Akilimalissiga & Sukdeo, 2024) explain that advanced digital solutions, including data analytics platforms, transportation management systems, and warehouse management systems, enable businesses to enhance operational visibility and optimise processes while resolving systemic inefficiencies. Cloud-based WMS solutions integrate real-time tracking and automated processes that enhance order fulfilment, improve inventory accuracy, enable seasonal demand control, and reduce handling errors. Current research supports the ongoing technological transformation in logistics by introducing technical solutions that improve delivery efficiency and enhance security for regional e-commerce operations.

3. Methods and tools

As this study focuses on preventing damage to products at Takealot during transportation, the researchers strongly believe that a quantitative approach was suitable for achieving the study's primary objective, which is to assess the key contributing factors that lead to product damage in transit and examine innovative strategies that can be integrated into logistics to reduce product damage during transportation. It would provide numerical and factual data on product damage rates as well as the analysis of trends and patterns in damage occurrences. A descriptive quantitative design was the most suitable research design for analysing various logistics strategies to minimise product damage in transit. Hence, a questionnaire was developed to collect data from respondents. The questionnaire follows a Likert scale structure and has two main sections: A-Factors, which address the causes of product damage, and B- innovative and technology-driven solutions. The idea behind subdividing the questionnaire was to thoroughly collect data on the operational status of logistics, current packaging systems, transportation operations, and the entire organisational strategic decisions. Also, it would detect all weak points in the logistics system which lead to transportation-related product damage. Data was collected using Google Forms. This made organising and analysing the data easier. The Human Resource Manager at Takealot facilitated the distribution of the questionnaire. A link was sent via email, and all participants were carbon copied. The questionnaire was then distributed amongst subgroups responsible for ensuring product delivery to customers in a timely, cost-effective, and reliable manner (logistics, supply chain, packaging, handling, pickup point agents, and transportation personnel).

This study targeted 80 employees (respondents) from the main Takealot Distribution Centre in Gauteng, including logistics coordinators, warehouse supervisor/s, packaging and handling personnel, and transportation personnel. The calculations below demonstrate how the authors generated the sample size for the study. However, the sample size was rounded down to 71 due to the number of responses received from employees. All the population groups mentioned above are linked to product handling. It was crucial to obtain feedback from these categories of employees to help improve damage mitigation, develop more effective collaboration methods, and optimise logistics operations; understand the contribution of every personnel group to damage reduction and their ability to synchronise their departmental strategies.

The collected data were analysed using SPSS (Statistical Package for the Social Sciences) along with descriptive statistics. These methods enabled the identification of trends, correlations, and patterns in how products are damaged, when they are damaged, and where they are damaged. Identifying these trends and patterns assisted in analysing the effectiveness of various logistics strategies. It also helped create a benchmark for Takealot and continuously improve transportation systems, while aiming to reduce product damage during transportation. Lastly, this approach helped develop better packaging, handling, and transportation strategies that will minimise product damage and improve the entire supply chain and customer satisfaction.

$$n_0 = \frac{z^2 \times p \times (1-p)}{e^2}$$

$$n_0 = \frac{1.96^2 \times 0.5 \times (1-0.5)}{0.05^2}$$

$$n_0 = 384.16$$

Therefore $n_0 = 385$

Total population N= 100

$$n = \frac{n_0}{1 + \frac{n_0 - 1}{N}}$$

$$n = \frac{385}{1 + \frac{384}{100}}$$

$$n = 79.54$$

Therefore $\boldsymbol{n = 80}\ respondents$

Open source: Caculator.net/ https://www.calculator.net/sample-size-calculator.html

4. Empirical findings and discussion

4.1 Findings related to factors contributing product damage during transportation.

The findings of study indictes that overloading or improper stacking of packages leads to product damage, which is ranked first with a mean of 3.99 and a standard deviation of 1.189. The factor that is ranked second, inadequate packaging is a major cause of product damage with a mean of 3.81 and a standard deviation of 1.120. Insufficient training of logistics staff increases the likelihood of product damage was ranked third with a mean of 3.55 and a standard deviation of 1.181. Product damage frequently occurs during the loading and unloading process ranked fourth, with a mean of 3.39 and a standard deviation of 1.152. poor road conditions contribute significantly to product damage during transportation with a mean of 3.37 and a standard deviation of 1.120. The last factor ranked sixth is limited use of tracking or monitoring tools during transit contributes to product damage, ranked fifth with a mean of 2.89 and standard deviation of 1.141. The group mean is 3.5, which is above 3, leaning closer to the agree side, suggesting moderate to stronger agreement (Figure 1).

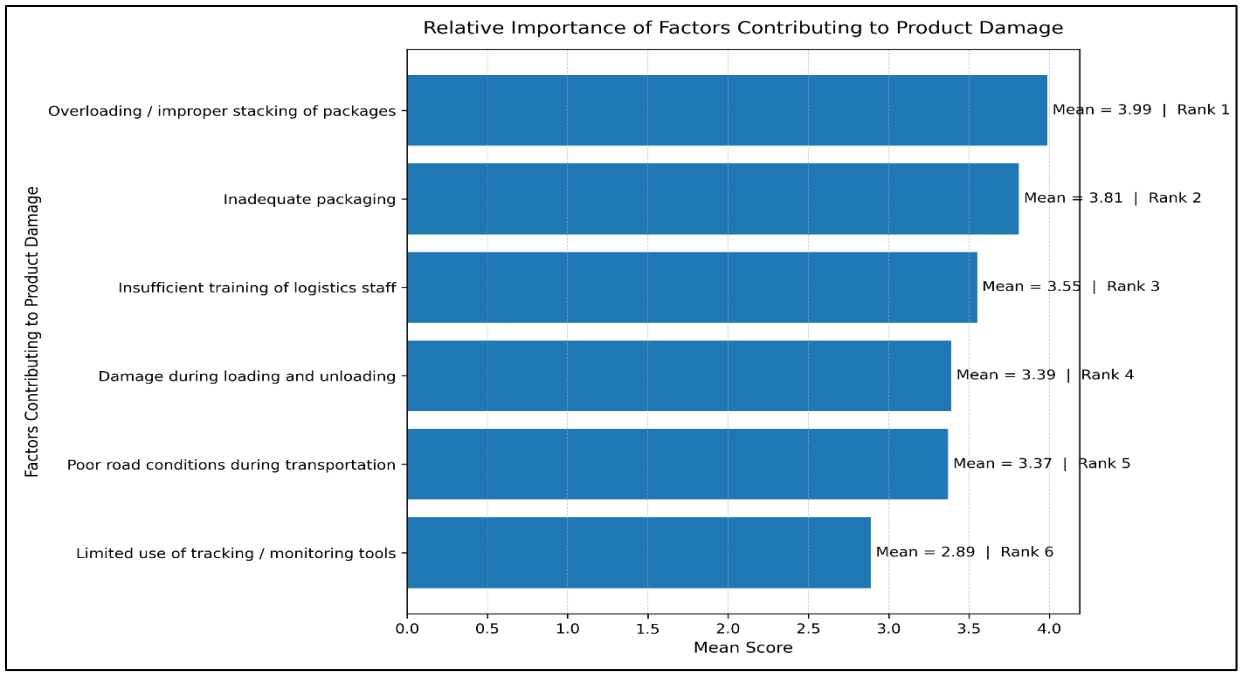

Figure 1. Ranking factors that lead to product damage

4.1.1 Discussion

Respondents were asked to select whether they strongly disagree, disagree, neutral, agree or strongly agree whether the factors that were listed on the questionnaire affect product damage. The first factor that respondents agree plays a significant role in products getting damaged in transit is overloading or improper stacking of packages that leads to product damage. This supports the notion by (Tkaczyk et al., 2021) and (Hoffmann et al., 2020) that focusing on

appropriate loading, stacking and packaging techniques decreases transportation damage and protects products throughout delivery. Moreover, inadequate packaging being a major cause of product damage ranked second supports findings of a investigation undertaken by (Singh et al., 2014) where they highlighted how appropriate packaging methods combined with secure protocols reduce the likelihood of product damage during transit. Insufficient training of logistics staff increases the likelihood of product damage was ranked third, which reveals that most respondents agree that it is the leading cause of damaged products. This study's results are in contrast with a study by (Magdalena & Klopott, 2021) where human error continues to be a primary contributing cause to transportation deficits. Majority of the respondents acknowledge that frequent damage during the loading/unloading process, which is ranked fourth, this calls for improvements in handling procedures, protective packaging and training of staff in these processes. According to (Munyaka & Yadavalli, 2022), the poor road infrastructure and unroadworthy trucks are amongst other reasons products get damaged in transit. Based on the analysis, this factor is ranked fifth, which suggests that poor road conditions are not recognised as primary causes of product damage by most respondents, or it could be that other factors overpower road conditions in their experience in the ecommerce. Limited use of tracking or monitoring tools during transit contributes to product damage is ranked sixth, according to the respondents' experience and knowledge this not a primary cause of damage. However, all these causes are still of interest for the organisation to prevent product damage.

4.2 Innovative and Technology-Driven Solutions

Figure 2 below shows, according to respondents, a solution that was ranked first, innovations from global e-commerce leaders could be applied to Takealot's logistics with a mean of 3.97 and a standard deviation of 1.084. The company investing more in technology to enhance its logistics systems is ranked second, with a mean of 3.97 and a standard deviation of 1.195. Using advanced analytics can help predict and prevent future damages was ranked third with a mean of 3.70 and a standard deviation of 1.164. Real-time tracking systems improve response to damage incidents was ranked fourth, with a mean of 3.69 and a standard deviation of 1.090. Automation in warehousing reduces handling-related damages was ranked fifth, with a mean of 3.66 and a standard deviation of 1.055. Smart sensors (e.g., impact, humidity) being able to help detect in-transit damage risks was ranked sixth mean of 3.37 and a standard deviation of 1.210. The group mean is 3.75, which is above 3, leaning closer to the agree side, suggesting moderate to stronger agreement (Figure 2).

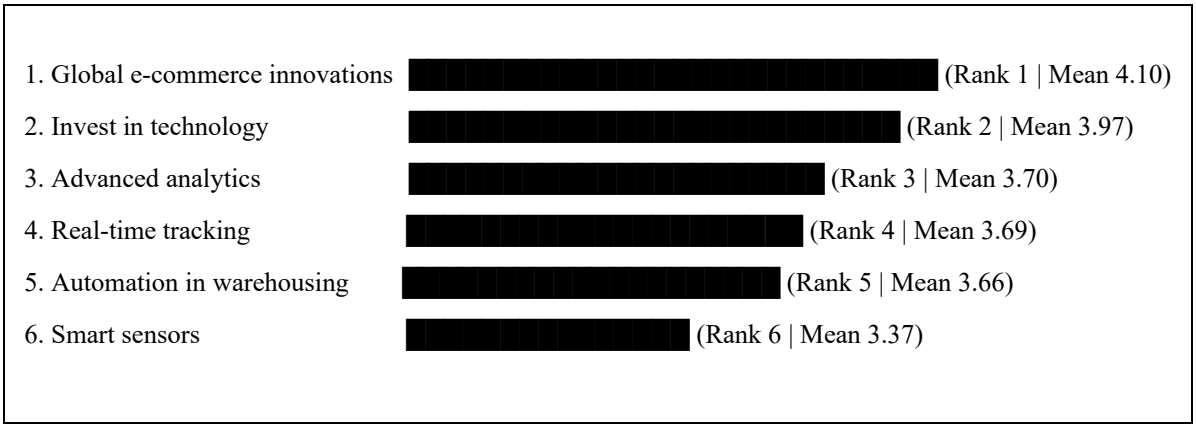

Figure 2. Ranking innovative and technology driven solutions

4.2.1 Discussion

With regards to the company investing more in technology to enhance its logistics systems, the findings agreed with a study conducted by (Sun et al., 2022) where they recognised the importance of implementing sustainable practices in logistics systems for achieving improved logistics operational sustainability across financial aspects and environmental outcomes and social fronts. Using advanced analytics can help predict and prevent future damages is ranked third followed by real-time tracking systems improve response to damage incidents, then automation in warehousing reduces handling-related damages ranked fifth. In a study by (Gupta et al., 2022), they claimed that data analytics platforms improve operational visibility and streamline procedures to address systemic inefficiencies. This notion is supported by the high ranking of advanced analytics for damage prediction and prevention. The advantages of cloud-based warehouse management systems and transportation management, which enhance order fulfilment and

reaction to transportation-related issues, are also reflected in the favourable opinion of real-time tracking systems. (Gupta et al., 2022) highlighted in their investigation output that automated procedures in warehouse management systems increase inventory accuracy and reduce handling errors and further provide the importance of enhancing automation adoption in order to lower product handling-related damages (Akilimalissiga & Sukdeo, 2024).

5. Conclusion

An extensive research on the causes of product damage during transit in the context of South African e-commerce logistics with Takealot as the case study, the methods of minimizing product damage that currently apply, and the innovative methods of enhancing the efficiency of logistics operations in the organisation. The results suggest that a lack of staff training, overloading, and inadequate packaging are the main factors contributing to damage of the product, which preconditions the vitality of employee performance quality and operational best practices. The current logistic approaches that were in accordance with the industry standards, such as extensive distribution systems, in-house delivery services, and a strict inventory control system have notable strengths, but at the same time, they face difficulties, one of them being the communication of third-party logistics and service reliability. The adoption of modern technologies like real-time monitoring, automation, and cloud-based management systems become one of the central innovations that can increase the visibility, responsiveness, and general reduction of damage in the logistics processes. These lessons give the South African e-commerce companies a strategic roadmap to optimize the operations and implement a technological solution that would together reduce the product damage, enhance customer satisfaction, and facilitate the sustainable development in the dynamic and complicated market.

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