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THE IMPROVEMENT OF THE ON-TIME DELIVERY FOR "COMPANY X" E-COMMERCE ORDERS DURING THE GOLDEN QUARTER

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A research project report submitted to the Faculty of Engineering and the Built Environment, University of the Witwatersrand, Johannesburg, in fulfilment of the requirements for the degree of Master of Science in Engineering.

Johannesburg, 2024

SCHOOL OF MECHANICAL, INDUSTRIAL & AERONAUTICAL ENGINEERING

PLAGIARISM DECLARATION

Name: Thobile Sukazi **Student No:** 791118

Course no.: MECN 7018A **Course Name:** Research Report

Submission Date: 15/02/2024

Project Title: The Improvement of the On-Time Delivery for "Company X" E-commerce Orders During the Golden Quarter.

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ABSTRACT

E-commerce has revolutionized global business and consumer interactions, offering convenience and accessibility across various domains like Business-to-Business (B2B), Business-to-Consumer (B2C), and Consumer-to-Consumer (C2C). The COVID-19 pandemic has accelerated digital transformation, with South Africa's e-commerce market showing robust growth projections, fuelled by factors such as improved internet penetration and shifting consumer behaviours. The Omni-channel strategy has become standard, with leading players leveraging digital capabilities to maintain market share. Notably, the "Golden Quarter" of retail, encompassing events like Black Friday and Singles Day, presents a pivotal opportunity for retailers to boost profits through strategic promotional efforts. As the market matures, focus shifts to optimizing the final mile of delivery, aiming to improve efficiency and reduce costs. This project seeks to explore tailored strategies for final mile optimization in Company X, aligning with the broader goal of enhancing efficiency and customer experiences in South Africa's growing e-commerce sector.

Despite being the second-largest wholesale food distributor in South Africa, Company X experienced significant on-time delivery performance declines, particularly in its discount retailer brand, Banner 3. The analysis identified logistical bottlenecks in the final mile as the primary contributor to these challenges, resulting in an average delay of 4.3 days in the order fulfilment process. Additionally, the study highlighted the importance of addressing these challenges to maintain customer satisfaction, loyalty, and competitiveness in the rapidly evolving South African e-commerce landscape.

This study employs a comprehensive framework and systematic approach to investigate the research questions and objectives. A qualitative research design involves one-on-one interviews conducted digitally via Microsoft Teams. Ethics clearance (MIAEC 099/23) was obtained, ensuring transparency and participant understanding. The sampling strategy prioritizes quality over quantity, with six diverse participants selected to provide rich qualitative data. Data analysis follows Braun and Clarke's thematic analysis approach, incorporating triangulation methods and emphasizing thorough documentation to ensure validity and reliability. This research has thoroughly investigated Company X's final mile delivery challenges during the Golden Quarter, providing comprehensive insights and recommendations for enhancement.

Key findings underscore the significance of accurate forecasts, planning collaboration, proximity to customers, fleet and technology utilization, customer service levels, and delivery types in optimizing delivery performance. Recommendations encompass advanced forecasting models, collaborative planning efforts, tailored customer promises, technological enhancements, and automation to address identified challenges and capitalize on opportunities for improvement. The proposed strategies offer a strategic roadmap for Company X to enhance efficiency, customer satisfaction, and competitiveness in the e-commerce landscape, aligning with the study's objectives and concluding the project successfully. The tailored recommendations contribute valuable strategies for improving efficiency, customer satisfaction, and competitiveness. Future research could focus on evaluating the implementation of these strategies and exploring emerging technologies to further optimize the delivery process and adapt to evolving market dynamics.

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CONTENTS

PLAGIARISM DECLARATION ii
ABSTRACT iii
ACKNOWLEDGEMENTS iv
LIST OF FIGURES vii
LIST OF TABLES viii
ABBREVIATIONS AND ACRONYMS ix
GLOSARRY OF TERMS x
1. INTRODUCTION 1
1.1 Research Background 1
1.2 Context 4
1.3 Problem Statement 6
1.4 Research Scope 6
1.5 Research Question 6
1.6 Research Objectives 6
1.7 Summary of the Research Method 7
1.8 Outline of Report Chapters 7
2. LITERATURE REVIEW 9
2.1 Factors Impacting Final Mile Performance 9
2.2 Seasonal Demand Impact on Final Mile Performance 11
2.3 Consumer Preferences in Final Mile 12
2.4 Case Studies and Best Practices 13
2.4.1 Final mile best practice 13
2.4.2 Top E-Commerce Retailers 14
2.4.3 Walmart's Final Mile Approach 15
2.4.4 Amazon and Alibaba Final Mile Approach 16
2.5 Conceptual Framework 17
2.6 Literature Review Insights and Summary 18
3. RESEARCH METHODS 20
3.1 Research Design 20
3.2 Data Collection 20
3.2.1 Semi-Structured Interviews 20
3.2.1.1 Interview Objectives 21
3.2.1.2 Interview Question Development 21
3.2.1.3 Participant Sampling 22
3.2.1.4 Participant Selection 23
3.3 Data Analysis 23
3.4 Validity and Reliability 24

3.5 Ethical Issues 25
3.6 Chapter Summary 25
4. ANALYSIS AND RESULTS 26
4.1 Interview Participant Breakdown 26
4.2 Thematic Analysis 27
4.2.1 Courier Management & Capacity Challenges 29
4.2.2 Customer Proximity and Location Challenges 31
4.2.3 Peak Planning and Efficiency 32
4.2.4 Courier Operating Philosophy 33
4.2.5 Store Delays 34
4.2.6 Exceptions 34
4.2.7 Master Data Integrity 34
4.2.8 Visibility and Communication 35
4.3 Thematic Analysis Results 35
4.4 Research Validity and Reliability 37
4.5 Chapter Summary 37
5. DISCUSSION 38
5.1 Forecast Accuracy and Planning Collaboration 38
5.2 Proximity to Customers 40
5.3 Fleet and Technology Employed 42
5.4 Level of Customer Service 43
5.5 Delivery Type 44
5.6 Limitations of the Study 44
5.7 Chapter Summary 45
6. CONCLUSION AND RECOMMENDATIONS 46
6.1 Recommendations 46
6.1.1 Forecast Accuracy and Planning Collaboration: 46
6.1.2 Proximity to Customers: 46
6.1.3 Fleet and Technology Employed: 46
6.1.4 Level of Customer Service: 47
6.1.5 Delivery Type: 47
6.2 Conclusion 47
References 49
Appendix A: Sample letter to the Participants 53
Appendix B: Research Instrument 54
Appendix C: Participant 3 Interview Transcript 55
Appendix E: Data Tables 59

LIST OF FIGURES

Figure 1.South African E-Commerce Market Shares Split by Company (Euromonitor, 2023) 2
Figure 2. Supply Chain Segments (Roel Gevaersa, 2014) 3
Figure 3. Company X Brands (Promozione, 2013) 4
Figure 4. Company X Third and Fourth Quarter %OTD 5
Figure 5. Company X High-Level Fulfilment Process 5
Figure 6. Conceptual Framework 18
Figure 7. Wengraf's CRQ-TQ-IQ/II: Pyramid Model (Wengraf, 2001) 21
Figure 8. Wengraf's Pyramid Model Applied 22
Figure 9. Braun & Clarke's Six Step Thematic Analysis (Braun Virginia, 2006) 23
Figure 10. Interview Participant Experience Breakdown 26
Figure 11. Interview Participant Role Breakdown 27
Figure 12. Interview Participant Education Breakdown 27
Figure 13. Theme distribution of associated codes 28
Figure 14. Thematic Map 29
Figure 15. % Contribution to late deliveries by period and Courier 33
Figure 16. Revised Thematic Map 36

LIST OF TABLES

Table 1. Actual and Projected Growth in the South African E-commerce Market 1
Table 2. Forecasted 2023 South African E-commerce Cost of Services 3
Table 3. Company X Comparative % OTD Performance across Brands 4
Table 4. Theme composition of associated codes 28
Table 5. Theme Prioritisation Score 36
Table 6. Interviewee Details Table 59
Table 7. Interviewee 1 Captured Codes 60
Table 8. Interviewee 2 Captured Codes 61
Table 9. Interviewee 3 Captured Codes 62
Table 10. Interviewee 4 Captured Codes 63
Table 11. Interviewee 5 Captured Codes 64
Table 12. Interviewee 6 Captured Codes 65
Table 13. Code and Theme Links 66
Table 14. No. of Codes per Theme 69
Table 15. Theme Relation Table 69

ABBREVIATIONS AND ACRONYMS

1. **OTD:** On-Time Delivery
2. **SLA:** Service Level Agreement
3. **RFP:** Request for Proposal
4. **BAU:** Business as Usual
5. **B2B:** Business to Business
6. **B2C:** Business to Consumer
7. **C2C:** Consumer to Consumer

GLOSARRY OF TERMS

1. **E-Commerce:** "E-commerce" or "electronic commerce" is the trading of goods and services on the internet. It is a platform that provides a virtual marketplace for users to engage in commercial transactions.

2. **Final mile:** The final mile refers to the last stage in a process, especially of a customer buying goods.

3. **Golden Quarter**: A time when large uplifts in retail site visitors and revenue can occur due to known sales periods such as Black Friday, Cyber Monday, and the Christmas period.

4. **On time delivery**: is the metric used to measure supply chain efficiency. This KPI shows whether or not an organization is meeting its goals in regards to promised delivery times, and is critical for both measuring carrier performance and maintaining customer satisfaction.

5. **Omni-channel:** Denoting or relating to commerce that integrates the different methods of interaction available to customers (e.g. online, via a mobile device, in a physical shop, etc.).

6. **Compound Annual Growth Rate:** The compound annual growth rate is the rate of return that would be required for an investment to grow from its beginning balance to its ending balance, assuming the profits were reinvested at the end of each period of the investment's life span.

1. INTRODUCTION

1.1 Research Background

E-commerce, defined as the electronic buying and selling of products or services over computer networks (Eduardo Diniz, 2018), has reshaped global business operations and customer interactions. These electronic transactions, spanning business-to-business (B2B), business-to-consumer (B2C), and consumer-to-consumer (C2C) domains, have brought forth benefits and advantages such as convenience, global reach, and accessibility (Palanisamy, 2022). The recent pandemic has significantly impacted industries across the globe. The imposition of port closures, travel restrictions, and supply chain disruptions has instigated a noteworthy shift towards digital transformation and increased consumer preference for e-commerce (Charm, et al., 2020).

A comprehensive analysis of the South African e-commerce landscape, as indicated by the 2023 Global High Tech & Emerging Markets report (Barnes, 2023), forecasts a robust growth trajectory. The South African e-commerce market, valued at 405,514.6 million Rands in 2023, is anticipated to experience a remarkable 17.6% growth in 2024 (Barnes, 2023). This surge is corroborated by the 20% year-on-year growth in 2022, as Worldwide Worx and MasterCard reported in their study "Online Retail in South Africa 2022" (Goldstuck & Motha, 2022). The market has grown steadily, with the observed growth highlighted in Table 1. The highest year-on-year growth numbers were from 2019 and 2020 due to the pandemic. Data shows no signs of slowing down, with a compound annual growth rate of 111% between 2023 and 2029 (Barnes, 2023).

Table 1. Actual and Projected Growth in the South African E-commerce Market

Year on Year change	Rands
2017 – 2018	23%
2018 – 2019	14%
2019 – 2020	36%
2020 – 2021	16%
2021 – 2022	23%
2022 – 2023	18%
2023 – 2024	17%
CAGR 2023 -2029	111%

Source: (Barnes, 2023)

E-commerce is here to stay and continuously growing. The Euromonitor International report on Retail in South Africa (2023) indicates the post-pandemic surge in digital service investments has reshaped South Africa's retail landscape, making Omni-channel offerings the new standard (Euromonitor, 2023). On-demand grocery delivery services experienced substantial growth, with a shift from third-party platforms like Uber Eats to first-party options like Checkers Sixty60 (Euromonitor, 2023). Despite increased competition, the leading e-commerce players leverage digital capabilities, personalized offerings, and a robust last-mile delivery network to maintain a leading market share (Euromonitor, 2023). This view is

also depicted in Figure 1, highlighting South Africa's most prominent e-commerce players and their year-on-year market share growth trend.

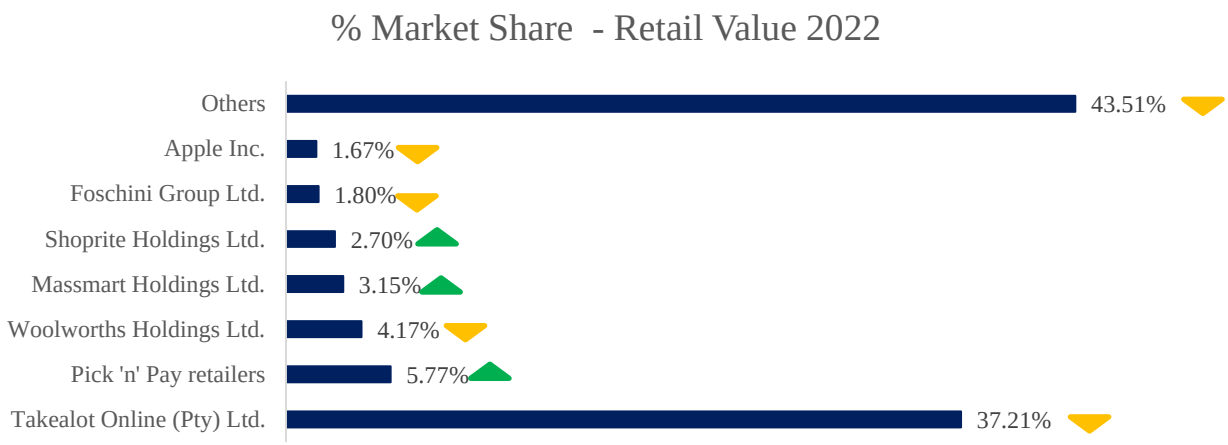

Figure 1.South African E-Commerce Market Shares Split by Company (Euromonitor, 2023)

The Euromonitor report highlights the Omni-channel strategy continues to reshape the retail landscape, and e-commerce remains the fastest-growing channel, driven by improved internet penetration, mobile app culture, and an influx of first-time users (Euromonitor, 2023). Overall, the retail e-commerce sector in South Africa is poised for continued growth, with players adapting to technological advancements and shifting consumer behaviours (Euromonitor, 2023).

Examining consumer trends further underscores retailers' need to communicate value through promotional efforts. Over 30% of consumers identify better prices or promotions as the main reason for trying a new brand (Charm, et al., 2020). Against this backdrop, the period between October and December marks a pivotal opportunity for retailers due to events such as Black Friday, Singles Day, and pre- and post-Christmas campaigns, collectively termed the "Golden Quarter" by retailers worldwide. For retailers that actively participate in these campaigns, the Golden Quarter signifies a crucial period when they can generate most of their annual profits, provided they are well prepared (Bergström, 2022). The importance of this quarter is further validated by the "Online Retail in South Africa 2022" report which indicates the growth of e-commerce and online sales have been boosted by major promotional events, such as Black Friday, where all banks have reported massive increases in card and online spending over November (Goldstuck & Motha, 2022). The above is a testament to the role of the Golden Quarter in the retail industry.

In the rapidly evolving, growing, and intricate e-commerce market landscape, a proactive, agile, and strategic approach is imperative for optimising profits. Presently, the focal point for most retailers lies in the final mile, indicated by researchers as the most expensive, inefficient, and environmentally impactful segment of the fulfilment process (Gevaersa, et al., 2014).

The supply chain is the participants' alignment that brings products or services to the market (Felea & Nastase, 2013). This alignment can be split into three segments: the first, middle, and final mile. The final

mile is when the goods get delivered to the customer. The last mile of delivery is further defined as the portion of a business-to-consumer delivery route during which a parcel or consignment is delivered to the recipient, either at the recipient's home or a collecting point (Gevaersa, et al., 2014). The final mile breakdown is depicted in Figure 2, which depicts the process put forward by Gevaersa in her work.

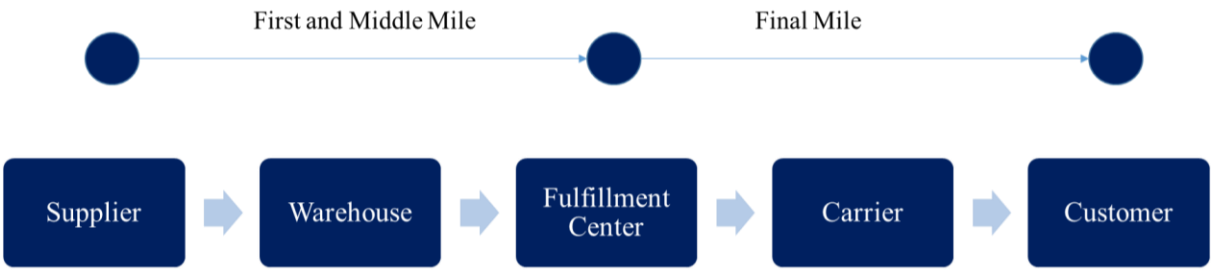

Figure 2. Supply Chain Segments (Gevaersa, et al., 2014)

As the growth rate stabilises, e-commerce players focus on operations and cost optimisation (Euromonitor, 2023). The Barney Report indicates the cost of services estimates in the South African online retail market as an indicator of potential focus areas. Advertising and promotional services account for 29% of the cost of services, followed by transportation and warehousing, which account for 20%.

Table 2. Forecasted 2023 South African E-commerce Cost of Services

2023 Cost of Services	US Dollars (000s)	% of Total Cost
Cost of Purchased Transportation and Warehousing	223,640.80	20%
Cost of Purchased Repair and Maintenance Services	111,820.40	10%
Cost of Purchased Printing Services	156,548.60	14%
Cost of Purchased Advertising and Promotional Services	313,097.10	29%
Cost of Purchased Legal Services	178,912.60	16%
Cost of Purchased Accounting and Auditing Services	111,820.40	10%

Source: (Barnes, 2023)

According to PwC Digital Trends in Supply Chain Survey 2022 (PWC, 2022), improving efficiency and managing or reducing costs are the top priorities for South African supply chain professionals. As such, companies are re-evaluating their current delivery technology, considering optimising last-mile operations and scaling accordingly with demand. The 2021 Digital CX report highlights that shipping cost and convenience show up as 1 of the top 5 reasons preventing customers from shopping online more (Alfeld, et al., 2021). The onus is now on South African retailers to focus on improving the final mile delivery customer journeys and experiences.

This project aims to explore tailored final mile optimisation strategies, particularly during the Golden Quarter, offering a timely and impactful opportunity for research. The research endeavour aligns with the

broader goals of enhancing efficiency, reducing costs, and improving customer journeys in the South African e-commerce sector, which is poised for sustained growth and evolution.

1.2 Context

Company X is the second-largest wholesale food distributor in South Africa, serving the general retail, liquor, and home improvement sectors across five banners (Bhukhari, 2022). Through its various subsidiaries and brand names, the company operates a customer-centric model, with 300 locations across 9 sub-Saharan countries, catering to a wide range of consumer needs. Company X is headquartered in Johannesburg, South Africa, where it runs its e-commerce operations across three of the five banner brand names, as depicted on Figure 3 below. The company's presence in urban and suburban areas, along with its diverse product offerings, positions it as a critical entity in the e-commerce ecosystem.

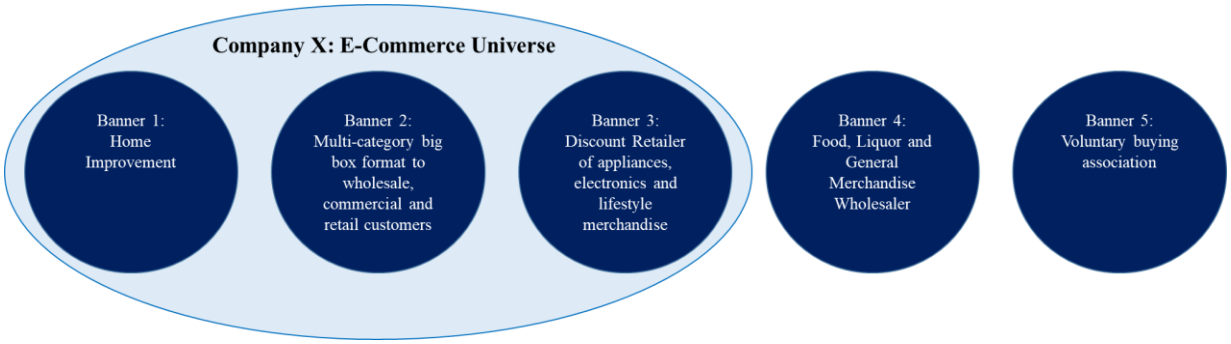

Figure 3. Company X Brands (Promozione, 2013)

With its varied store formats and extensive product range, Company X experiences a surge in e-commerce orders during the Golden Quarter. This period is crucial for revenue generation, contributing over 30% of its yearly sales. In the competitive retail industry, on-time delivery is a pivotal factor influencing customer satisfaction and loyalty. (Choi, et al., 2019), found the quality of delivery has a statistically significant impact on customer satisfaction, which in turn influences repeat purchasing behaviour.

Despite its market prominence, Company X encounters challenges during high-demand periods, affecting the on-time delivery of e-commerce orders. As can be seen in Table 3, all three banners did not meet the on-time delivery target of 95%, with the biggest opportunity in Banner 3, which had a 12% opportunity gap.

Table 3. Company X Comparative % OTD Performance across Brands

Company X Brand	2022 % OTD
Banner 1	91%
Banner 2	93%
Banner 3	83%

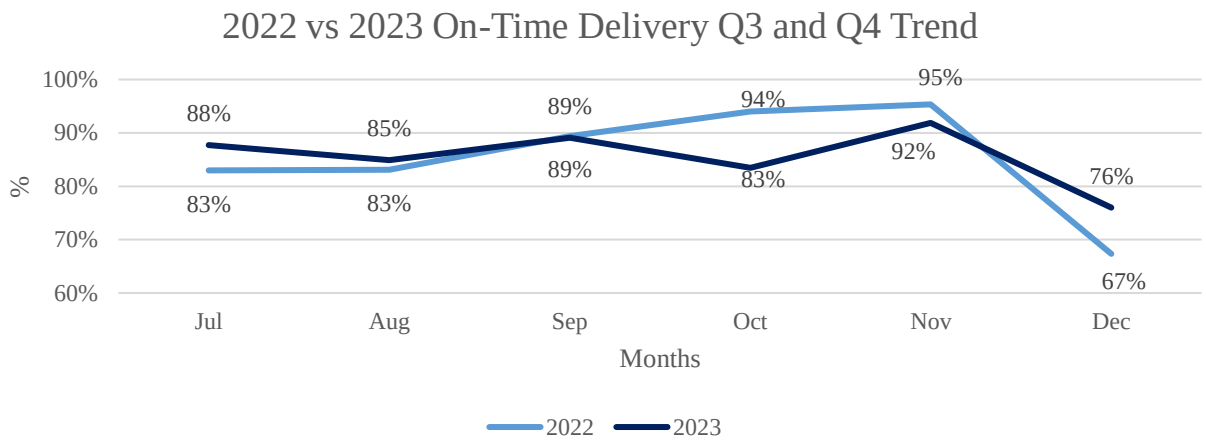

Figure 4. Company X Third and Fourth Quarter %OTD

In 2022, the on-time delivery for Company X's Banner 3 e-commerce division dropped by 28% in December due to the Black Friday volumes. The 2023 view shows a similar trend, with a 16% dip in delivery performance in the same period. An investigation of errors revealed the most negatively impacting leg is in the final mile of delivery, which is also the bottleneck in the high-level fulfilment process highlighted in Figure 5, where there is an average of 4.3 days' lag in the final mile space.

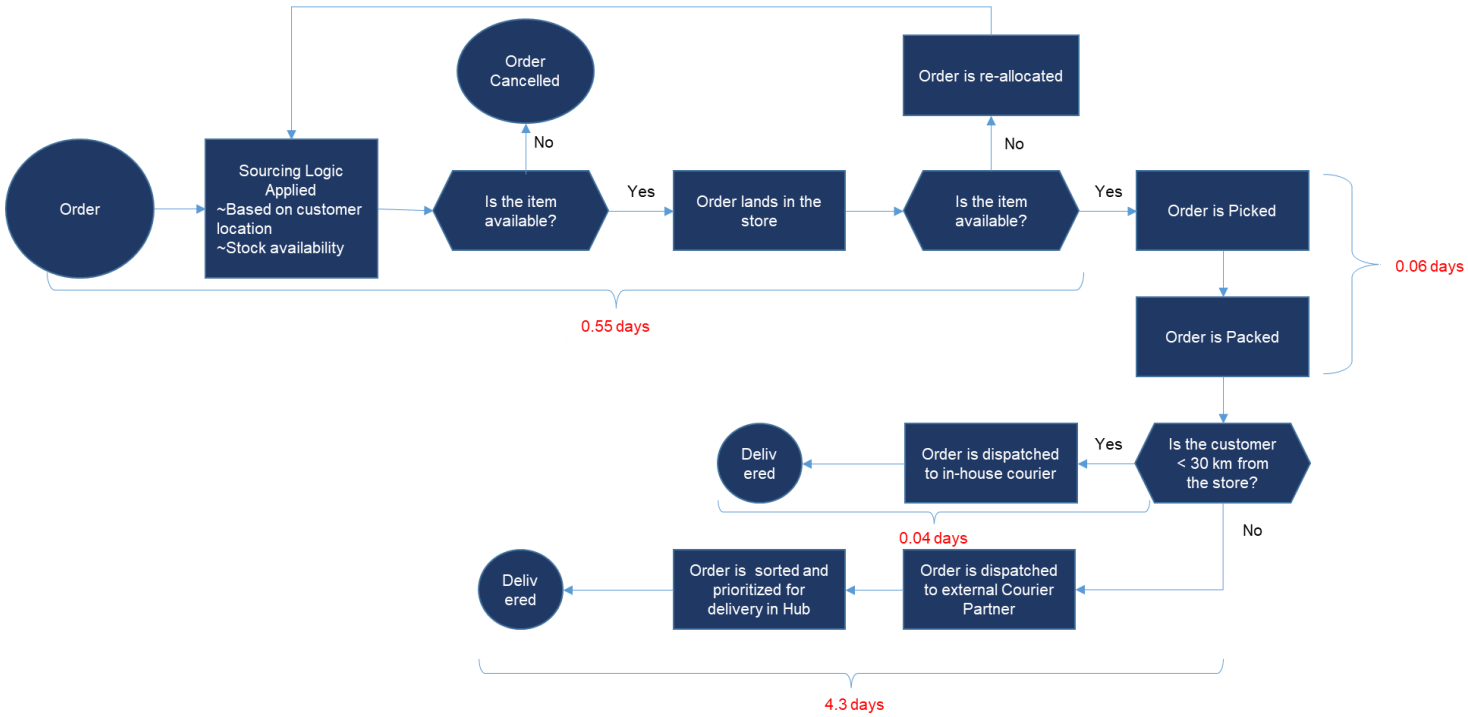

Figure 5. Company X High-Level Fulfilment Process

As Company X navigates the intricate landscape of the South African e-commerce market, understanding and addressing the challenges leading to poor OTD performance during the Golden Quarter is imperative to enhance Company X's efficiency in the order fulfilment process. This study provides insights, strategies, and recommendations to enhance the company's delivery performance, ensuring customer satisfaction and sustained competitiveness in the evolving e-commerce sector.

1.3 Problem Statement

During the Golden Quarter, a critical period contributing over 30% of yearly sales for Company X, the e-commerce division faces challenges in maintaining on-time delivery of orders, impacting customer satisfaction and loyalty. Despite being the second-largest wholesale food distributor in South Africa, Company X experienced a 28% drop in on-time delivery in December 2022 and a 16% dip in 2023, primarily attributed to logistical bottlenecks in the final mile of delivery.

This final mile bottleneck results in an average delay of 4.3 days in the order fulfilment process, exacerbated by increased order volume. Failure to address these challenges will not only compromise customer satisfaction and loyalty but also jeopardize Company X's competitiveness in the rapidly evolving South African e-commerce landscape. Consequently, enhancing on-time delivery performance during the Golden Quarter is imperative for Company X to sustain its market position and meet the evolving demands of the e-commerce sector.

1.4 Research Scope

- This project focuses on one banner, named “Banner 3” in Figure 3, a discount retailer of electronics, appliances and general merchandise.
- The geographical confines of the fulfilment will be focused on the South African market.

1.5 Research Question

How can on-time delivery performance be improved in Company X’s discount retailer brand during the Golden Quarter?

1.6 Research Objectives

The overall objective of this research is to:

Determine how Banner 3’s delivery performance in South Africa can be improved during the Golden Quarter.

The sub-objectives of this research are to:

a) Identify the risks and constraints in final mile processes that lead to poor delivery performance.
b) Evaluate the effectiveness of Company X’s final mile strategy.
c) Provide recommendations on how Company X can improve and sustain its delivery performance.

1.7 Summary of the Research Method

A comprehensive framework and systematic approach were utilised in this project's methodology, employed to investigate the research questions and objectives outlined above.

The qualitative research design was followed to explore the complex and dynamic nature of final mile delivery. This design allowed for an in-depth exploration of challenges through the utilisation of one-on-one semi-structured interviews, conducted digitally on the Microsoft Teams platform. The ethics clearance was obtained for this project (MIAEC 099/23). The interviewees were assured of the transparency of the research purpose and the objectives clearly explained. The interviews were designed to yield rich qualitative data, offering an in-depth understanding of the multifaceted challenges from various final mile stakeholder perspectives. The participant sampling involved intentionally selecting a smaller yet diverse sample size of 6 participants, emphasising the quality of data over quantity, in line with the research focus on nuanced insights.

The data analysis process follows Braun and Clarke's (Braun & Clarke, 2006) approach to a thematic analysis, including steps such as familiarization with data, initial coding, theme generation, theme refinement, and interpretation and synthesis. The validity and reliability concerns were addressed, incorporating triangulation methods and emphasizing thorough documentation through the recording of interviews, to enhance the credibility and replicability of the study's results.

1.8 Outline of Report Chapters

This section in the introductory chapter serves as a roadmap, delineating the trajectory and scope of the investigation. Each chapter plays a distinct role, contributing to the overall study. This paper consists of six chapters, with a summary of all details below:

Chapter 1: The introductory chapter serves as the gateway to the project, providing a comprehensive background and context to the study. The chapter outlines the problem statement the research aims to address. The purpose is articulated, along with the research questions which guide the investigation.

Chapter 2: The literature review chapter dives into the existing academic writing relevant to the research topic. The chapter provides an overview of the current state of knowledge, reviewing associated topics explored in literature to build a base of understanding and a theoretic framework of elements that impact the on-time delivery of orders during the Golden Quarter.

Chapter 3: The methodology chapter details the research design and outlines the plan throughout the study. It discusses the sampling methods employed and the chosen data collection method and provides a rationale for the chosen approach. Ethical considerations are also addressed, detailing how the research adhered to ethical standards and guidelines.

Chapter 4: The results chapter offers a presentation of the data collected, providing a clear and organized presentation of the findings supported by visual representations. The chapter aims to be objective and factual, allowing readers to draw their interpretations. A concise summary of the key findings bridges the next chapter, where these results are thoroughly discussed and interpreted.

Chapter 5: The data is interpreted for meaning in the discussion chapter. The results are analysed in-depth, drawing connections to the literature reviewed in chapter 2. The implications of the results are explored, discussing their significance concerning the research question. The chapter sets the stage for the conclusion by summarizing key insights and their implications, as well as the acknowledgement of the study's limitations.

Chapter 6: The conclusion and recommendations chapter synthesises the entire research project, summarizing all insights gathered throughout the project. This chapter aims to bridge the gap between theory and practice, offering concrete steps that can be taken based on the research outcomes.

2. LITERATURE REVIEW

This chapter provides an understanding of the topic, informs the research question, and contributes to developing a robust conceptual framework that guides the investigation. Initially, the focus is on understanding seasonal demand impact on supply chain performance and factors impacting last-mile performance, followed by the exploration of best practices from the world's most prominent e-commerce players.

2.1 Factors Impacting Final Mile Performance

The evolution of e-commerce markets has drawn attention to various delivery service issues (Bosona, 2020). As mentioned in the above sections of this report, the final mile is the costliest and most inefficient part of the fulfilment process. This indicates the existence of significant risks that need to be managed to ensure optimal performance.

The last mile is characterised by five aspects, i.e. the level of customer service, security and delivery type, the geographical area, the degree of market penetration and density and the vehicle fleet and technology employed (Gevaersa, et al., 2014). Many issues exist in these different areas, but how well a courier determines and manages these characteristics can impact an order's successful and on-time fulfilment.

- The level of consumer service refers to sub-elements such as time windows, the promised customer lead-time, the frequency of deliveries, and the clarity of the reverse logistics process. A substantial issue in the final mile of home deliveries occurs if a signature is required for collection. This characteristic is validated by different authors, highlighting the potential positive impact on performance if done well. Seghezzi and Mangiaracina, in their work titled "Smart home devices and B2C e-commerce: a way to reduce failed deliveries", indicate that without pre-arranged delivery windows, the failure rate due to "customer not home" is high (Seghezzi & Mangiaracina, 2023). Allocating customers to time windows based on their availability profiles can increase the total travel time but decrease the average delivery cost per parcel, thus affecting the overall efficiency of the final mile delivery (Seghezzi & Mangiaracina, 2023). Consequently, delivery will be attempted two or three times before successful order fulfilment (Gevaersa, et al., 2014). Research shows that allocating customers to time windows based on their availability profiles also has a positive impact on the customer satisfaction and operational performance (Wu & Wu, 2022).
- The security and delivery type refers to sub-elements such as whether the delivery is a home delivery, which requires a signature upon goods receipt (attended delivery) vs non-attended delivery, and elements like whether collection points are utilised instead.
- The geographical area and market density refers to the density of deliveries required in the given geographical area and whether it allows for the pooling of goods. Another frequently encountered problem is a lack of a critical mass in each geographical region due to inadequate market density. This would mean a courier would travel longer distances to deliver a single parcel. Thus, efficiency

would be strongly reduced, and costs greatly increased (Gevaersa, et al., 2014). Gevaersa is further validated by Mangiaracina et al. (2019) who indicates that customer density is one of the main factors influencing costs.

- Fleet and Technology refers to sub-elements like the type of delivery vehicles utilised and whether these are outsourced or insourced.

The critical issues facing the last mile can be packaged into two major themes: The sharing economy and customer proximity (Sundstrom, 2018). Information and communication technology advancement has accelerated the introduction of the sharing economy in the last mile. The sharing economy involves a way of parcel deliveries by individual, self-contracted joined at crowdsourcing platform. Passenger cars are utilised for home delivery services. This can decrease emissions and delivery costs while maintaining delivery speed and reliability. This, however, requires a mature market, which South Africa is not yet. A deeper eye on the issues that arise during implementation is required to understand the barriers in these changes further. The sharing economy has further increased the complexity of service regulations and the limited delivery time.

Issues in the Final mile can be viewed from various geographical dimensions, which speaks to the e-commerce organisation's proximity to customers (Gevaersa, et al., 2014). The eCommerce organisation must be strategically located close to the customer; if not, bridge the distance by implementing delivery/pickup stations and hubs. Implementing these solutions became necessary due to the number of drop-off exceptions due to customer unavailability. This further causes multiple delivery attempts and adds delivery costs. The proximity issue further highlights the need for the appropriate network design, delivery vehicle routing, and the correct courier, as some do not operate in certain areas.

Sundstrom's major themes are further validated in Gevaersa's (2014) work. To understand the barriers, the factors that need to be analysed, mapped and understood are the above mentioned four factors.

2.2 Seasonal Demand Impact on Final Mile Performance

The "Golden Quarter" refers to the year's final three months and is characterized by increased consumer demand due to holidays, festivals, and promotional events. These events include but are not limited to Single's Day, Black Friday and Christmas shopping. Seasonal demand can have a significant impact on the performance of the supply chain. The extent of the impact varies depending on industry, product and the nature of the demand. The extensive body of literature on the impact of demand variability on the supply chain's performance provides a rich backdrop for understanding the challenges associated with the golden quarter.

Seasonal demand often leads to fluctuations in demand patterns. Forecasting becomes challenging as historical data may not accurately represent future demand, especially during peak seasons. Understanding the impact of the demand fluctuation on forecast accuracy is imperative for overall operational effectiveness. The accuracy of demand forecasts plays a pivotal role in the effective functioning of supply chains. Accurate forecasts are essential for inventory optimisation, production planning, and overall supply chain efficiency. Li, et al. (2005) emphasized the importance of error magnitude accuracy in forecasting models, highlighting the need for precise predictions to effectively manage demand fluctuations. Taylor & Xiao (2010) extended this perspective by delving into the impact of a retailer's forecasting accuracy on overall supply chain performance, revealing the interconnected nature of accurate forecasts and positive supply chain outcomes. The above work indicates the importance of forecast accuracy in any supply chain and can potentially negatively impact performance if inaccurate.

Ozer, et al., (2011) explored the implications of trust in forecast information sharing, emphasizing the role of collaborative forecasting in enhancing accuracy. This collaborative approach recognizes the importance of communication and information sharing among supply chain partners to improve forecast precision. The study underscores the need for building trust and cooperation in forecasting to address the challenges posed by demand fluctuations.

Recent studies have explored advanced technological solutions to enhance forecast accuracy. Kim, et al., (2023) compared long short-term memory and recurrent neural networks for demand forecasting, providing insights into cutting-edge forecasting techniques. Additionally, Altintas & Trick (2012) discussed the use of data mining to forecast behaviour, emphasizing the potential for advanced analytical methods to improve accuracy. Integrating such technologies into forecasting models reflects the evolving landscape of supply chain management.

In conclusion, the impact of demand fluctuations on forecast accuracy requires a comprehensive understanding of forecasting models, collaborative approaches, and advanced analytical techniques. The studies in this section provide valuable insights into the challenges, strategies, and implications of improving forecast accuracy in supply chain management. As industries grapple with the complexities of seasonal demand, ongoing research and innovative approaches will be essential to continually enhance forecast accuracy and, consequently, the efficiency of supply chain operations.

2.3 Consumer Preferences in Final Mile

Consumer behaviour and preferences in final mile logistics play a crucial role in shaping the success of online delivery strategies and consumers' overall satisfaction. The study by Esper et al. (2003) titled "THE LAST MILE: AN EXAMINATION OF EFFECTS OF ONLINE RETAIL DELIVERY STRATEGIES ON CONSUMERS" provides valuable insights into the impact of online retail delivery strategies on consumer behaviour and satisfaction. The critical link between consumer-based internet ordering and product delivery to the consumer, often referred to as the final or last mile, is highlighted as a key component of online consumer satisfaction. The study emphasizes the importance of transportation and delivery issues as key components of online consumer satisfaction, indicating that logistics decision-makers should focus on these aspects to enhance consumer satisfaction (Esper, et al., 2003).

Furthermore, the study underscores the significance of the quality of the final delivery service in shaping consumers' final impression of the entire logistics service and retailer's fulfilment capabilities. This suggests the last mile influences consumers' overall satisfaction with the online retail experience.

Studies have conceptualized end-consumers choice behaviour of innovative service offerings in the field of last-mile logistics, emphasizing the need for responsive logistics systems that provide customized products at a low cost to align with consumer preferences (Wang, et al., 2018)

The trends in consumer satisfaction in the final mile logistics are influenced by various factors and dynamics, such as the availability of final delivery facilities, the perceived importance of last-mile logistics services, and the effectiveness of last-mile delivery processes. The disruption magnitude, customer utility, and delivery service cost have also played significant roles in shaping consumer satisfaction trends.

Jiang, et al., (2021) highlighted that consumers' perceived importance of last-mile logistics services significantly impacts consumer satisfaction. This suggests the importance of last-mile logistics services directly influences consumer satisfaction trends.

Furthermore, Xiao, et al., (2017) utilised a mixed structural equation model to predict the interactions among the availability of final delivery facilities, level of satisfaction with delivery services, and e-shopping usage after controlling individual socioeconomic attributes and retail environment. This indicates the availability of final delivery facilities plays a crucial role in shaping consumer satisfaction trends in final mile logistics.

In conclusion, consumer satisfaction trends in final-mile logistics are influenced by various factors such as the availability of final delivery facilities, the perceived importance of last-mile logistics services, the disruption magnitude, and the effectiveness of last-mile delivery processes. Understanding and addressing these factors are crucial for enhancing consumer satisfaction in the final mile logistics.

2.4 Case Studies and Best Practices

2.4.1 Final mile best practice

The final mile in logistics and supply chain management has garnered significant attention due to its impact on customer satisfaction, operational efficiency, and sustainability. Several best practices have been identified through extensive research and literature review.

Bakogianni & Malindretos (2021) conducted a comprehensive review of last mile logistics best practices, focusing on the impact of e-commerce on last mile deliveries, the dynamics between public authorities and private businesses, and the role of final customers in urban distribution and supply chain management. The review identified several recommended best practices for last mile deliveries, which are crucial for enhancing efficiency and customer experience in urban logistics.

The recommended best practices highlighted in the study encompass various aspects of last mile deliveries. These include adopting innovative technologies and delivery solutions to optimise route planning and minimise delivery times. Furthermore, the study emphasises the importance of effective collaboration between public authorities and private businesses to address urban distribution challenges. This collaborative approach involves implementing sustainable and environmentally friendly delivery practices, such as using electric vehicles and alternative energy sources for transportation. Additionally, the study underscores the significance of customer engagement and satisfaction in last-mile deliveries, advocating for customer-centric strategies and flexible delivery options to meet diverse customer needs and preferences.

Datta (2018) also contributed to the understanding of last-mile delivery practices by conducting a literature review of the strategies adopted by e-commerce companies globally and the factors influencing last-mile delivery performance. According to Datta (2018), one of the most critical determinants of successful last-mile delivery operations is the options e-commerce companies choose. This encompasses the various choices e-commerce companies make regarding delivery options offered to customers. The study underscores these options not only influence the cost implications but also directly impact the level of service provided to shoppers. Therefore, the selection and implementation of delivery options by e-commerce companies emerge as a key determinant that significantly influences the overall success and performance of last-mile delivery operations in the Indian e-commerce landscape.

Furthermore, Datta's (2018) research sheds light on the multifaceted nature of last-mile delivery determinants, emphasizing the intricate relationship between cost considerations and shopper service levels. This underscores the complexity of decision-making in last-mile logistics, where the choices made by e-commerce companies regarding delivery options have far-reaching implications on both operational costs and customer satisfaction levels. Therefore, the strategic management of delivery options emerges as a critical determinant that requires careful consideration and effective decision-making to ensure the success of last mile delivery operations in the Indian e-commerce context.

While the references provide valuable insights into last mile best practices, it is essential to note the evolving nature of e-commerce, urbanization, and sustainability will continue to shape and redefine these practices. Therefore, ongoing research and adaptation to emerging trends are crucial for the continuous improvement of last mile logistics and supply chain management.

2.4.2 Top E-Commerce Retailers

The largest e-commerce retailers globally include Amazon, Alibaba, and Walmart. Founded in the United States, Amazon has grown into a global behemoth, setting itself apart through its extensive product offerings, efficient logistics, and customer-centric approach. Amazon's Prime membership program, offering fast and free shipping, has been a key differentiator, enhancing customer loyalty and satisfaction (Obu & Ukpere, 2023). On the other hand, based in China, Alibaba has established itself as a dominant force in the e-commerce industry, particularly in the Asian market. Its innovative business model, which includes platforms such as Taobao and Tmall, has contributed to its significant market presence and influence.

Furthermore, Walmart, a retail giant in the United States, has made substantial strides in e-commerce. Its acquisition of a majority stake in Flipkart, India's largest e-commerce marketplace, for approximately $16 billion, marked one of the largest transactions in the history of the global online retail space, demonstrating Walmart's commitment to expanding its e-commerce footprint (Pachpande, et al., 2022).

These e-commerce retailers have also been at the forefront of technological advancements and innovation. For instance, Amazon has been a pioneer in leveraging technologies such as artificial intelligence and machine learning to enhance its recommendation systems and personalize the shopping experience for customers (Yu, et al., 2020).

In conclusion, the biggest e-commerce retailers, such as Amazon, Alibaba, and Walmart, have set themselves apart through their innovative business models, technological advancements, and strategic acquisitions. Their influence extends beyond traditional retail, shaping consumer behaviour, market dynamics, and the broader digital economy.

2.4.3 Walmart's Final Mile Approach

Walmart's final mile approach for online orders is a critical aspect of its e-commerce logistics strategy, influenced by various factors such as market growth, format evolution, and supply chain management. The growing importance of online sales has necessitated the creation of new logistics models for Omni-channel management in traditional grocery retailing, impacting the final mile strategy (Hubner, et al., 2016). Retailers, including Walmart, offer different delivery service options to win online customer orders, reflecting the significance of providing diverse delivery options to meet customer needs (Ishfaq, et al., 2016).

Furthermore, the conversion of Walmart Supercentres has influenced consumer shopping behaviour, reflecting the importance of retail logistics in shaping consumer experiences and preferences, including the final mile delivery experience. The approach used in addressing last-mile capacity constraints in online grocery fulfilment is transferable to other online service delivery providers, highlighting the broader implications for e-commerce logistics (Newing, et al., 2022).

The findings from the study highlight the significance of addressing last-mile capacity constraints in online grocery fulfilment. This is particularly crucial in the growing importance of online sales and the increasing demand for efficient and reliable last-mile delivery services in the e-commerce sector. Understanding and mitigating these constraints is essential for enhancing the overall customer experience, optimizing delivery operations, and maintaining competitiveness in the online grocery market.

Moreover, the study offers insights into the potential effectiveness of addressing last-mile capacity constraints through optimization strategies. By simulating same-day delivery services and comparing the results to those of traditional dedicated fleet delivery drivers, the research provides a basis for evaluating the performance and effectiveness of different last-mile delivery approaches. This can inform the development of more efficient and responsive last-mile logistics strategies tailored to the specific needs of online grocery fulfilment.

Furthermore, the study contributes to a better understanding of the operational challenges and dynamics in last-mile delivery, particularly in dynamic market conditions. By examining the performance of delivery services under varying market conditions, the research provides valuable insights into the adaptability and resilience of last-mile logistics operations in response to changing demand patterns and market dynamics.

Overall, the insights on last-mile capacity constraints in online grocery fulfilment offer valuable implications for e-commerce logistics, providing a basis for addressing operational challenges, optimizing delivery strategies, and enhancing the overall efficiency and effectiveness of last-mile delivery services in the online grocery sector.

2.4.4 Amazon and Alibaba Final Mile Approach

The Chinese retail group Alibaba is the largest e-commerce retailer in the world, with sales valued over 7400 billion U.S dollars in 2022 (Chevalier, 2022). Forecasts show that Amazon will surpass Alibaba in estimated sales by 2027, when Amazon will generate over 1.2 trillion U.S dollars in online sales (Chevalier, 2022).

This section of the study aims to understand the role and structure of the final mile in the success of these leading businesses. This view will explore the available academic resources detailing the similarities and differences between these successful strategies.

Amazon was founded by Jeff Bezos in the early 1990s, setting its foundation in Seattle. The company showed gradual growth, becoming widespread and awareness increasing, which further positively impacted the investment opportunity. In 2011, Amazon made its most effective impact on retail by launching Amazon Prime. This was a shipping service which guaranteed two-day shipping to customers from any location. Understanding how Amazon got this correct is essential to understanding final mile characteristics of success.

Wu and Gereffi's (2019) work on Amazon and Alibaba's business models describes Amazon as more of an online retailer than a marketplace due to its "asset-heavy" business model. This can be traced back to 1994 when Amazon first started its business as an online bookseller. The business model was such that Amazon would store and distribute its products, rather than outsource the Fulfilment Centre as other retailers would at that time. Amazon built a vertically integrated network of facilities that hold its inventory and use it to assemble and ship orders (Abdulrahman & Oreijah, n.d.). This became the secret to the success of Amazon Prime, the company's extensive logistics infrastructure. This was further coupled with Amazon Prime Air, a drone-based delivery system, providing 30-minute delivery service and Amazon Lockers where customers could pick up packages at their convenience. These were the critical enablers for the combination of fast delivery, product diversity, and competitive price that made Amazon the company we know it to be today.

Alibaba was founded by Jack Ma in 1998 with the aim of providing SMEs in China with online services information to help them enter the B2B e-market. Around 2004, Alibaba started overseas marketing to expand its field of electronic trade (Wu & Gereffi, 2019). Today, Alibaba has transformed into a platform facilitating sellers' and buyers' transactions. Wu and Gereffi (2019) further describe Alibaba's business model as "asset-light". This in contrast to Amazon, means the company owns no major assets.

To ensure the delivery and fulfilment of customer orders, Alibaba formed a logistics company called "Cainiao Network" in partnership with four major Chinese package delivery companies in 2013. This courier network can support over 47 million packages per day, across 224 countries globally (Wu & Gereffi, 2019). Instead of delivering packages itself, the Cainiao network operates a logistics platform

that uses data insights and technology to improve the capacity and capabilities of its package delivery partners.

Amazon and Alibaba clearly employ differing operating models yet meet their objectives. The information presented above shows these companies have adequately covered two of the four risks discussed in section 6.3, The Geographical area, market density, and the fleet and Technology. Amazon's ability to create an extensive network of fulfilment centres ensures its proximity and reach to its customers. Alibaba has positioned its courier network for ease of goods distribution. These approaches, though different, guarantee ease of reach and cover the customer's geographical area to ensure success. Regarding Fleet and technology, Amazon's utilisation of drones and Alibaba's outsourced fleet, as well as their utilisation of data to improve capacity, are critical enablers to the management of this critical characteristic. These elements are highlighted throughout this research to ensure Company X is adequately aligned to industry standard.

2.5 Conceptual Framework

The conceptual framework to be used in this research is developed on the foundation of the above examined literature and aims to incorporate key concepts from operations management and logistics. This framework will provide insights into the factors that affect delivery performance and the basis for the strategies to enhance operational efficiency and customer satisfaction.

Input Factors

- Demand Variability: The degree of fluctuation in customer demand during the Golden Quarter.

Transformation Processes

- Forecasting Accuracy and planning collaboration
- Geographical Area and Proximity to Customers: The position of the product source to the customer, and the categorisation of customers based on their proximity.
- Level of customer service: The customer expectation (Customer promise) against different customer segmentations and delivery time windows
- Delivery Type: The optimal delivery type used to ensure optimal proximity and convenience
- Fleet and Technology employed: The technology used to plan for and optimise resource capacity in line with demand, resource utilisation and minimise bottlenecks.

Output

- On-Time Delivery Performance: The ability to deliver products or services within the agreed time frame.
- Customer Satisfaction: The improved perception of the company's brand through consistent performance.

- Sales Growth: The anticipated growth in sales, which is the effect of improved customer satisfaction.

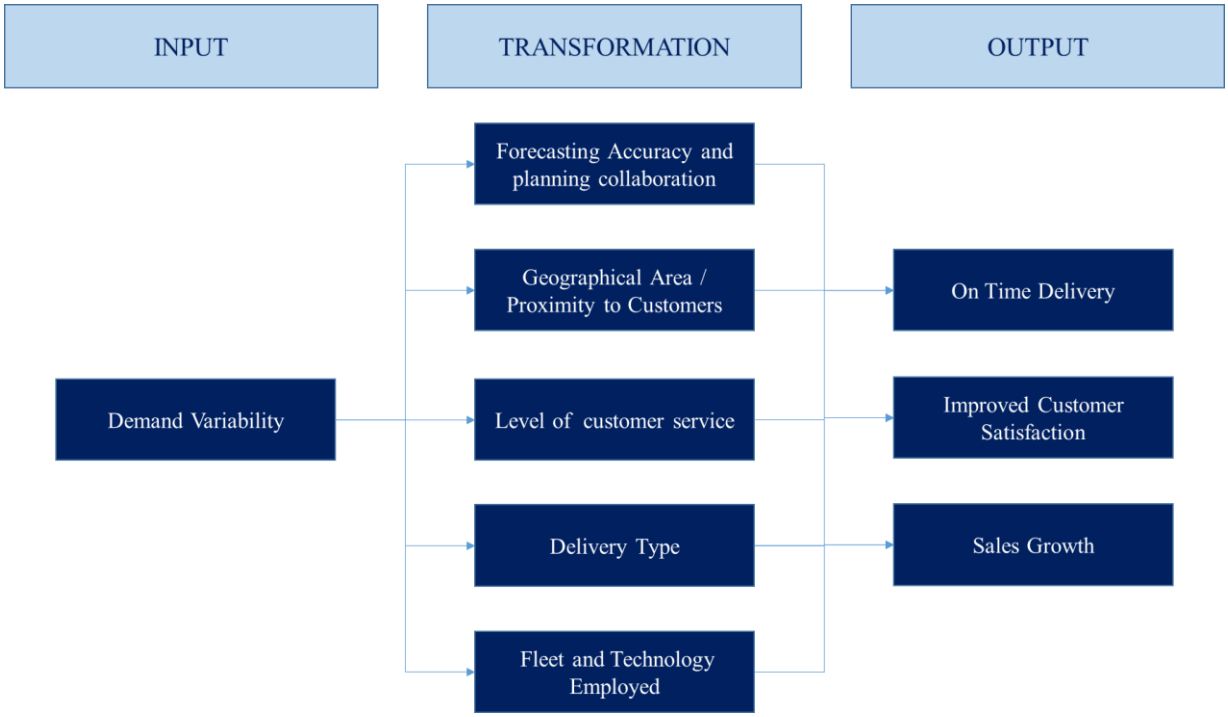

Figure 6. Conceptual Framework

The conceptual model proposes the input factor directly influences the transformation processes, which in turn, affect the output factors. The model recognizes the dynamic nature of the Golden Quarter and the need for effective management of the transformation processes to achieve the desired output factors. It is important to note this conceptual model serves as a starting point for this research and will be refined and expanded based on findings.

2.6 Literature Review Insights and Summary

The literature review highlights the substantial growth of the e-commerce landscape in South Africa, exceeding expectations with a 20% year-on-year growth in 2022 and further projections indicating a continued upward trajectory. Established players like Takealot in South Africa, face competition from new entrants, and the post-pandemic surge in digital service investments has led to Omni-channel offerings becoming the new standard. The literature indicates four main trends around the e-commerce landscape in South Africa, namely, Continuous growth, Omni-channel Integration, Strategic Partnerships and Technology Adoption. Insights indicate:

- E-commerce growth in South Africa is not merely a trend but a fundamental shift in consumer behaviour, with sustained growth expected.
- Seamless Omni-channel integration across physical and digital platforms is reshaping the retail landscape.
- Strategic Partnerships: Collaborations are crucial for meeting evolving consumer demands.

- Technology Adoption: Digital technologies, such as personalized marketing and tailored product offerings, are essential for success.

Seasonal Demand and Forecasting Challenges:

The literature emphasizes the impact of seasonal demand, especially during the "Golden Quarter," on supply chain performance. Accurate forecasting is pivotal for inventory optimization, production planning, and overall supply chain efficiency. Collaborative forecasting and advanced technologies like neural networks are proposed strategies to enhance accuracy.

Final Mile Challenges and Optimization:

The final mile segment poses challenges and risks, including increased costs due to dispersed delivery locations. Strategic management of factors such as customer service, security, geographical considerations, and technology is necessary. Consumer preferences play a crucial role in the final mile, influencing online delivery strategies and overall satisfaction.

Final Mile Best Practices:

- Technological Adoption: Innovative technologies and collaborative approaches are crucial.
- Route Optimization: Emphasis on route optimization for efficiency.
- Customer-Centric Strategies: Flexible delivery options and environmentally friendly practices are essential for urban logistics.

Walmart, Amazon, and Alibaba Final Mile Approaches:

Walmart focuses on market growth, format evolution, and supply chain management in its final mile approach. Amazon employs an asset-heavy model with extensive logistics infrastructure and innovative delivery solutions, while Alibaba adopts an asset-light approach, outsourcing delivery to Cainiao Network.

Conceptual Framework:

The conceptual framework integrates key concepts from operations management and logistics to understand factors affecting delivery performance and strategies for operational efficiency and customer satisfaction. Input factors feed into transformation processes, leading to critical output factors such as on-time delivery performance, customer satisfaction, and sales growth. The model recognizes the seasonal nature of the Golden Quarter and anticipates continuous refinement based on evolving findings. The Forecasting Accuracy and planning collaboration, geographical Area and Proximity to Customers, Level of customer service, Delivery Type, Fleet and Technology employed are put forward as the critical transformative factors which will further be the basis of the research.

3. RESEARCH METHODS

This chapter provides the framework that details the systematic approach employed to investigate the research questions and objectives stipulated in Chapter 1. It is designed to offer a detailed understanding of the research design, data collection methods and the analytical techniques utilised to garner meaningful insights, ultimately ensuring the credibility of the research as well.

3.1 Research Design

There are two main types of overarching research designs, i.e. quantitative and qualitative. Quantitative research systematically investigates phenomena by gathering quantifiable data and performing statistical, mathematical, or computational techniques (Fleetwood, 2022). This type of design aims to find answers using scientific quantitative research methods and deductive reasoning. The outcome is based on statistics and usually implemented for large populations and laboratory experiments. The qualitative research design is focused on finding answers through open-ended questions, enabling you to find what people think and why. This design uses different types of methods like in-depth structured or semi-structured interviews, focus groups, ethnographic research, questionnaires, content analysis and case study research (Fleetwood, 2022).

A qualitative research design was used to investigate on-time delivery due to the intricate and dynamic nature of the problem. The final mile process is rife with complexities such as geographical area and customer proximity, technology usage and increased customer demands as discovered in Chapter 2. The qualitative method facilitates an in-depth exploration of these challenges (Olawale, 2023). This approach is particularly suitable for its exploratory nature, enabling the investigation of this research topic as an emerging issue (Olawale, 2023). Employing qualitative research in this context ensured a comprehensive and targeted understanding of the barriers faced during the Golden Quarter, shedding light on underlying issues and contributing valuable insights for effective solutions.

3.2 Data Collection

There are different methods to collect data to execute a successful investigation, and it is imperative the data collection be done systematically. The instrumentation below, was used to collect qualitative data for this project. The Semi-Structured Interviews are the major source of information, but to ensure validity, will be backed up by the Literature gathered in Chapter 2.

3.2.1 Semi-Structured Interviews

Interviews can be divided into three categories: structured, semi-structured and unstructured. Structured interviews are verbal processes that adhere as closely as possible to a pre-determined set of questions. When project goals and major concerns are understood, this sort of interview is most effective. The same questions should be asked in the same order to every interviewee for the purposes of consistency and

reliability. When comparing data from various groups or assessing knowledge of a subject, structured interviews are helpful. (Chauncy, 2013). Semi-structured interviews are also based on pre-determined questions but differ from structured interviews in that follow-up questions can be asked based on the interviewees' answer. Unstructured interviews allow the interview to be conducted as a dialogue, where questions are formulated and posed as they are needed (Chauncy, 2013) .

For the purposes of this research, one hour long, one on one, semi-structured interviews were conducted digitally on the Microsoft Teams platform. This method yields rich qualitative data, enabling an in-depth understanding of the multifaceted challenges faced during the golden quarter from various stakeholder perspectives. The format allows for participant involvement, iterative exploration of emergent themes, and contextual understanding of final mile delivery operations. Each interview began with an initial set of 15 standard questions, that were shared with each participant before the interview. However, further questions were asked whenever a compelling subject came up, allowing for a deeper view on issues affecting Company X.

3.2.1.1 Interview Objectives

The objective of the interviews was to build an understanding of the existing barriers impeding Company X's performance, on the base of the participant's perspective, experience and the research theoretical framework.

3.2.1.2 Interview Question Development

The methodology employed in the development of the interview questions was based on Tom Wengraf's work on Qualitative Research Interviewing, depicted on Figure 7. Wengraf details a theoretic and practical guide to the planning and conduct of semi-structured interviews through a Pyramid model of interview research which progresses from the Research purpose, Central Research Question, Theory Question and ultimately leading to the interview questions. (CRQ→TQ→IQ/II) (Wengraf, 2001).

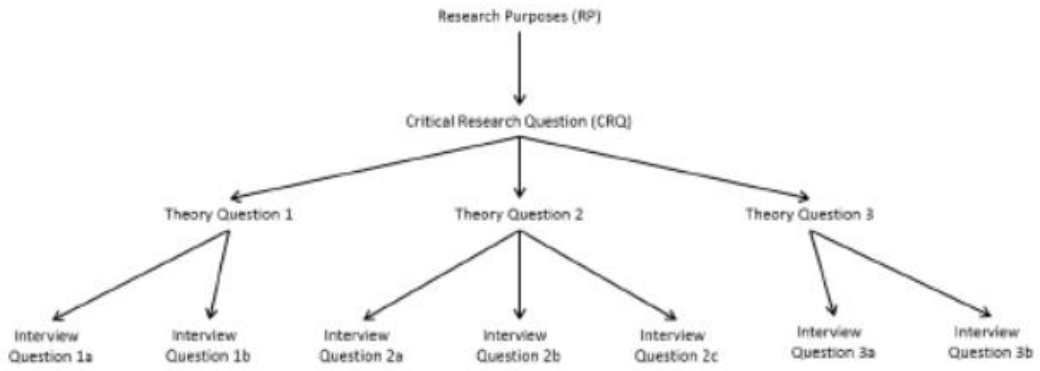

Figure 7. Wengraf's CRQ-TQ-IQ/II: Pyramid Model (Wengraf, 2001)

The interview questions were developed using this model, with the theoretical framework developed in Chapter 2 as the base for input, covering process, strategy, strategy effectiveness, constraints and challenges as well as improvement opportunities. Figure 8 highlights the application of this model to the research problem at hand. The basis of all questions was based on how best Company X's delivery performance could be improved during the Golden Quarter. The four Theory Questions resulted in 15 associated questions which explored the transformational elements of the conceptual framework.

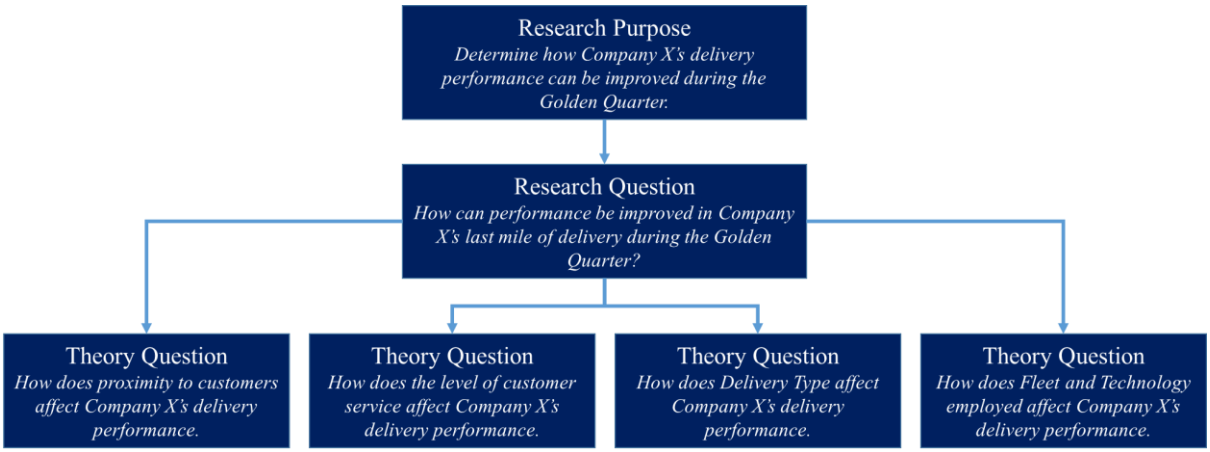

Figure 8. Wengraf's Pyramid Model Applied

3.2.1.3 Participant Sampling

Although the qualitative research design places more emphasis on the quality of the data than the quantity, it is still crucial to select the correct sample size to produce reliable research findings. The optimal sampling techniques in qualitative research have been explored by several academics. Creswell (1998) recommends the sample ranges between 5 and 25 interviews for a phenomenological study. Guest et al. (2006) found that in homogeneous studies using purposeful sampling, like many qualitative studies, 12 interviews should be sufficient to achieve data saturation.

In line with Creswell's recommendation, this study used a sample size of 6 participants. Creswell suggests that a smaller sample size can be effective when seeking in-depth insights and rich qualitative data, especially in studies where the focus is on understanding complex problems. By intentionally selecting a smaller yet diverse sample of participants, the research aimed to capture nuanced perspectives and uncover detailed information about the challenges faced during peak periods in the final mile. The point of data saturation was used as the indicator for whether more participants should be added.

3.2.1.4 Participant Selection

The quality of the data in a qualitative research study is imperative, as this can significantly impact the validity of the research findings. The following participant inclusion criteria was developed and used to ensure the quality output of the interviews, as well as transparency and consistency in participant selection.

- Participants who are directly involved in Company X's final mile process.
- The participants had more than 2 years' experience in the eCommerce final mile.
- Diverse perspectives.
    - Different levels of the organisation and areas of responsibility.
    - Varying years of experience.

3.3 Data Analysis

In this research, Braun and Clarke's (2006) approach to qualitative data analysis was employed to analyse the interview data collected from participants. Braun and Clarke's (2006) approach, as outlined in their seminal work, provides a systematic and rigorous framework for analyzing the interview data. It allows for the identification and development of themes that capture the essence of the participants' experiences and perspectives, leading to insightful findings and contributing to the overall research objective. The following section outlines the steps followed in the data analysis process.



Figure 9. Braun & Clarke's Six Step Thematic Analysis (Braun & Clarke, 2006)

Step 1: Familiarization with the Data

The first step involved thoroughly reading through and the familiarization of the Microsoft Teams interview transcripts. This step was aimed at gaining a comprehensive understanding of the data (Braun & Clarke, 2006).

Step 2: Initial Coding and Analysis

Open coding was conducted to identify meaningful segments of the interviews. The outcome of this step was a list of initial codes that capture the key ideas, concepts, and experiences expressed by the participants. This analysis was done manually on Excel to ensure a comprehensive understanding of all captured codes (Braun & Clarke, 2006).

Step 3: Theme Generation

Following the initial coding, similar codes were grouped to form initial themes. These themes are from patterns and manually captured connections observed in the coded data (Braun & Clarke, 2006).

Step 4: Theme Refinement

Once the initial themes are identified, they were reviewed and refined to ensure clarity and coherence. This involved revisiting the coded data and critically examining the relationships between codes and themes. At this point, a thematic map of relationships between primary themes are drawn up. Highlighting influencing and influenced themes (Braun & Clarke, 2006).

Step 5: Defining and Naming Themes

Clear definitions were developed to describe each theme and its underlying concepts. The definitions helped in ensuring consistency and precision in interpreting the data. This step also included the theme review and verification, and data mapping (Braun & Clarke, 2006).

Step 6: Interpretation and Synthesis:

The final step involved interpreting the themes in the context of the research questions and objectives. The themes were then synthesized to generate meaningful insights and conclusions. Connections were made between the themes and the conceptual framework and existing literature to provide a deeper understanding of the research topic (Braun & Clarke, 2006).

3.4 Validity and Reliability

Validity is defined as the extent to which a concept is accurately measured in a study. Reliability refers to the accuracy of the study, in other words, the extent to which the study would replicate the same results if it were repeated. There are methods that can be used to ensure that either are achieved in this study (Heale & Twycross, 2015). Triangulation is an integral part of how this will be achieved. Triangulation refers to the use of multiple methods or data sources in qualitative research to develop a comprehensive understanding of phenomena (Patton, 1999).

- One type of triangulation that will be used in this project is the use of different data sources to attain data triangulation through the literature review which incorporates the views and opinions of different authors.
- Biggam (2008) mentions another way to ensure reliability is through the thorough documentation of the study. In this project, interviews were recorded to ensure the ability to go back and listen to the material again, ultimately ensuring that information from interviews is not only based on subjective memory.

3.5 Ethical Issues

Ethical clearance was obtained from the School of Mechanical, Aeronautical and Industrial Engineering's University Main Ethics Committee (non-medical), prior to data collection commencement. The ethics clearance number provided for this report is MIAEC 099/23. The interviewees were assured of the transparency of the research purpose and the objectives clearly explained. Informed consent was obtained from participants, ensuring they understand their rights, the voluntary nature of participation, and the potential risks and benefits. Participants were assured their responses would be anonymized and confidential to minimize potential coercion or pressure from employers and that strong data security measures to protect participant information would be implemented. Lastly, the participants were given the freedom to opt out of the research at any point without facing consequences from their employer.

The interview recordings and transcripts were stored on the researcher's password protected computer. In the data cleansing process, the ethical considerations around participant anonymity and confidentiality were observed, all information that could be used to identify a participant were omitted. The data was identified by a special coding e.g. Participant 1 and Company X.

3.6 Chapter Summary

This chapter outlines the systematic approach used to investigate the research questions regarding the final mile delivery process in Company X. The research design is discussed, highlighting the choice between quantitative and qualitative methods. The qualitative approach is deemed suitable due to the intricate and dynamic nature of final mile challenges. The chapter also delves into the data collection methods, with a focus on semi-structured interviews conducted digitally. The participant sampling strategy involves selecting 6 individuals directly involved in Company X's final mile process, ensuring diverse perspectives. The data analysis follows Braun and Clarke's six-step thematic analysis, providing a systematic framework for deriving meaningful insights. Validity and reliability are addressed through triangulation and thorough documentation. The study's limitations include a small number of participants and limited years of experience in Company X, with ethical considerations ensuring participant confidentiality and consent.

4. ANALYSIS AND RESULTS

In the Analysis and Results chapter of this project, a comprehensive examination of the collected data is presented, aiming to unravel patterns, relationships and insights that contribute to answering the research questions put forward.

4.1 Interview Participant Breakdown

The primary objective of this project was to determine how Company X's delivery performance can be improved during the Golden Quarter. For this to be achieved the exploration of the risks and constraints in final mile processes that lead to poor delivery performance were discussed in all the interviews. Each one-hour-long interview covered 15 basic questions and was followed up by relevant follow up questions delving into each subject matter experts' experience.

The sample selected for these interviews were all in line with the criteria stipulated in Chapter 3. Each participant was directly involved and employed by Company X, thus having direct understanding of all existing issues and risks. The next criteria stipulated a requirement for each participant to have more than 2 years' experience. The resulting experience ranged from 1.8 years to 8 years, in line with the proposed criteria. Figure 10, shows the experience bucket breakdown, highlighting that 83% of the respondents fit the years of experience criteria. Company X's eCommerce team is close to 3 years old, impacting the amount of experience which could be explored in these interviews, however each participant had industry relevant experience further qualifying and adding insights to the opportunity related questions.

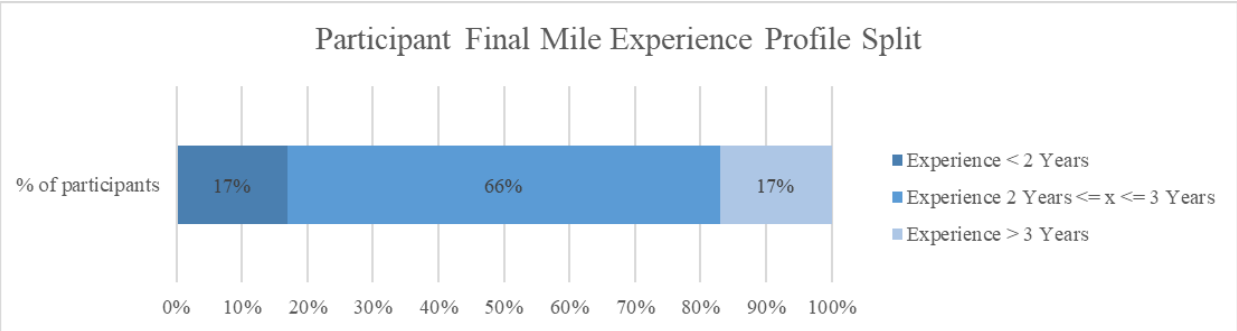

Figure 10. Interview Participant Experience Breakdown

The final criteria involved gathering diversity in thought through different roles and years of experience. Four roles were involved in the interviews i.e. Final Mile Managers, Final Mile Analyst, National Courier Operations Manager and Senior Delivery Strategy Manager. 49% of the participants held the title of "Final Mile Manager", diversity in views were still achieved through ensuring that each of these participants had different exposure to retail banners, thus having differing views and experiences to bring to the table. The remainder of the roles were fairly represented, as depicted in Figure 11.

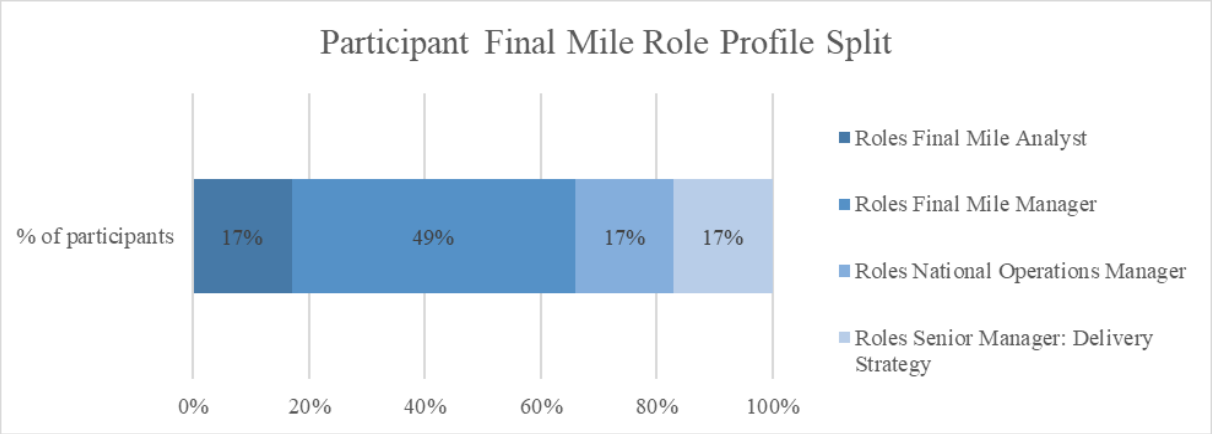

Figure 11. Interview Participant Role Breakdown

The educational profile split of the participants indicates a spread from bachelor's degree qualification to MBA qualified participants as well. There was an equal split of degree qualified (33%) vs MBA qualified participants (33%). This profile indicates that all participants are qualified to be interviewed as subject matter experts in their field.

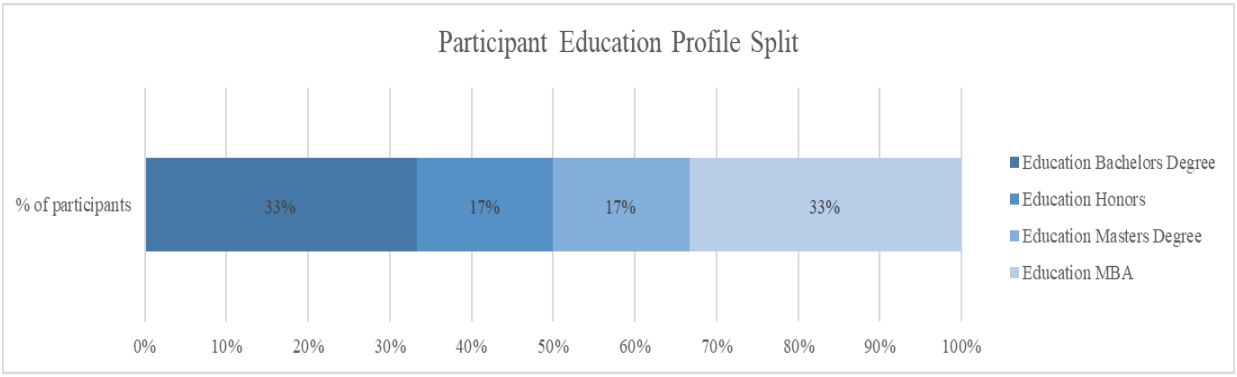

Figure 12. Interview Participant Education Breakdown

4.2 Thematic Analysis

Through the one-hour long interviews, the recorded transcripts were used as the basis for a thematic analysis to determine how to improve the on-time delivery for Company X during the Golden Quarter. Snippets of the Raw data used in this thematic analysis is also attached in Appendix E to support this segment. Eighty-Seven codes were interpreted from the interview transcripts, and further bucketed into 9 overarching themes. 78% of the codes were linked to 4 themes indicating the emphasis on the importance of these themes. Courier Management and Capacity Challenges, Proximity and Location challenges, Peak Planning and efficiency challenges as well as an impact of Courier Operations on the on-time delivery performance.

Table 4. Theme composition of associated codes

Theme	No. of associated codes
Courier Management & Capacity Challenges	27
Proximity and Location Challenges	18
Peak Planning and efficiency	14
Courier Operations	9
Store Delays	7
Exceptions	6
Master Data Integrity	4
Visibility	1
Communication	1
Total	87

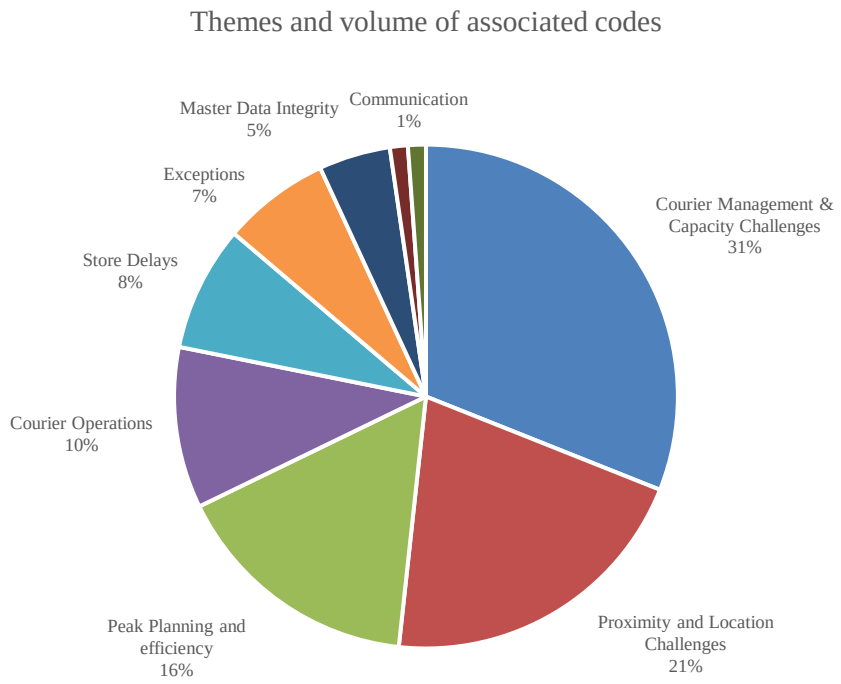

Figure 13. Theme distribution of associated codes

The details of our qualitative analysis results are represented through a thematic map on Figure 14, a visual representation designed to illuminate patterns and relationships and trends within the data. Each of these themes and sub themes are explored and defined in this section.

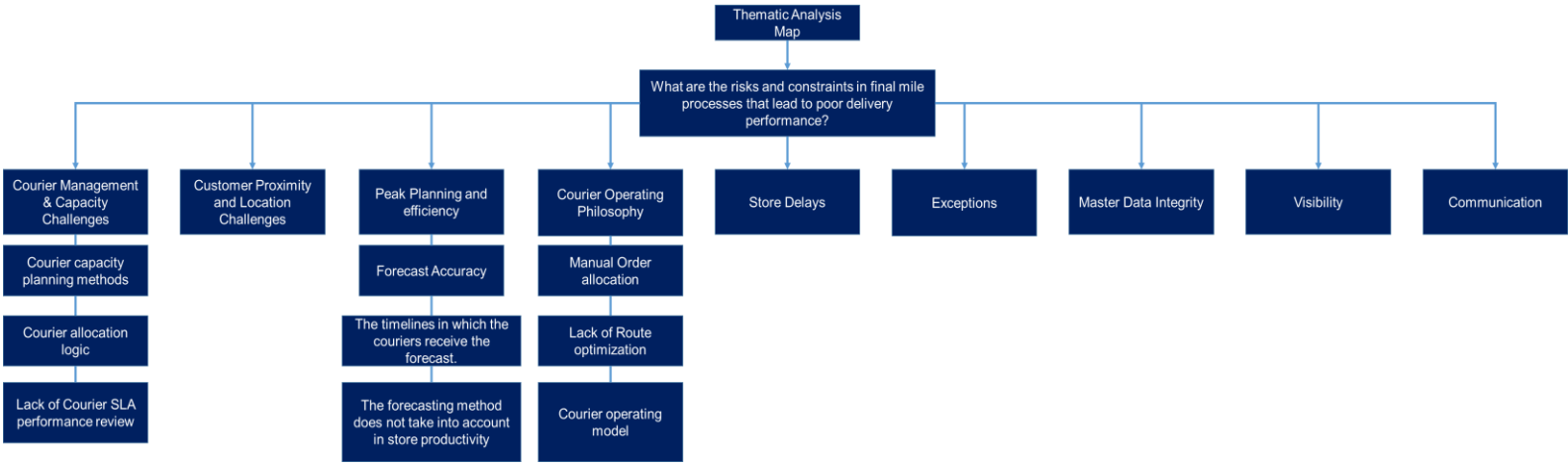

Figure 14. Thematic Map

4.2.1 Courier Management & Capacity Challenges

As part of the interviews, the participants were asked "How do you manage the coordination and allocation of delivery resources to ensure efficient and timely deliveries during the Golden quarter" as well as "How does the composition and size of the fleet impact delivery performance during the golden quarter and do you make adjustments to handle increased demand?". All the interviewees indicated that courier management and courier capacity challenges have a direct impact on the on-time delivery of orders during the golden quarter. 31% of the codes are linked to this theme, covering challenges related to capacity determination, a lack of visibility and clarity on available fleet size, courier allocation criteria and the organization's reliance on separate courier forecasting for fleet requirement determination. The results indicate 3 sub themes:

a. Courier capacity planning methods

Company X uses 4 couriers in the banner, employed through the process of a Request for proposal (RFP). Through this process, the organization shares the business as usual (BAU) expected volumes for each of the couriers, who in turn commit based on available capacity which is shared among other clients. This was highlighted as a gap in the planning methods, as a lack of visibility of the available fleet size impacts the ability to plan accordingly for volumes. Further to this, each courier is individually responsible for planning the capacity required to service Company X's increased demand during the Golden Quarter, often leading to a difference in the resulting cover.

As a link to this sub theme one participant highlighted the below:

"We are fortunate enough with our service providers that we can shift things around based on sales capacity, so if there is an increase in sales, then we can just alter and move vehicles around. However, there is no set number of vehicles allocated per store. It's crucial for one to know the capacity of the vehicle prior and to understand how volume then fits into this capacity, because if those two are misaligned, this will lead to late deliveries"

"Couriers have their own capacity calculator per vehicle type. So, when they ingest the sales forecast and product dimensions of the orders. The calculation is done separately to see whether those packages will fit on a specific vehicle type, and that's how they would plan the vehicle that they send out. I think there's a gap in our current final mile systems, our couriers aren't always looking at it ultimately resorting to manual data communications for capacity planning."

"During Peak we increase the intensity of pickups, umm it is however dependent on how efficient we are at the store level in getting those vehicles loaded quicker. What we saw during our midyear sale was that we had planned to pick up multiple times per day with our traditional couriers. What we found was that at specific locations or stores courier vehicles were held up terribly and that meant that they spend so much time there at the store. They ended up loading as full as they could, and that one collection would be it for the day. So, although we plan for multiple pickups, the challenge is the handover of those orders."

An opportunity exists in the integration of courier capacity planning for the quarter, factoring in demand, in-store productivity hours, as well as driver availability.

b. Courier allocation logic

The participants indicate that couriers are currently allocated based on delivery distance from the source location, this method disregards each courier's unique capacity in the region. This results in local, regional and national orders being allocated to a different courier. This presents an issue, as couriers would enlist the service of a 3rd party courier to service far outlying areas, ultimately impacting the service level agreement (SLA) performance.

The participants indicate there is potential for improvement in this area with one participant highlighting this as having a "big impact on OTD".

"Courier determination at store level is a big impacting factor on OTD. It gives us all the flexibility in the world. The final mile in delivery is about understanding your courier partner's strengths and weaknesses, such as understanding that Courier 1 has poor capacity in Queenstown and ultimately plugging an alternative courier in that region. It's about having that flexibility to make changes. At this point, we know these strengths and weaknesses, but we're not technologically enabled to do anything about it".

c. Courier management challenges

There is no standard approach to the management of couriers, no monitoring of volume, region and performance in line with the SLA. In the absence of the correct monitoring measures, the final mile team has no poor performance trigger for the adjustment of courier selection.

"The second point is managing your courier partners effectively, which requires having standard Key Performance Indicators set up. Every courier is currently sitting comfortably because they know that their performance has no direct implication to their business, even if they're not focused on timely deliveries"

4.2.2 Customer Proximity and Location Challenges

The semi-structured interviews included two questions that relate to this theme, asking participants "How does proximity to customers play a crucial role in the final mile delivery process during the Golden Quarter?" and "In your experience, how does proximity to customers affect the level of customer service provided during the busy holiday season? Are there any unique challenges or opportunities related to customer service that arise during this period?".

In their accounts, all of the participants highlighted that proximity to the customer is a major impacting factor in the on-time delivery performance for Company X. The results imply the customers positioned in the metro cities are most likely to be closer in proximity to the stores and ultimately to the couriers as well. In the South African context of proximity, the participants also highlighted the impact of nation-wide deliveries also including coverage to the "Rural" or "Informal" parts of the country which further impacts Company X's ability to deliver on-time.

"In my world customer proximity plays a big role in terms of how I build routes for the drivers. If I know the density of customers around that specific location, then I know how to build routes that are mutually beneficial. It makes driver allocation easier, and we also get better driver utilization. All these elements ensure that a customer can often, get their order on time"

"Most of the stores which run e-commerce businesses are currently located in urban areas and that means that if you are within proximity to an urban area, it's going to be much easier for you to get your deliveries on time. The biggest challenge to customer proximity is delivering in rural areas. These areas normally have lower demand coverage making it less profitable for couriers to operate there. Our infrastructure also has an impact, where it may be difficult to travel these areas because of roads and poorly mapped customer locations resulting in failed deliveries."

Where the organization is currently not realizing the benefit of the number of brick-and-mortar stores they have in the country. One participant stated, “the company uses a single customer promise regardless of where the customer is positioned”. This is further exacerbated by the blanket courier allocation logic, which does not factor in courier cover in the customer location.

4.2.3 Peak Planning and Efficiency

This theme results from insights gathered through two main questions in the interviews i.e. “How do you manage the coordination and allocation of delivery resources to ensure efficient and timely deliveries during the Golden Quarter? What strategies do you employ to handle the increased demand and maintain delivery performance?” and “Do you make any adjustments to the fleet or logistics operations to meet the increased demand?”. The insights resulted in 16% of the codes being linked to peak planning efficiency. The participants highlighted the planning process as an opportunity for improvement with the following sub-themes.

a. Forecast Accuracy

Company X’s planning manager provides a forecasted number of orders for peak. This becomes the basis on which all couriers plan. If the forecast is off, the margin of error only grows further down the planning chain.

“Capacity planning relies heavily on forecasting, just to set the base for having the correct number of vehicles in place. The Courier goes based on the number of orders we allocate to them that's how they prepare the vehicles.”

b. The timelines in which the couriers receive the forecast.

The ability to flex available resources is limited to when the forecast is released to the couriers, therefore, the earlier the planning can start, the better the anticipated outcome. The existing delays and lack of standard in terms of ideal forecast publishing timelines impact planning downhill was also highlighted in a participant stating the following:

“During Peak, we procure seasonal drivers. What we also do is tap into our existing partners with fleets and say to them, can you add two vehicles and two drivers. They do that because they know there's going to be volumes coming their way. So, where we need to add more, we add more where we need to reallocate, we reallocate.

But we look at the stores with the highest forecasted numbers and then make sure those areas are beefed up in terms of drivers. This process is tedious and time consuming, and the timelines of us receiving the forecast have previously been delayed. The earlier we can receive the forecast, the earlier we can plan.”

c. The forecasting process does not take into account in store productivity.

The final mile experts also highlight a gap in the planning process where, in store, productivity is not considered, leading to a misalignment in resource capitation between picking, packing and delivering.

4.2.4 Courier Operating Philosophy

This theme is linked to the question, "How do you manage the coordination and allocation of delivery resources to ensure efficient and timely deliveries during the Golden Quarter?" and "What strategies do you employ to handle the increased demand and maintain delivery performance?". These results lead to 10% of the codes highlighting three main challenges in courier operations. The participants highlighted Manual order allocation, lack of route optimization and a crowd sourced operating model as characteristics that are unique to one of the four courier partners operating in this e-commerce space. The courier, also referred to as "Courier 4" in this segment, is the only courier out of the four which operates on a crowd sourced system. Figure 16 indicates that Courier 4, is the only courier that increases in its contribution to late deliveries over the Golden quarter, further validating the opportunity in this space.

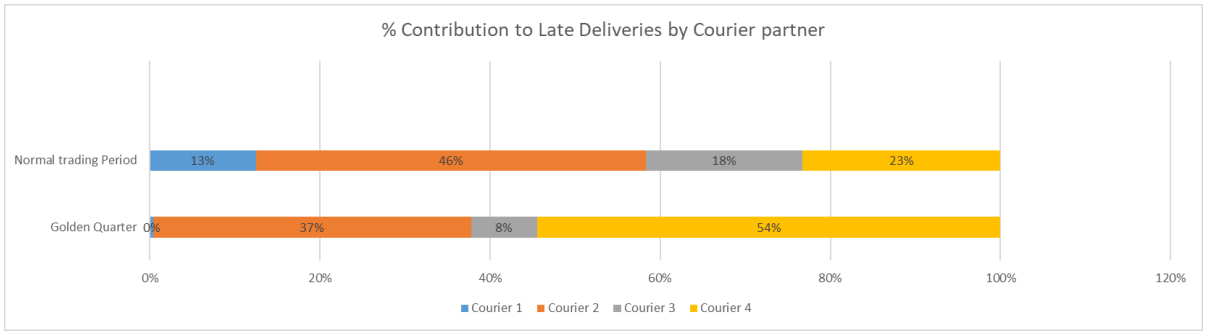

Figure 15. % Contribution to late deliveries by period and Courier

a. Manual Order allocation

The order allocation process takes place manually, ultimately leading to a bottleneck and congestion point in the final mile process.

b. Lack of Route optimization

Orders are not optimally allocated to drivers based on optimized routes, this is still done manually, resulting in pick up exceptions as drivers are incorrectly allocated non-profitable delivery routes.

"One of the things that we've been working on for a while now, which for me is a big opportunity, is what we call auto-grouping and auto-routing. It is currently a manual process for us and results in mistakes that impact the OTD."

c. Courier operating model

The biggest courier used in the banner operates on a crowd sourcing model. This model requires symbiosis in terms of order drop rate vs Order delivery rate in order not to cause congestion.

A key observation in these interviews is a clear congestion result which is based on lack of balance between the input and output from the stores.

Interviewer:

Are you finding that the crowd-sourcing model is not as effective during the Golden Quarter?

Interviewee:

"No, it's not. I mean we know that for a fact, like I said, the Uber model works on having a conveyor belt of drivers literally every hour getting in as many drivers as you can to pick up. But that's not the reality, especially when products are traveling 30 to 60 kilometers away, right?

This is easier to manage during off-peak seasons. During peak demand you must adjust the model slightly to be able to allow the store to do what it needs to do without them having the frustration of getting congested due to an frequency imbalance between order input vs output"

4.2.5 Store Delays

This theme is linked to 8% of the coded feedback. As all the drivers and couriers arrive at the same time, the stores take a considerably long time to dispatch and handover these orders to the courier. This issue is exacerbated due to the volume of orders, no. of couriers and no. of resources focused on ensuring a seamless handover process.

"During Peak we increase the intensity of pick-ups, it is however dependent on how efficient we are at the store level in getting those vehicles loaded quickly. What we saw during our midyear sale was that we had planned to pick up multiple times per day with our traditional couriers. What we found was that at specific stores, courier vehicles were held up terribly and that meant that they spent so much time there at the store. They ended up loading as full as they could, and that one collection would be it for the day. So, although we plan for multiple pick-ups, the challenge is the handover of those orders."

4.2.6 Exceptions

The no. of pickup and drop off exceptions impact the final OTD number, linked to 7% of the codes.

"The second biggest impacting factor on OTD is the pick-up and drop-off exceptions, which is not entirely dependent on the Couriers, instead also is based on how efficiently the stores hand over parcels to the couriers. During peak many drivers arrive at one time, the stores just cannot hand over the orders to all the couriers at the same time. Drivers end up putting in exceptions due to in-store handover delays."

4.2.7 Master Data Integrity

The quality of the Master data was highlighted as through 5% of the themes impacts the courier's ability to execute a seamless final mile process. These are linked specifically to addresses and product / package dimensions.

"Now on master data, we need to focus more on the product dimensions of all our orders. The courier plans are based on volumetrics, but our data is a mess. We are currently reliant on whatever data we get from the couriers, but from our end we not leveraging off the stores to get to a point where I know the right dimensions of my order, I know how much I'm going to spend for that month based on the forecast and I know how best to plan for capacity"

4.2.8 Visibility and Communication

Linked to 2% of the feedback. Highlighting an opportunity for improved data visualization in this space to aid in the decision making in this space, and the relevant systems to aid in quick, easy, seamless communication through all final mile stakeholders.

"I think another element we're missing as a business is the communication and the visibility of data between the courier and Massmart. This being from our forecasting to the courier's available delivery resources, all of this being managed digitally as well."

4.3 Thematic Analysis Results

As part of the thematic analysis, a revised thematic map was developed to highlight the interdependencies and links between the themes. This view depicted in Figure 15, highlights the complexity impacting the Golden quarter. This view highlighted four themes as having the highest impact on other themes: Customer Proximity, Courier Operating Philosophy, Peak planning efficiency and Courier Management and Capacity Issues. This view further is validated by the feedback received through the interviews.

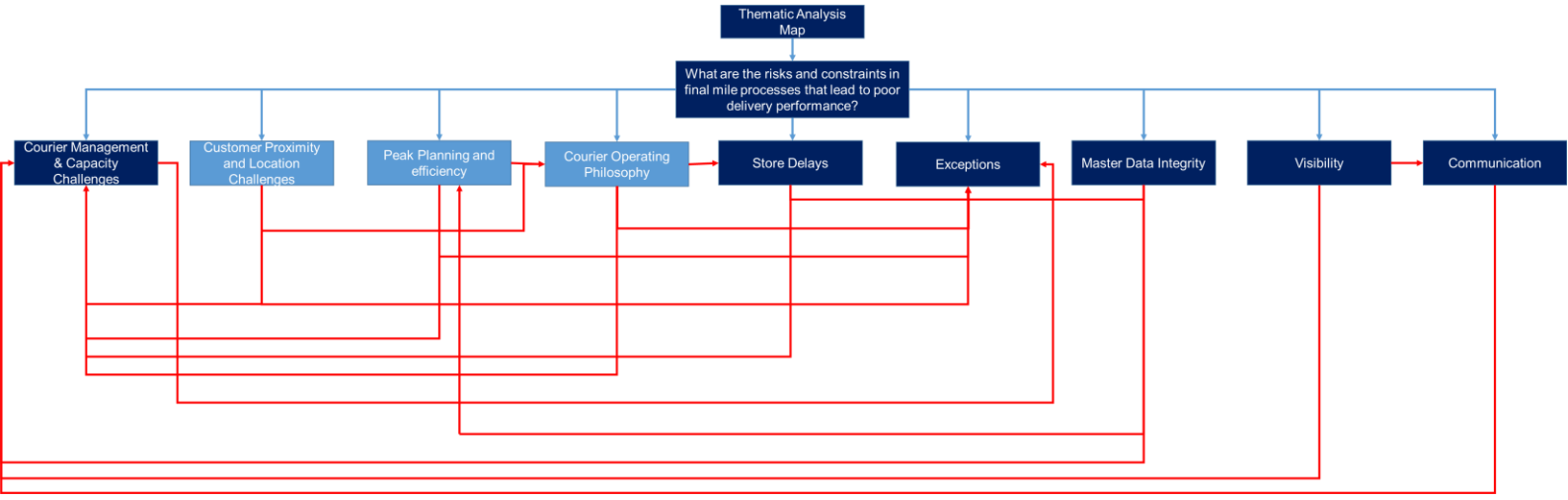

Figure 16. Revised Thematic Map

Each Participant was further engaged on the following question: "In your opinion, what are the top three factors that have the most significant impact on on-time delivery performance during the Golden Quarter?". This view enabled a prioritized understanding of what themes have the biggest impact on the performance.

The results are represented on Table 4 below. Each participant scored in the top 3 factors, if solved first that would have the biggest impact on Company X's delivery performance.

Table 5. Theme Prioritisation Score

Participant	Courier Management & Capacity Challenges	Proximity and Location Challenges	Peak Planning and efficiency	Courier Operations
1	2	-	1	3
2	2	3	-	1
3	-	3	1	2
4	1	-	3	2
5	2	-	1	3
6	1	3	1	-
Average Score	1.6	3	1.4	2.2

The participants voted for the top four priority below, with all remaining themes not being selected at all.:

- Peak Planning and efficiency
- Courier Management and Capacity Challenges
- Customer Proximity and Location
- Courier Operations

4.4 Research Validity and Reliability

Methodical triangulation and thorough documentation were used in the analysis to improve the validity and reliability of the research findings. As previously stated, the report relied on recoded interviews, transcripts and a literature review, because of the combination of these approaches, the study was more accurate and valid, with less bias and greater generalizability.

4.5 Chapter Summary

In the Analysis and Results chapter, a comprehensive examination of collected data is conducted to address the research questions regarding improving Company X's delivery performance during the Golden Quarter. The interview participant breakdown reveals adherence to criteria in terms of experience, roles, and diversity. Thematic analysis of one-hour interviews identifies challenges, such as Courier Management & Capacity Challenges, Proximity and Location Challenges, Peak Planning and efficiency challenges, and Courier Operations. Specific issues within these themes, like courier capacity planning methods, allocation logic, and management challenges, are explored in detail. Participants prioritize themes, with Peak Planning and efficiency, Courier Management and Capacity Challenges, Customer Proximity and Location, and Courier Operations being identified as top priorities for improving delivery performance during the Golden Quarter. The research validity and reliability are reinforced through methodical triangulation and a combination of interviews, transcripts, and literature review, enhancing accuracy and reducing bias.

5. DISCUSSION

In this chapter, we delve into a comprehensive discussion that synthesises and interprets the findings emerging from this research. The narratives and diverse perspectives gathered from our participants are explored with the aim of illuminating the intricacies and answering the research question: “How can performance be improved in Company X’s final mile of delivery during the Golden Quarter?”. The theoretical framework underpinning this discussion includes five critical elements: Forecast accuracy and planning collaboration, Proximity to Customers, Level of customer service, Delivery type, and Fleet and technology employed. A discussion of these five elements based on all data gathered.

5.1 Forecast Accuracy and Planning Collaboration

A customer’s order sets the e-commerce supply chain in motion. Generating a course of action to respond to demand by fulfilling the order through product and fulfilment service. The type of demand in Company X’s supply chain is not known and is thus forecasted. The “bullwhip effect” is a term used in supply chain management to refer to the phenomenon where small fluctuations of demand for a product at consumer level can lead to larger and more significant fluctuations in demand at supplier level (Lee, et al., 1997). The same can be inferred with a supply chain’s length and depth impacting the forecast accuracy (Syntetos, et al., 2016).

The work by Lee, et al., (1997) on the bullwhip effect is crucial in highlighting the importance of forecasting accuracy and timely planning. The study highlights information distortion, amplification of variability, role of forecasting accuracy, timely planning and supply chain co-ordination as key points. Information distortion refers to the impact of delays, inaccuracies and misinterpretations at each stage of the supply chain. Amplification of variability means that fluctuations in demand are magnified upstream. Timely planning and effective communication are crucial for minimizing information distortion and the resulting bullwhip effect. The authors argue for improved coordination among supply chain partners. Collaborative planning and information sharing between retailers, manufacturers, and suppliers can help in reducing uncertainties and minimizing the bullwhip effect.

Consistent with the above explored literature, the thematic analysis validates this critical element with the theme of "Peak Planning and efficiency" emerging as a crucial aspect of the final mile delivery process during the Golden Quarter, shedding light on the challenges and opportunities associated with forecast accuracy and planning collaboration. This theme is rooted in insights gathered from interviews, particularly focusing on how coordination and resource allocation are managed during the heightened demand period. The following sub-themes provide a detailed exploration of the challenges identified:

- Forecast Accuracy

The reliance on forecasted numbers for capacity planning is a fundamental aspect of Company X's operations during peak periods. As highlighted by participants, the accuracy of these forecasts directly influences the effectiveness of subsequent planning and resource allocation. The quote, "*Capacity planning relies heavily on forecasting*," underscores the pivotal role that accurate forecasts play in determining the correct number of vehicles and resources needed for efficient deliveries.

- Timelines in Forecast Release

The timing of forecast release is identified as a critical factor in planning efficiency. Participants emphasize the ability to flexibly allocate resources is constrained by the timing of forecast information. Delays in receiving forecasts hinder the planning process, limiting the proactive adjustments that can be made to accommodate the anticipated surge in demand. The quote, "*The earlier we can receive the forecast, the earlier we can plan*" underscores the urgency and importance of timely information for effective planning.

- In-store Productivity Gap

A significant gap in the forecasting process is identified concerning in-store productivity. Participants note the current forecasting process does not consider in-store productivity, leading to a misalignment in resource distribution between picking, packing, and delivering. This misalignment can result in inefficiencies and suboptimal resource utilization, impacting the overall delivery process.

Opportunities for Improvement

Enhancing Forecast Accuracy:

- Addressing the challenge of forecast accuracy is paramount. Exploring advanced forecasting models, leveraging historical data, and incorporating real-time information can contribute to more accurate predictions.
- Collaborative efforts between Company X and its couriers to refine the forecasting process can lead to more accurate estimations, minimizing errors downstream.

Timely Forecast Release:

- Streamlining the forecast release process is critical for planning efficiency. Implementing a standardized timeline for forecast publishing can provide couriers with the necessary lead time to make informed decisions and allocate resources effectively.
- Utilizing technology solutions that facilitate real-time communication and collaboration between Company X and its couriers can contribute to faster and more efficient information dissemination.

Incorporating In-store Productivity:

- Recognizing the importance of in-store productivity in the final mile process, adjustments to the forecasting process should be made to account for these factors.
- Collaboration with store management and leveraging technology to integrate in-store productivity data into the forecasting model can lead to more accurate resource allocation.

The results highlight that efficient peak planning and collaboration are essential for overcoming challenges in the final mile delivery process during the Golden Quarter. The identified sub-themes provide valuable insights into areas of improvement, emphasizing the need for accurate forecasts, timely information dissemination, and an inclusive consideration of in-store productivity. Addressing these challenges presents opportunities for Company X to enhance its planning processes, ultimately improving the efficiency and performance of the final mile delivery during the Golden Quarter.

5.2 Proximity to Customers

The theme of "Customer Proximity and Location Challenges" sheds light on the significant impact that the proximity of customers to stores and the overall geographic location has on the final mile delivery process during the Golden Quarter. The insights gained from semi-structured interviews provide valuable perspectives on how customer proximity influences on-time delivery (OTD) performance, especially in the context of Company X's operations. Participants unanimously emphasized the critical role of customer proximity in determining on-time delivery performance. The density of customers around a specific location influences how routes are built for drivers, making driver allocation easier and ensuring better driver utilization. Proximity to urban areas is highlighted as a factor that significantly enhances the effectiveness of timely deliveries, emphasizing the importance of efficient logistics within densely populated regions.

Conversely, challenges arise when delivering to rural areas, where lower demand coverage and infrastructure limitations can impact the profitability of courier operations. The geographical challenges, such as difficult roads and inaccurate customer locations, contribute to failed deliveries in rural areas. The distance between stores and customers directly affects delivery time, routing, and scheduling, as indicated by the thematic analysis results. One notable challenge identified is the uniform customer promise applied regardless of the customer's location. This approach, coupled with a blanket courier allocation logic that does not consider courier coverage in specific customer locations, exacerbates the impact of customer proximity challenges. The organization's failure to leverage the potential benefits of its brick-and-mortar stores in different regions further underscores the need for a more tailored and location-sensitive approach to customer promises and courier allocations.

The analysis supports the understanding that meeting delivery promises is a crucial commitment that significantly influences consumer behaviour. Consumers, especially during the Golden Quarter, prioritize the delivery experience in their shopping decisions. Factors such as convenience, cost, and speed of delivery play pivotal roles in shaping the overall customer journey. Satisfied customers, resulting from on-time deliveries, contribute to increased checkout conversion rates, higher average order values (AOV), and enhanced customer loyalty.

Opportunities for Improvement

Tailored Customer Promises:

- Tailoring customer promises based on the geographic location and proximity of customers can enhance the effectiveness of delivery commitments. Differentiating promises for urban and rural areas, considering infrastructure challenges, can contribute to a more accurate representation of delivery expectations.

Dynamic Courier Allocation:

- Implementing a dynamic courier allocation logic that considers courier coverage in specific customer locations can optimize the distribution of delivery resources. This approach ensures that couriers are strategically positioned to minimize delivery time and enhance overall efficiency.

Technology Integration:

- Leveraging technology, such as advanced geographical mapping and real-time tracking, can address challenges related to inaccurate customer locations and optimize routing for rural deliveries. Integration of technology solutions can improve the accuracy of delivery operations and mitigate delays.

The analysis of customer proximity and location challenges provides actionable insights for Company X to enhance its final mile delivery performance during the Golden Quarter. By recognizing the varying impacts of customer location, tailoring promises, implementing dynamic courier allocation, and integrating technology solutions, Company X has the opportunity to address challenges and meet customer expectations more effectively. Meeting delivery promises remains central to customer satisfaction and loyalty, making it a critical aspect of strategic improvements in final mile operations.

5.3 Fleet and Technology Employed

The insights from the "Courier Operating Philosophy" theme shed light on crucial challenges in the coordination and allocation of delivery resources, specifically focusing on manual order allocation, lack of route optimization, and the impact of a crowdsourced operating model. Let's explore these findings in the context of Fleet and Technology elements. Efficient operations are crucial for successful e-commerce order fulfilment. The challenges associated with manual order allocation, route optimization, and the adoption of a flexible "crowdsourced delivery" model directly impact on-time delivery. Our findings underscore the unique challenges posed by Courier 4, the only courier operating on a crowdsourced model, contributing significantly to late deliveries during the Golden Quarter.

A study on crowd sourced deliveries by Alnagga, et al. (2021), highlights four main categories of decisions that impact the successful operation of this system. Namely matching, routing, driver scheduling and compensation. Matching refers to the process of connecting or pairing a delivery task with an available delivery person from the crowd of individuals who are part of the delivery network. This process is a fundamental aspect of how the system operates and is often facilitated through a digital platform (Alnagga, et al., 2021). Routing refers to the process of determining the optimal path or sequence of locations that a delivery vehicle or courier should follow to efficiently complete a set of tasks. The goal is to minimise travel time, distance and associated costs. Scheduling involves efficiently coordinating and assigning delivery tasks to available couriers or drivers in a flexible and dynamic environment. Crowd-sourced delivery platforms often leverage technology to automate the scheduling process, ensuring timely and reliable fulfilment of delivery requests.

All three of these categories are elements highlighted as a gap in Company X's golden quarter processes. The fact this courier is the only courier that uses this model, is not a direct reflection the model is flawed, on the contrary, Amazon Flex and Walmart Spark Delivery are cases indicative of situations of if done right, the crowd sourced model is proven to work. (Alnagga, et al., 2021) Manual order allocation in final mile presents several challenges impacting the customer experience and on time delivery of orders, more-so during peak. The biggest cons presented by this manual and integral process includes, how time consuming it is, especially when dealing with a large volume of orders during the Golden Quarter, prone to human error and having trouble with prioritisation. As this process is also heavily dependent on humans, the aspect of allocation timing becomes essential, especially when the in store picking operations run on a 24-hour cycle.

A dynamic solution is required for flexibility and scalability. Therefore, the automation of these elements is an urgent requirement. The issue around the lack of route optimisation is also linked to the manual allocation of orders. Efficient route planning is crucial for timely deliveries, as manual route planning may not account for real time traffic, leading to delays and sub-optimal routes. The bigger impact of this

issue is observed in the allocation of orders to drivers which makes the order drop unprofitable and unfeasible for the driver. This impacts order delivery delays resulting from collection and drop off exceptions.

Opportunities for Improvement

Automation of Manual Processes:

- The urgency for automation is clear, especially in manual order allocation. Developing and implementing automated solutions can significantly reduce the time-consuming nature of this process and minimize human errors.
- The incorporation of technologies for route optimization, such as auto grouping and auto routing, can enhance efficiency and reduce mistakes impacting OTD.

Adaptation of Crowd-Sourced Model:

- Recognizing the challenges posed by the crowd-sourced model during the Golden Quarter, there is an opportunity to adapt and optimize this model for peak periods.
- Leveraging technology and data analytics can help in dynamically adjusting the model to balance input and output, preventing congestion and maintaining operational efficiency.

Investment in Technology:

- Overall, there is a clear need for increased investment in technology to address gaps in matching, routing, and scheduling within Company X's golden quarter processes.
- Adopting advanced technologies that facilitate dynamic decision-making and real-time adjustments can contribute to a more efficient and responsive courier operating philosophy.

The challenges identified within the courier operating philosophy underscore the key role of technology and automation in addressing inefficiencies. Company X can leverage these insights for strategic improvements, ensuring that manual processes are replaced with dynamic, technology-driven solutions. Moreover, the adaptation of the crowd-sourced model for peak efficiency and the careful balancing of input and output remains key considerations for enhancing delivery performance.

5.4 Level of Customer Service

The thematic analysis and its link to the customer expectation (Customer promise) against different customer segmentations and delivery time windows indicates that Company X, currently does not segment its customers either based on delivery time windows or even geographical location. The thematic analysis does however shed light on critical factors influencing on-time delivery (OTD) during the Golden Quarter at Company X. All the challenges highlighted in the thematic analysis collectively impact

the fulfilment of customer expectations during the Golden Quarter. Addressing these issues is crucial for aligning operations with diverse customer promises, ensuring timely deliveries.

5.5 Delivery Type

The thematic analysis revealed that Company X, currently has not implemented a delivery type. The e-commerce business currently operates on a single blanket approach customer promise. This theoretical element can be linked to the "Courier Operating Philosophy" theme, already discussed in Chapter 5.3 above.

The impact of delivery type, particularly the courier operating philosophy, on OTD is significant. Manual processes, lack of optimization, and unique operating models introduce challenges that directly influence the fulfilment of on-time delivery promises. Addressing these challenges, such as implementing automation, refining allocation logic, and adapting operating models to peak demand, can substantially improve the final mile efficiency and contribute to meeting customer expectations during the Golden Quarter.

5.6 Limitations of the Study

Low number of participants:

The study used the insights from 6 interviews, all having had exposure and experience in Company X's final mile process. This limited and narrowed the scope of the research, whereas a larger data pool would have allowed for a broader scope and higher level of data saturation. This limitation is also brought about by the small size of the final mile team, which is 4 currently under Company X's employment, therefore requiring the expansion of the interviewees into the courier network and organization's leaders as well.

Limited years' experience in Company X

Company X's e-commerce division is new, with less than 3 years in conception. Therefore, most of the team is new with fewer years of experience. This impacted the participants' view of industry trends. To curb the effect of this limitation, participants with added external final mile experience were selected.

As part of future work:

- A similar study can be undertaken as Quantitative research in order to understand the issues, from a numerical data perspective.
- External Industry Participants may be added to improve validity of results.
- Company X to work on the implementation of the proposed solutions, as there are low hanging fruits identified which can improve the overall delivery performance.

5.7 Chapter Summary

This chapter delves into improving Company X's final mile delivery during the Golden Quarter. It emphasizes accurate forecasting, timely planning, and challenges in rural areas and uniform customer promises. Opportunities include advanced forecasting, tailored promises, and technology integration. The chapter explores challenges in manual order allocation, route optimization, and a crowdsourced model, suggesting automation, model adaptation, and increased tech investment. It notes Company X's lack of customer segmentation based on delivery windows or location, stressing the need to align operations with diverse promises. The chapter also highlights Company X's single blanket approach to delivery type and advocates for addressing challenges through automation, refined logic, and adapting models to peak demand.

6. CONCLUSION AND RECOMMENDATIONS

This research has delved into the intricacies of Company X's final mile of delivery during the Golden Quarter, seeking to identify the risks impacting performance. This report provides comprehensive insights into enhancing Company X's final mile delivery during the Golden Quarter. The research explores key elements like Forecast Accuracy, Planning Collaboration, Proximity to Customers, Fleet and Technology, Level of Customer Service, and Delivery Type. Findings include the importance of accurate forecasts and collaboration, tailored promises for customer proximity, and challenges in manual processes and crowdsourced delivery. The analysis identifies opportunities for improvement, such as advanced forecasting models, dynamic courier allocation, and automation, offering a strategic roadmap for enhancing efficiency and customer satisfaction.

6.1 Recommendations

6.1.1 Forecast Accuracy and Planning Collaboration:

- Explore advanced forecasting models, leverage historical data, and incorporate real-time information.
- Foster collaborative efforts between Company X and couriers to refine the forecasting process.
- Implement a standardized timeline for forecast release and utilize technology for efficient communication.

6.1.2 Proximity to Customers:

- Tailor customer promises based on geographic location, differentiate commitments for urban and rural areas.
- Implement dynamic courier allocation logic considering courier coverage in specific customer locations.
- Leverage technology for accurate geographical mapping and real-time tracking to optimize routing.

6.1.3 Fleet and Technology Employed:

- Automate manual order allocation processes and incorporate route optimization technologies.
- Adapt and optimize the crowd-sourced delivery model for peak periods, leveraging technology.
- Increase investment in advanced technologies for dynamic decision-making and real-time adjustments.

6.1.4 Level of Customer Service:

- Implement customer segmentation based on delivery time windows and geographical locations.
- Address challenges highlighted in the thematic analysis to ensure timely deliveries and meet customer expectations.

6.1.5 Delivery Type:

- Implement automation to address challenges associated with manual processes and lack of optimization.
- Adapt and optimize operating models, especially the crowd-sourced model, to balance input and output dynamically.
- Increase investment in technology to support automated processes, refine allocation logic, and adapt models to peak demand.

6.2 Conclusion

This research paper provides a holistic understanding of the challenges and opportunities in Company X's final mile delivery during the Golden Quarter. The identified insights offer a roadmap for strategic improvements, emphasizing the integration of advanced technologies, collaboration, and tailored approaches to enhance overall efficiency and customer satisfaction in the final mile delivery process. All the objectives of the research have been met based on the information provided from the thematic analysis, discussion and recommendations. Each sub-objective is discussed below as an evaluation and conclusion to the project.

a) Identify the risks and constraints in final mile processes that lead to poor delivery performance:
The project highlighted various challenges and risks in Company X's final mile processes, such as issues related to forecast accuracy, planning collaboration, customer proximity challenges, fleet and technology employed, level of customer service, and delivery type. These challenges are discussed in detail, providing a clear understanding of the risks and constraints that can impact delivery performance.

b) Evaluate the effectiveness of Company X’s final mile strategy:
The report highlights the effectiveness of Company X's final mile strategy, examining different critical elements like forecast accuracy, planning collaboration, proximity to customers, fleet and technology employed, level of customer service, and delivery type. Through the analysis of these elements, the strengths and weaknesses of the current strategy are explored, providing a comprehensive evaluation and understanding.

c) Provide recommendations on how Company X can improve and sustain its delivery performance:

The discussion concludes with actionable recommendations for improvement in each critical element. The proposed opportunities for improvement are directly linked to the identified challenges, providing a roadmap for enhancing and sustaining delivery performance.

In summary, the research successfully achieves its overall objective of determining how Company X's delivery performance can be improved during the Golden Quarter. Additionally, the sub-objectives are met by identifying risks and constraints, evaluating the current strategy, and providing practical recommendations for improvement.

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7. Appendices

Appendix A: Sample letter to the Participants

Dear [Interviewee's Name]

I am a part-time MSc student in the School of Mechanical, Industrial and Aeronautical Engineering at the University of the Witwatersrand, under the supervision of Dr Bernadette Sunjka. I am currently conducting a project on the improvement of On-time Delivery for Company X eCommerce orders during the Golden Quarter.

I would like to formally invite you to participate in this study. Your valuable insights as a final mile expert are crucial to aid in understanding the opportunities involved in achieving timely deliveries during this critical period. Before we proceed, I would like to stress that your participation is entirely voluntary, and you have the right to withdraw at any stage without providing a reason.
The data collection for this research project will involve conducting Zoom interviews with you and other final mile experts between September and November 2023. These interviews will be scheduled at a mutually convenient time to accommodate your availability. The interviews are expected to last approximately 1.5 hours and will be recorded. Rest assured that your personal information and identity will be kept strictly confidential throughout the process.

Your privacy and confidentiality are of utmost importance. All data collected during the interviews will be anonymized, and any personally identifiable information will be removed to ensure your identity remains protected. The research findings will form part of my MSc dissertation. and may also be reported in academic papers and at conferences.

A summary of the results of the research will be made available to you on request. Please contact me if you have any questions regarding the research and participation in the study.
I look forward to hearing from you.

Yours faithfully
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Appendix B: Research Instrument

Interviewee Number:

1. Can you please describe your role as a final mile expert?

2. How long have you been working in this role, and what prior experience do you have that qualifies you as a final mile expert?

3. How does proximity to customers play a crucial role in the final mile delivery process during the Golden Quarter?

4. In your experience, how does proximity to customers affect the level of customer service provided during the busy holiday season? Are there any unique challenges or opportunities related to customer service that arise during this period?

5. Different delivery types (e.g., standard, express, same-day) are offered to Company X's customers. How does the choice of delivery type impact on-time delivery performance during the Golden Quarter? Are there any specific factors that need to be considered when determining the optimal delivery type for various orders?

6. How do you manage the coordination and allocation of delivery resources to ensure efficient and timely deliveries during the Golden Quarter? What strategies do you employ to handle the increased demand and maintain delivery performance?

7. What role does technology play in optimizing final mile delivery during the busy holiday season? Are there any specific technological tools or systems that have been particularly effective in improving on-time delivery performance?

8. How does the composition and size of the fleet impact delivery performance during the Golden Quarter? Do you make any adjustments to the fleet or logistics operations to meet the increased demand?

9. During the Golden Quarter, what are the key challenges you face in maintaining on-time delivery? How do you address these challenges, and have you identified any recurring issues that need special attention?

10. How do you measure and track on-time delivery performance? What key performance indicators (KPIs) or metrics do you use to evaluate success during this critical period?

11. How do you ensure seamless communication and coordination between different stakeholders involved in the final mile delivery process? How do you handle any potential miscommunication or coordination issues that may arise?

12. In your opinion, what are the top three factors that have the most significant impact on on-time delivery performance during the Golden Quarter? How does your team prioritize these factors?

13. Are there any specific challenges or opportunities related to final mile delivery that are unique to Company X's eCommerce orders during the Golden Quarter compared to other times of the year?

14. Are there any industry trends or innovations that you believe could further enhance Company X's on-time delivery performance during the Golden Quarter?

15. Based on your expertise and experience, do you have any recommendations or suggestions for further improving on-time delivery for Company X's eCommerce orders during future Golden Quarters.

Appendix C: Participant 3 Interview Transcript

Interviewer: So thank you so much for your time. Before we begin, I just want to give you some background as to why this project. This is all based on my observations last year, where our performance took a dip over Peak. It was clear that there are opportunities for improvement in Final mile. And at that point in time, it seemed like a great area to kind of gain insight as to what are these opportunities and what can we do about them. So my topic then eventually landed on, improving performance in final mile, specifically during peak Times.

Interviewee (P3): OK.

Interviewer: I've got 15 questions for you that range from who you are and your experience as well as different elements from a theoretical perspective that might have an impact on us winning or losing at the e-commerce final mile game.

Interviewee (P3): I am a Final Mile manager, and well, I see my role really being around managing performance with regards to carriers and couriers within the final mile space. So not just managing cost, but managing performance and obviously driving our continuous improvements in ensuring that we meet our end goal, which is a near perfect OTD with as limited cost as possible.

Interviewer: Spoken like a true expert. The next question is how long have you been working in this role and what prior experience do you have that qualifies you as a final mile expert?

Interviewee (P3): In this particular role, I've been working in this role for uh. I would say about two years in November.

Interviewer: Great, and what other prior experience do you have?

Interviewee (P3): So apart from this I used to be in the mining sector and that's really where majority of my experience comes from. In the mining sector I was still in logistics Umm. I dealt with the delivery of bulk commodities from excavation sites to manufacturing plants. So I was, you could say Middle mile in a way prior to processing. But yeah, that's where the bulk of my experience comes from. And apart from that, some of my experience will come from the fuel and energy sector.

Interviewer: So this is the part where we start looking at different elements that play into our final mile performance now and the first element we're going to touch on is proximity to customers. How does proximity to customers play a crucial role in the final mile delivery process?

Interviewee (P3): Umm, so proximity to customer plays an important role. So being closer to the customer is always an added bonus because obviously the closer you are to the customer, the quicker the customer can receive their order. But the further away you are from the customer and there are efficiencies that could be put in place to still achieve your targeted boutique. But it all depends on various number of factors as opposed to just being.

Interviewer: So the next question is, how does proximity to customers affect the level of customer service provided?

Interviewee (P3): So from a performance standpoint, I think the closer you are to the customer, the easier it is to achieve your performance or to achieve a near perfect OTD. And also it's not just the performance thing, but it's a cost thing. If the customers relatively closer to the store then it's a cheaper exercise because there's less fuel burning, there's less time the delivery resource spends in traveling. And effectively, if I can put it that way, now you the Direct Line between store to customer is much shorter as opposed to there being a third party which is a harbour, a warehouse in which things will be trans shipped in, grouped and then sent out for efficiency in cost. So the closer you are to the customer, you avoid that middle hub that will help reduce cost.

Interviewer: Now specifically around this point, in your opinion, are there any unique challenges relating to customer service and proximity that arise during the peak seasons?

Interviewee (P3): I think considering the fact that majority of our customers are based in the metropolitan area, so during peak season, you find that customers that are generally based in the metropolitan area tend to shop online for families based in rural areas or outlying areas. So as opposed to a customer not having to buy bucket loads of groceries and traveling with them, they would rather to minimize their own costs. Just buy online and then ship it off and let I handled that whole process of transporting all those things. So you find that because majority of those delivery points are in outlying areas, it's very difficult to reach. And considering that during peak it's a high volume period whereby we need to turn the vehicles around faster, the vehicles turn around a bit slower because they have to cover more ground as opposed to ohm, the customer being closer to the store. So we tend to see that a lot during peak is relatively closer to the holiday season. So you'll find customers that are based in different countries, customers that are based in different locations in order for the whatever they're buying online to reach either the friends and family with dependent on making sure. So the, delivery window is rather tight. You know way case in point customers that buy Christmas presents online. Uh customer would buy something a week before Christmas. In normal or during normal times that could be easily achieved, but during peak where capacity is strained where resources are strained. Uh, it's difficult to deliver on time, so yeah, it it becomes a bit of an issue. And then also from a supplier standpoint, UH-1 say touching capacity with three PL's, they more relieved it's a they have a large pool of customers to service. So if we are all bringing the same amount of demand that the resources are scattered all over, so capacity is affected. So with less capacity, they are unable to deliver everything on time because not just their vehicles or resources on limited, but also the productivity and they hubs. So yeah, it becomes a very challenging to reach outlying areas and based on those three points really, which is distance, the time of the year it is and capacity from 3 PL.

Interviewer: Very interesting. Thanks, man. Do we as an organization currently have a good understanding of those different customer segments based on proximity? And do we treat our customer differently based on that?

Interviewee (P3): No, not yet. I think there's an organization, or rather this part of the business is very cost centric. So there's it's all about striking a balance with customer centricity and making sure that your costs don't skyrocket. So as an organization, one of our biggest challenges effect that we are painting everybody with the same brush. Just because it can be done in a metropolitan area. We assume it can be done with the outlying areas and we are we face a good problem to have whereby we have or our locations or stores are almost everywhere. But the serviceability to our customers is difficult because as much as, for example, a store services that lower LSM customer, we neglect the fact that the lower LSM customer is not necessarily located very close to a Company X store.

Interviewer: Alright, now let's move over to Delivery types. So industry has standard, express and same day. What type of deliveries do we offer to our customers?

Interviewee (P3): We offer everything the industry offers. We offer same day, Next day, on demand, so we really appeal to every need from a delivery standpoint.

But I think majority of the time when it comes to peak periods or when customers are looking to have something delivered, they don't really care about the different types of delivery. They just want the product. And they want the product in the time frame that it is, that they were sold that it will be delivered in.

Interviewer: Do we have a good understanding of our performance across these different delivery types?

Interviewee (P3): No, I don't think so. I think majority of the time, the understanding is just solely based on how much did we sell and what percentage of that did we deliver? And if that percentage was 100 percent or below, what went wrong. It's not broken down to, we promised X amount of Next Day deliveries. This is what we delivered. We promised X amount of same day deliveries. This is what we delivered. It's not broken down like that.

Interviewer: And then, regarding our delivery resource allocation during the peak times. How do we ensure that we are efficiently and effectively allocated resources?

Interviewee (P3): Planning, planning, planning, and more planning. So you know, peak for us starts from October and it ends in January. So we usually just begin prepping from as early as May, just so that when the time comes, we know exactly how many resources we need. We know exactly what our capacity is. And if we've done a forecast accurately, we should be able to execute as planned.

Interviewer: Okay, cool. Let's talk about technology and its impact on the efficiency of our delivery strategies, especially during peak.

Interviewee (P3): Technology is the backbone of everything we do. From a routing perspective, technology plays a massive role. From an integration standpoint, technology plays a massive role. So I would say our processes and what we do on a daily basis is heavily influenced by the technology that we use. And peak is the one time where if your systems are down, you're pretty much screwed. Because peak is when the demand is high, resources are strained. It's when you need to execute better than what you're used to. And you can't really do that without systems.

Interviewer: And then, are all our carriers currently effectively utilizing these route optimization technologies?

Interviewee (P3): That's where the challenge comes in. So, the technology is there and it's there for the carriers to use, but it's not effectively used. And that's purely just because there's always this notion of change. And change is something that not everybody's comfortable with. So if it's something that they have to get out of their comfort zone to adapt to, it's a bit of a challenge.

Interviewer: And then are there any areas within the final mile process that could benefit from automation during peak?

Interviewee (P3): Everything can be automated, from the moment an order is placed, to the moment it's picked and dispatched, to the moment it's handed over to a third party and then eventually to a customer. Everything can be automated. But I think what we need to understand is, the automation of things takes away jobs and it also needs to be maintained. So yes, there are areas that we can automate. But we need to be mindful of the implications.

Interviewer: Now, based on your experience, what are the top three factors that you would say impacts our delivery performance during peak?

Interviewee (P3): Courier capacity, managing promises, and demand. And then, lastly, technology. Those are the three.

Interviewer: Alright, interesting. Are there any unique challenges that you've noticed for our organization during peak times compared to other sectors?

Interviewee (P3): Yes, so I think one of the biggest challenges is the fact that our capacity is spread very thin. So we only have a limited amount of suppliers and within that, we only have a limited amount of capacity. Whereas in other sectors, you know, they have a large pool of suppliers to choose from. So if they're unable to get capacity from supplier A, they can easily get capacity from supplier B. Whereas for us, it's a bit more difficult because, like I said, capacity is limited.

Interviewer: And then finally, how do we coordinate and communicate with our stakeholders during peak times to ensure that we're able to address issues as they come up?

Interviewee (P3): I think the biggest thing for us is visibility. So, having one centralized platform where we are able to see what's happening in real-time and where we're able to communicate in real-time would go a long way. Because, I think what you tend to find is, by the time we are aware that something is

happening, it's too late. And then from a customer's perspective, it just looks like we're not in control of what's happening. So yeah, I would say having one centralized platform would be key.

Interviewer: Thank you for your insights. Is there anything else you'd like to add for improvement's sake?

Interviewee (P3): No, I believe we've covered the key areas for improvement.

Interviewer: Great, thank you once again for your time.

Appendix E: Data Tables

Table 6. Interviewee Details Table

	Role	Highest Level of Education	Years of experience	Years
Interviewee 1	Final Mile Manager	Master's Degree	2 Years, 4 Months	2.3
Interviewee 2	Senior Manager: Delivery Strategy	MBA	8 Years	8
Interviewee 3	National Operations Manager	MBA	2 Years	2
Interviewee 4	Final Mile Analyst	Honour's Degree	3 Years	3
Interviewee 5	Final Mile Manager	Bachelor's Degree	2 Years	2
Interviewee 6	Final Mile Manager	Bachelor's Degree	1 Year, 10 Months	1.83

Table 7. Interviewee 1 Captured Codes

	Identify bottlenecks in Company X's final mile processes	Identify the risks and constraints in Last Mile processes that lead to poor delivery performance.	Evaluate the effectiveness of Company X's final mile strategy.	Provide recommendations on how Company X can improve and sustain its delivery performance
Interviewee 1	Proximity to the customer is very important, it can impact your reliability and KPI performance as well as the costs of delivery.	The business does out of area deliveries, including remote areas.	Our proximity strategy is not being realised at the moment	Shared platform for optimised planning
	The business is not where it should be here, as we have a lot of out of area deliveries.	We need to be closer to customers, we are not at this point	Ability to scale for increased volumes is based on courier ability and capacity	flexibility in courier selection based on capacity and performance
	No understanding of customer address limits on vehicle size.	Gap in courier cover in the outlying areas which further increases during peak	Existing final mile technology e.g Trackmatic and FarEye not used optimally	Implement a risk log in final mile planning
	Business uses external couriers.	" Our product is not close, and it does not help us"	Business lacks trust in the final mile capabilities due to past experiences	a system of some sort that can help us and match our fleet versus our volumes that are coming in and a lot of automation would be nice.
	There is no visibility and clarity in final mile improvement opportunities.	The fleet requirement is based on sales capacity	There is a misalignment in the business promise to the customer vs the courier's promise to Massmart.	Need for reporting automation
	No clear understanding of available fleet size.	" We have given all responsibility to the courier, which I feel is not helping us"	Risk management in the space needs to improve	Opportunity for standardisation across banners
	Courier may not be able to meet the capacity requirements	No clarity and visibility of available fleet size		Standardised planning for peak
	Pickup exceptions			Need to improve peak planning frequency
	Failed deliveries and drop off exceptions			

Table 8. Interviewee 2 Captured Codes

	Identify bottlenecks in Company X's final mile processes	Identify the risks and constraints in Last Mile processes that lead to poor delivery performance.	Evaluate the effectiveness of Company X's final mile strategy.	Provide recommendations on how Company X can improve and sustain its delivery performance
Interviewee 2	Due to the location of some of our stores, the courier does not visit the region frequently.	The business promises delivery anywhere in the country, but the customer SLA in these areas is not aligned to courier capability	Massmart has a vast network of stores within the network	Implement a delivery surcharge based on proximity
	There is a blanket approach to customer promise regardless of positioning	Our couriers have multiple customers	Massmart currently a strategic view that we deliver anywhere and if you spend over a certain amount of money than your delivery is free.	exclude certain postal codes from promise
	Store designs impact the efficiency of dispatching. The stores were designed for foot traffic not courier traffic.	Courier capacity determined during the RFP	Need to use tech and data better to drive improvement	Ability to select a courier for a specific area / region
	these couriers will serve us the big bulk areas where there is lots of volume and then they outsource to another carrier to service this, the more regional and outlying areas where they don't have to invest in a feet,	The business communicates the expected volume, and the courier commits to the volume		Flexibility for capacity management
	they are limited vehicles available too many people, so we not the only client of that Courier	Store shortage of space vs Wumdrop on demand service misalignment during peak		
	There is no clear understanding of the available fleet to service each store	Driver wait time high at stores due to misalignment in ops designs		
		Courier allocation based on region and distance around a location.		
		There is no realistic ETA communicated to the customer.		
	Due to the location of some of our stores, the courier does not visit the region frequently.	The business promises delivery anywhere in the country, but the customer SLA in these areas is not aligned to courier capability	Company X has a vast network of stores within the network	Implement a delivery surcharge based on proximity

Table 9. Interviewee 3 Captured Codes

	Identify bottlenecks in Company X's final mile processes	Identify the risks and constraints in Last Mile processes that lead to poor delivery performance.	Evaluate the effectiveness of Company X's final mile strategy.	Provide recommendations on how Company X can improve and sustain its delivery performance
Interviewee 3	outlying areas are impacted because couriers do not find it economically viable to operate in these areas frequently	Customer proximity impacts the route planning	Ineffective planning strategy over peak	Early predictions or store level forecasts
	Timely peak forecasting. This is always delayed, ultimately delaying the courier planning downstream	The further the customer the more difficult to plan for fulfilment	Uberisation model ineffective during peak	The adjustment of the operating philosophy over peak to include a middle mile
	Communication and alignment i.t.o plans	Manual forecasts used to manually calculate the no. of drivers required for each store		
	Lack of integrated planning	Lack of clarity w.r.t in store productivity which further impacts the no. of drivers required for each store		
	No concrete capacity plan during peak	No alignment i.t.o a 24 hour operations vs courier plans		
	Manual allocation of orders to drivers			
	Manual route optimisation			
	Pickup exceptions			
	Dispatch delays			

Table 10. Interviewee 4 Captured Codes

	Identify bottlenecks in Company X's final mile processes	Identify the risks and constraints in Last Mile processes that lead to poor delivery performance.	Evaluate the effectiveness of Company X's final mile strategy.	Provide recommendations on how Company X can improve and sustain its delivery performance
Interviewee 4	The number of outlying deliveries that we do impact our delivery performance	Tech enabled middle mile	Massmart's store footprint is a great opportunity to cover the proximity gap	Flexible courier allocation
	Time it takes to handover a parcel from in store to courier	Non - standardised courier management strategy	The biggest courier is not designed optimally for peak operations	Middle mile hub
	Failed deliveries and drop off exceptions	Lack of system integration with Massmart and couriers	Optimised tech or digital delivery universe	
	Planning process	No route optimisation		
	courier commitment to volumes	accurate addresses		
	ease of courier adjustment when a courier is not performing.	lack of 2 way communication between the customer and courier		
	staging - orders are not ready for the courier when the courier arrives	No scheduled drop offs		
		Not speaking same language from planning to execution		
		Massmart does not monitor its couriers i.t.o volume, region and performance		

Table 11. Interviewee 5 Captured Codes

	Identify bottlenecks in Company X's final mile processes	Identify the risks and constraints in Last Mile processes that lead to poor delivery performance.	Evaluate the effectiveness of Company X's final mile strategy.	Provide recommendations on how Company X can improve and sustain its delivery performance
Interviewee 5	So our biggest challenge at the moment is in our outlying areas where we just don't have frequent enough pickups and frequent enough deliveries to the customer	our OTD is affected the further away we go. And the further the store is from the customer.	The company currently is not taking advantage of its sore footprint	Phased courier collections at the stores
	The accuracy and timeliness of forecasting efforts and planning for peak	The accuracy of the dimensions we feed our couriers	Three banners currently operate as silos	Final Mile dashboard
	there's a gap in our system at the moment is our couriers aren't always looking at this and not always utilizing this tool that's available to them leading to WhatsApp based collection requests	Each courier has their own capacity calculator	our communication is not where it needs to be to the customer	Scheduled deliveries
	Delayed dispatching times at the stores	Courier determination does not happen at store or regional level	There is a big opportunity for data visualisation and utilisation to highlight where the business needs to focus its efforts for improved operations	
	Pickup exceptions	Driver incentives to drive correct behaviour		
	inefficient failed delivery rebooking system			
	there's a gap in our system at the moment is our couriers aren't always looking at this and not always utilizing this tool that's available to them leading to WhatsApp based collection requests	Each courier has their own capacity calculator	our communication is not where it needs to be to the customer	Scheduled deliveries

Table 12. Interviewee 6 Captured Codes

	Identify bottlenecks in Company X's final mile processes	Identify the risks and constraints in Last Mile processes that lead to poor delivery performance.	Evaluate the effectiveness of Company X's final mile strategy.	Provide recommendations on how Company X can improve and sustain its delivery performance
Interviewee 6	it becomes a very challenging to reach outlying areas and based on those three points really, which is distance, the time of the year it is and capacity from 3 PL	Peak period leads to increased outlying orders, but the courier network is not geared to manage these in the given SLA	The business currently does not have a grasp of how far we are travelling for deliveries	Adjust courier determination to store level
	The ability for the courier to prioritise us an a customer over peak	The couriers rely heavily on our forecasting for their own planning	one of our biggest challenges effect that we are painting everybody with the same brush i.t.o customer promise	Dynamic customer promise based on available capacity
	we're doing a hybrid approach in the sense that longer distances are covered by Koreas because of their ability to transcript these orders at a cheaper rate.	If our forecast is off, the courier will give the capacity away	Couriers given volume throughout the year, to build strong reliable relationship fo peak	The effective utilisation of dark stores
	No view of available fleet size from the courier	Data no leveraged for route optimisation an planning	Big opportunity for tech investment	Cross banner delivery
	Our courier ensuring that they have sufficient capacity to service us	Lack of integrated planning	Few courier partners	
	Massmart securing the courier capacity	We have not touched the surface of route optimisation	utilizing our wide network of brick and mortar stores to get closer	
	The organisation does not have enough alternative couriers	The master data creates a delay for handover and courier/ vehicle determination		

Table 13. Code and Theme Links

Code	Theme
Proximity to the customer is very important, it can impact your reliability and KPI performance as well as the costs of delivery.	Proximity and Location Challenges
The business is not where it should be here, as we have a lot of out of area deliveries.	Proximity and Location Challenges
No understanding of customer address limits on vehicle size.	Master Data Integrity
Business uses external couriers.	Courier Management & Capacity Challenges
There is no visibility and clarity in final mile improvement opportunities.	Visibility
No clear understanding of available fleet size.	Courier Management & Capacity Challenges
Courier may not be able to meet the capacity requirements	Courier Management & Capacity Challenges
Pickup exceptions	Exceptions
Failed deliveries and drop off exceptions	Exceptions
Due to the location of some of our stores, the courier does not visit the region frequently.	Proximity and Location Challenges
There is a blanket approach to customer promise regardless of positioning	Proximity and Location Challenges
Store designs impact the efficiency of dispatching. The stores were designed for foot traffic not courier traffic.	Store Delays
these couriers will serve us the big bulk areas where there is lots of volume and then they outsource to another carrier to service this, the more regional and outlying areas where they don't have to invest in a feet,	Courier Management & Capacity Challenges
they are limited vehicles available too many people, so we not the only client of that Courier	Courier Management & Capacity Challenges
There is no clear understanding of the available fleet to service each store	Courier Management & Capacity Challenges
outlying areas are impacted because couriers do not find it economically viable to operate in these areas frequently	Proximity and Location Challenges
Timely peak forecasting. This is always delayed, ultimately delaying the courier planning downstream	Peak Planning and efficiency
Communication and alignment i.t.o plans	Peak Planning and efficiency
Lack of integrated planning	Peak Planning and efficiency
No concrete capacity plan during peak	Courier Management & Capacity Challenges
Manual allocation of orders to drivers	Courier Operations
Manual route optimisation	Courier Operations
Pickup exceptions	Exceptions
Dispatch delays	Store Delays
The number of outlying deliveries that we do impact our delivery performance	Proximity and Location Challenges
Time it takes to handover a parcel from in store to courier	Store Delays
Failed deliveries and drop off exceptions	Exceptions
Planning process	Peak Planning and efficiency
courier commitment to volumes	Courier Management & Capacity Challenges

ease of courier adjustment when a courier is not performing.	Courier Management & Capacity Challenges
staging - orders are not ready for the courier when the courier arrives	Store Delays
So our biggest challenge at the moment is in our outlying areas where we just don't have frequent enough pickups and frequent enough deliveries to the customer	Proximity and Location Challenges
The accuracy and timeliness of forecasting efforts and planning for peak	Peak Planning and efficiency
there's a gap in our system at the moment is our couriers aren't always looking at this and not always utilizing this tool that's available to them leading to WhatsApp based collection requests	Courier Operations
Delayed dispatching times at the stores	Store Delays
Pickup exceptions	Exceptions
inefficient failed delivery rebooking system	Exceptions
it becomes a very challenging to reach outlying areas and based on those three points really, which is distance, the time of the year it is and capacity from 3 PL	Proximity and Location Challenges
The ability for the courier to prioritise us an a customer over peak	Courier Management & Capacity Challenges
we're doing a hybrid approach in the sense that longer distances are covered by couriers because of their ability to transcript these orders at a cheaper rate.	Courier Management & Capacity Challenges
No view of available fleet size from the courier	Courier Management & Capacity Challenges
Our courier ensuring that they have sufficient capacity to service us	Courier Management & Capacity Challenges
Massmart securing the courier capacity	Courier Management & Capacity Challenges
The organisation does not have enough alternative couriers	Courier Management & Capacity Challenges
The business does out of area deliveries, including remote areas.	Proximity and Location Challenges
We need to be closer to customers, we are not at this point	Proximity and Location Challenges
Gap in courier cover in the outlying areas which further increases during peak	Proximity and Location Challenges
" Our product is not close, and it does not help us"	Proximity and Location Challenges
The fleet requirement is based on sales capacity	Courier Management & Capacity Challenges
" We have given all responsibility to the courier, which I feel is not helping us"	Peak Planning and efficiency
No clarity and visibility of available fleet size	Courier Management & Capacity Challenges
The business promises delivery anywhere in the country, but the customer SLA in these areas is not aligned to courier capability	Proximity and Location Challenges
Our couriers have multiple customers	Courier Management & Capacity Challenges
Courier capacity determined during the RFP	Courier Management & Capacity Challenges
The business communicates the expected volume, and the courier commits to the volume	Courier Management & Capacity Challenges

Store shortage of space vs Wumdrop on demand service misalignment during peak	Store Delays
Driver wait time high at stores due to misalignment in ops designs	Store Delays
Courier allocation based on region and distance around a location.	Courier Management & Capacity Challenges
There is no realistic ETA communicated to the customer.	Proximity and Location Challenges
Customer proximity impacts the route planning	Proximity and Location Challenges
The further the customer the more difficult to plan for fulfilment	Proximity and Location Challenges
Manual forecasts used to manually calculate the no. of drivers required for each store	Peak Planning and efficiency
Lack of clarity w.r.t in store productivity which further impacts the no. of drivers required for each store	Peak Planning and efficiency
No alignment i.t.o a 24 hour operations vs courier plans	Peak Planning and efficiency
Tech enabled middle mile	Courier Operations
Non - standardised courier management strategy	Courier Management & Capacity Challenges
Lack of system integration with Massmart and couriers	Courier Management & Capacity Challenges
No route optimisation	Courier Operations
accurate addresses	Master Data Integrity
lack of 2 way communication between the customer and courier	Communication
No scheduled drop offs	Courier Operations
Not speaking same language from planning to execution	Peak Planning and efficiency
Massmart does not monitor its couriers i.t.o volume, region and performance	Courier Management & Capacity Challenges
planning for the forecast margin of error	Peak Planning and efficiency
our OTD is affected the further away we go. And the further the store is from the customer.	Proximity and Location Challenges
The accuracy of the dimensions we feed our couriers	Master Data Integrity
Each courier has their own capacity calculator	Courier Management & Capacity Challenges
Courier determination does not happen at store or regional level	Courier Management & Capacity Challenges
Driver incentives to drive correct behaviour	courier operations
Peak period leads to increased outlying orders, but the courier network is not geared to manage these in the given SLA	Proximity and Location Challenges
The couriers rely heavily on our forecasting for their own planning	Peak Planning and efficiency
If our forecast is off, the courier will give the capacity away	Peak Planning and efficiency
Data no leveraged for route optimisation an planning	Courier Operations
Lack of integrated planning	Peak Planning and efficiency
We have not touched the surface of route optimisation	Courier Operations
The master data creates a delay for handover and courier/ vehicle determination	Master Data Integrity
Our approach in determining carriers is a blanket approach.	Courier Management & Capacity Challenges

Table 14. No. of Codes per Theme

Theme	No. of associated codes	% of overall codes
Courier Management & Capacity Challenges	27	31%
Proximity and Location Challenges	18	21%
Peak Planning and efficiency	14	16%
Courier Operations	9	10%
Store Delays	7	8%
Exceptions	6	7%
Master Data Integrity	4	5%
Visibility	1	1%
Communication	1	1%

Table 15. Theme Relation Table

Theme	Count of Themes which Impact this Theme	Count of Themes which are Impacted by this Theme
Courier Management & Capacity Challenges	1	7
Proximity and Location Challenges	3	
Peak Planning and efficiency	4	1
Courier Operations	3	2
Store Delays	2	2
Exceptions		6
Master Data Integrity	3	
Visibility	2	
Communication	1	1