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ENABLING CUSTOMER SERVICE TRAINING WITH AN AI-TECHNOLOGY CHATBOT

by

RAEESAH MC NIEL

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Supervisor: Dr Errol Francke

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DECLARATION

I, **Raeesah Mc Niel**, declare that the contents of this thesis represent my own unaided work and that the thesis has not previously been submitted for academic examination towards any qualification. Furthermore, it represents my own opinions and not necessarily those of the Cape Peninsula University of Technology.

Signed	07/08/2025 **Date**

ABSTRACT

The popularisation of Artificial Intelligence (AI) has accelerated its integration and use across various sectors for multiple purposes, particularly within the education sector. AI technologies, such as AI-enabled chatbots, have also been applied to corporate operations to assist with handling customer inquiries. However, the application of AI technologies to facilitate cross-pollination between the educational and corporate sectors for staff training remains underexplored. There is limited empirical evidence indicating the effects of AI in addressing training needs to improve customer service standards in small to medium-sized enterprises (SMEs). Despite the potential AI offers for information transfer and automation, its use in learning and development within SMEs presents opportunities for emerging research. Guided by the Implementation Science framework as a theoretical lens, this study investigates how AI support tools influence customer service capability, the factors affecting the diffusion of such innovations, and establishes a framework to support the effective implementation and integration of AI tools to enhance customer service training. This study aims to bridge the gap by examining the effects of an AI-enabled chatbot prototype in customer service training within an SME in the South African context. The study employed a qualitative approach, utilising a case study design. The data were primarily collected using semi-structured interviews with participants from a purposive sample.

The study revealed that AI-enabled chatbots improved information accessibility, offered personalised learning opportunities, facilitated self-paced and adaptive learning, provided consistency in responses, enhanced operational efficiency among customer service agents, and contributed to teamwork and engagement. Findings suggest that the AI tool is most effective when used in conjunction with human facilitation. However, highlighted challenges included the limited depth of content in the responses and technical infrastructure constraints that questioned organisational readiness and strategic direction. Therefore, this study presents the ABIRM Framework, which was developed to guide SMEs in implementing and adopting AI tools for training purposes.

Keywords: artificial intelligence (AI), chatbots for training, customer service, workplace learning, implementation science framework.

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LIST OF ABBREVIATIONS

AI	Artificial Intelligence
ASICSs	Application-Specific Integrated Circuits
DOI	Diffusion of Innovation
ABIRM	Assess, Build, Implement, Refine, Maintain
FGPA	Field-Programmable Gate Array
GPT	Generative Pre-trained Transformer
GPU	Graphics Processing Unit
IS	Implementation Science
ML	Machine Learning
NLP	Natural Language Processing
RP	Research Participant
RQ	Research Question
SME	Small to Medium-Sized Enterprises
SSI	Semi-Structured Interview
TAM	Technology Acceptance Model

CHAPTER ONE: RESEARCH INTRODUCTION

1.1 Introduction

The success of a company is highly dependent on the calibre of customer service provided to its customers and facilitated by the customer service representatives. These agents are responsible for ensuring that the best possible assistance and care are taken when handling customer queries. If this is disregarded, the results can lead to customer dissatisfaction, reduced loyalty, and negative impacts on the company's reputation. Mbavai (2022:55) states that competitiveness in the industry is due to improved performance at every component level of the business. Important practices should include efficient customer query handling, soliciting appropriate customer feedback and, ultimately, providing effective customer service training.

Fowler et al. (2019:10) argue that effective training can ensure that representative agents provide quality customer service. The integration of technology into teaching and learning environments has undergone substantial change in recent years due to technological breakthroughs. One significant change is the growth of Artificial Intelligence (AI) and its creative uses in education and learning (Li & Miraj, 2022). AI technologies have demonstrated extraordinary capabilities, including the ability to automate and simplify tasks, increase productivity, and produce better results. Examples of such technologies include ChatGPT and Notion AI, which have demonstrated how AI can be used to automate and streamline a variety of activities (Conroy, 2023).

Companies can enhance their customer service processes and procedures by leveraging AI technologies to deliver more efficient and effective solutions. Solutions driven by AI technology enable digital transformation through automation, facilitation of seamless customer interactions (Ameen et al., 2021), as well as provide a platform that encourages continuous learning (Li & Miraj, 2022). These features can revolutionise customer service practices and result in the overall enhancement of consumer service.

AI holds significant importance and benefits in its ability to automate and simplify processes, in addition to providing tailored offerings that collectively result in increased customer satisfaction (Jiang et al., 2020:618). The ability to respond to client inquiries promptly and accurately, while efficiently meeting their expectations, is a crucial component of delivering effective customer service. By investigating the integration of AI technology into the commercial environment, specifically in customer service, companies can harness the potential of AI to eliminate the need for human facilitators and achieve improved customer service outcomes.

1.2 Research problem

The problem driving this study is that we have a limited understanding of the factors influencing the adoption of AI technologies to enhance customer service within an organisation. High-quality customer service in the business environment is crucial for ensuring that customers receive the best service from the businesses they choose to support. There are ongoing issues related to the inability of customer service representatives to address queries effectively and a failure to meet customer expectations (Burton, 2022:80). Technological advances have ensured the integration of technology into learning environments. AI has begun to produce innovative approaches to education and learning (Li & Miraj, 2022).

Recently, AI capabilities have been demonstrated through technologies such as ChatGPT and Notion AI through their abilities to automate and simplify certain tasks (Conroy, 2023). Initial and continual training can be time-consuming for employees, as small companies, non-corporates and start-ups may not have dedicated learning and development departments, therefore requiring time from employees' schedules to provide training to newcomers and conduct refresher training. Magnoler and Pacquola (2016:42) concur that this is attributed to the deprioritisation of effective training in small and medium-sized enterprises. Due to traditional training techniques and the time required for instruction, employees struggle to remember the material they have learned. This is crucial as training ensures that employees can perform better at their jobs (Jaman & Hossain, 2020:6).

Insufficient levels of product and customer service training are frequently offered due to time restrictions brought on by the traditional training methods used. Additionally, there is no platform for employees to review previously taught material, necessitating more frequent refresher training. Training requires constant reassessment (Rosa, 2023:2), thus affecting how much time facilitators need to spend retraining staff members as needed. Furthermore, Muhammad Syihabuddin et al. (2025:204) argue that knowledge retention necessitates structured documentation as the lack thereof hinders the possibility of transferring and retaining knowledge.

Nassazi (2013:29) emphasises that effective employee training enhances productivity and boosts production. It is therefore necessary to investigate more effective and accessible training delivery techniques that are independent of in-person facilitators and do not require many training-related man-hours. Thus, to improve the level of training provided, which will subsequently enhance customer service, companies must also investigate how AI may be used as a support model. It is crucial to examine the application of AI technology as a potential support model for current customer service training and evaluate the effectiveness of AI technology in reducing the need for human facilitator intervention. The overarching goal of the

research is to better understand how AI can be effectively integrated into training programs, ultimately enhancing the standards of customer service.

1.3 Research aim

This research aims to evaluate the effect of the use of an AI tool in a customer service training environment and assess the viability of the AI tool as a potential enhancement to human facilitators in terms of product and business knowledge.

1.4 Research objectives

This research is undertaken with the following three objectives:

1. To examine the utilisation of AI support tools to enhance customer service training.
2. To investigate and understand factors influencing the adoption of AI technologies to improve customer services within the organisation.
3. To develop a framework that assists in the implementation and adoption of AI tools to enhance customer service training.

1.5 Research questions

There are three questions this research aims to address:

1. How can the utilisation of AI support tools improve customer service training?
2. What are the factors influencing the diffusion of AI innovations to improve customer service within the business?
3. What elements will contribute to a framework that assists in the implementation and adoption of AI tools to enhance customer service training?

1.6 Literature review

The ever-changing product offerings and landscape of businesses have put customer value and satisfaction at the forefront as a determining factor attributed to survival and success (McFarlane, 2013:66). Organisations must ensure that innovative solutions are developed to uphold satisfactory levels of customer service, leading to established trust with customers, ensuring customer retention, gaining market share, and ultimately increasing revenue for shareholders (Hamzah & Shamsudin, 2020:3). Therefore, this literature review explores the critical themes surrounding the use of AI in enhancing customer service. The study delves into the significance of effective training to improve customer service offerings within organisations.

Subsequently, the benefits of AI are examined in relation to training, highlighting how this technology can enhance the conduct of training and the delivery of materials. Furthermore, the literature review evaluates the efficacy of AI technology in training, as well as outlines certain

factors and concerns related to its adoption. To effectively assess the application of AI for training in customer service, the Implementation Science framework provides insight into the adoption factors that influence the integration of AI within organisations. By reviewing literature based on the aforementioned themes, a comprehensive understanding of customer service and AI, as well as its adoption and diffusion in training environments, is attained.

1.6.1 Customer service

Training plays a pivotal role in the improvement of work performance that ultimately leads to the achievement of organisational goals (Somborac et al., 2022:24). Traditional training approaches have several drawbacks that affect employees' absorption and retention of training content following the traditionally facilitated training sessions. This is attributed to the monotonous nature of training methods lacking innovation, not capturing the interest of trainees, and not encouraging active participation (Zhang et al., 2022:215). These difficulties are particularly noticeable in start-ups, small businesses, and non-corporate organisations, where the lack of dedicated learning and development departments can lead to lengthy and inefficient training practices, as well as inadequate and irregular training and non-identification of training needs (Adaobi & Owusuaa-Konadu Snr, 2022:761). While the study conducted by Adaobi and Owusuaa-Konadu Snr (2022:761) depicts the inefficiencies of traditional training, it does not present concrete evidence to motivate the use of technological solutions to combat the training issues that could positively influence employee performance and productivity.

One of the major drawbacks of traditional training methods is the requirement for lengthy, time-consuming and ongoing in-person training that consumes significant portions of employees' time. Peng et al. (2022) concur that this is particularly prevalent in customer service training. Training sessions can last hours or even days, which significantly disrupts daily operations. According to Misch and Saborowski (2018:3), the misallocation of resources negatively impacts on productivity, resulting in inefficiency. The imposition of training facilitation on more skilled employees creates a barrier for both individuals and the company, as it diverts critical resources and affects productivity.

Inadequate levels of product and customer service training, caused by time constraints imposed by traditional training methods, exacerbate the problem. Employees may not receive thorough training on all aspects of their jobs, resulting in subpar performance and consumer dissatisfaction due to their inability to effectively handle customer queries (Burton, 2022:80). According to a study conducted by Mbavai (2022:44), more than 75% of staff members who partook in the study of the organisation concurred that effective customer service training has a direct impact on the enhanced performance of the business. Customer loyalty is highly dependent on the quality of customer service received; thus, companies must ensure the

standard of customer service remains above average to retain customer trust (Hendri et al., 2021:203).

1.6.2 Benefits of AI

AI technology has gained popularity in recent years, with the promise of enhancing various aspects of traditional training and addressing customer service challenges faced by businesses. According to Prentice and Nguyen (2020:7), adoption leads to the enhancement of customer experience due to the customisation and support experience provided by AI technologies, thus enabling the possibility to improve customer service processes. Due to its real-time and natural language processing (NLP), AI technology offers intelligent and contextually relevant information, providing direct assistance to frontline employees to handle inquiries efficiently (Xu et al., 2020:190).

The ability of AI to automate specific tasks allows for the reorganisation of departmental processes and focusing on more complex tasks (De Cock et al., 2020:1). A notable benefit of AI in training is its capacity to automate various tasks, saving time and resources (Stoilova, 2021:2). AI-powered systems offer advantages through techniques such as gamification, encouraging convenient and continuous learning (Tan & Cheah, 2021:6). Furthermore, Mbavai (2022:44) states that cultivating customer service skills has enabled representative agents to enhance communication and provide adequate assistance. While the benefits of AI use are evident in the studies conducted, there is limited empirical evidence highlighting the challenges associated with user resistance and trust. Tan and Cheah (2021) do not explicitly highlight the realised benefits of content gamification for knowledge retention, leading to a gap in exploring similar tools to address the issue.

The mitigation of training-related challenges can be achieved through the minimisation of training-related man-hours, effective knowledge transfers, and ultimately improving the way in which training is conducted. AI technologies have enormous potential for improving customer service and training due to the nature of AI systems for training, shifting from instructor-centric to learner-centric facilitation (Chen, 2022). The automation of content delivery, powered by AI systems, enables accessibility to training materials regardless of physical location (Li & Miraj, 2022). The personalised and adaptable nature of AI technology enhances successful learning by catering to individual trainee needs and optimising training outcomes (Singh & Shaurya, 2021:3).

Peng et al. (2022) proved that training time is significantly reduced with an AI bot, and efficiency is improved due to the mitigated need for human facilitators. Reducing the time and resources necessary for training-related operations has considerable benefits since organisations may

provide training faster and have more training sessions. Peng et al. (2022) achieved success using an intelligence-driven virtual coach for customer service training, which has supported 500,000 training simulations and produced a total of 1,000 agents trained using the tool. Despite the reduced training time and increased volume of trainees, the study lacks a concrete assessment of the long-term knowledge retention achieved by these agents.

Popular AI applications include chatbots and robotic AI systems. According to Kruse et al. (2019:6408), many financial services firms are experimenting with chatbots or robotic advisors, often on their mobile apps or social media. AI-powered virtual assistants and chatbots have emerged as significant solutions for boosting company performance by improving customer support interactions and encouraging the adoption of AI and overall flexibility (Ameen et al., 2021).

1.6.3 Adoption and efficacy of AI technology in customer service

Companies are exploring the use of AI to enhance their customer service offerings due to the growing demand for personalised and immediate assistance, as well as advancements in AI capabilities. This is made possible by the real-time management and analysis of large amounts of data (Perez-Vega et al., 2021:902). The adoption of AI technology is driven by the promise to automate repetitive business processes, reduce human error, enhance response times, and cut operating costs (Cubric, 2020:11). Despite the emphasis on operational benefits, Cubric (2020) did not establish the justification between operational savings and implementation challenges that organisations could face. Hangl et al. (2022:15) further presented the driving factors in conjunction with the aforementioned, which include faster identification of issues, reduction in material and information search time and easier access to data, ultimately leading to enhanced efficiency. AI-powered virtual assistants, chatbots and voice recognition systems have been used by companies across multiple industries to handle consumer inquiries and provide real-time support.

A study conducted by Tuffaha et al. (2022:48) highlights the use of AI chatbots in Human Resource Management for candidate sorting and inquiries, as well as the mitigated need for manual intervention in the early stages of recruitment. AI innovations, such as chatbots and virtual assistants, have resulted in more efficient service delivery, faster response times through automated interactions, and higher customer satisfaction (Chong et al., 2021:3). Analytics enabled by AI help companies understand the preferences and behaviour of their customers (Nicolescu & Tudorache, 2022:2), enabling proactive service delivery and customised experiences.

While AI technology is advantageous for training, it is imperative to acknowledge the disadvantages that apply in this context. Data security and privacy remain among the biggest concerns regarding the adoption of AI in customer service environments, thus highlighting the ethical responsibilities that companies must adhere to (Hentzen et al., 2022:1321). Challenges raised by Kruse et al. (2019:6410) include the lack of quality training data that hinders the adoption of AI in financial services organisations. Thus, the availability of training data plays a crucial role in the successful implementation of AI technology for efficient customer service. The replacement of human facilitators is one key ethical consideration to note. Companies with dedicated learning and development departments must acknowledge the concerns regarding job displacement and ensure succession planning. However, despite the technological advancements in training environments, according to Paranjape et al. (2019:7), human empathy can never entirely be replaced. Therefore, the conjunctional use of AI technologies and human facilitators creates a gap in empirical evidence that motivates research into the factors that could influence the adoption of AI chatbots in training environments.

1.6.4 Underpinning theory

The Implementation Science (IS) framework underpins this study, providing a guide to understanding the adoption and use of AI technology for training in the customer service sector. The emergence of IS is historically attributed to the challenges related to the proper implementation of evidence-based practices, which could not be achieved solely through basic research and literature (Douglas & Burshnic, 2019:4). Predominantly used in clinical research, IS promotes efficient and effective implementation of findings through constructive knowledge translation (Miles, 2020). Furthermore, Soicher et al. (2020) describe IS as a tool to assist researchers in integrating science-based teachings in real-world settings and focuses on the factors influencing the acceptance of innovation in the daily lives of the user. Through the lens of IS, the successful implementation of inventions can be attributed to the common factors that influence the impact, management support and buy-in, how well the needs of the end-users are addressed, and the various implementation strategies that ensure sustainable adoption and usage over time (Kilbourne et al., 2020:783).

Other theoretical frameworks that could arguably be relevant in this study include the Technology Acceptance Model (TAM) and the Diffusion of Innovations (DOI) theory. The TAM framework was derived as an acceptance theory analysing user acceptance in relation to system design (Davis & Granić, 2025). TAM is limited in capturing complexities such as adoption behaviours and organisational characteristics related to the adoption of new technologies (Mogaji et al., 2024:3329), thus the study favours the IS framework that provides a structured approach to ensure effective systemic adoption and integration.

According to Chukwuma (2023:4), the DOI theory is used to understand the acceptance of new innovations within a population in relation to the innovation's attributes, highlighting the five categories of adopters: innovators, early adopters, early majority, late majority, and laggards. While the DOI theory may be beneficial for understanding the causal factors of technology adoption, it lacks the aspect of sustainable implementation for long-term integration.

Curran (2020) introduced the concept of THE THING and DO THE THING, which describes the innovation and how to use the innovation best, to simplify the understanding of IS and how this is differentiated in the implementation of inventions (Figure 1.1).

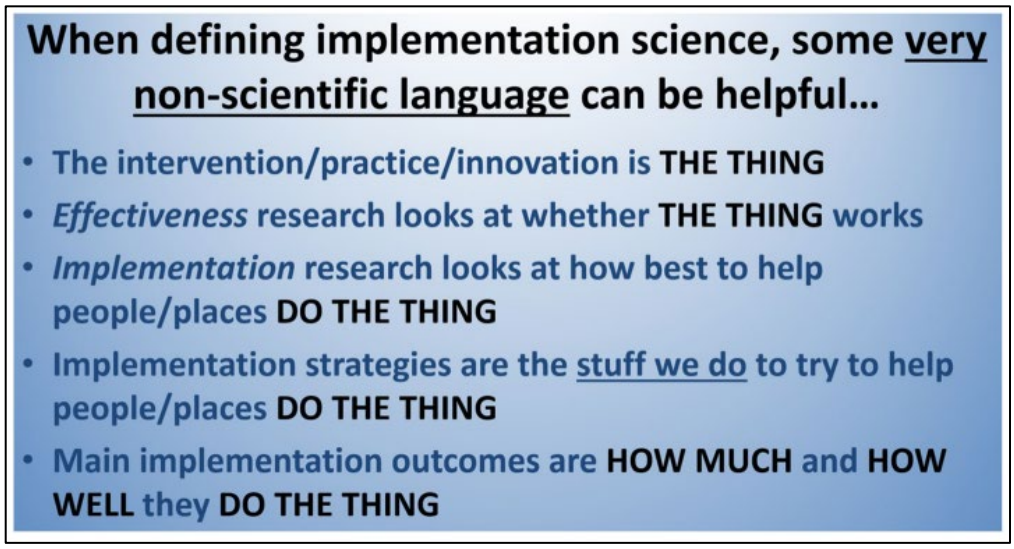

Figure 1.1: A slide on THE THING and DO THE THING (Source: Curran, 2020)

As presented above, the five elements aid the understanding of the innovation and enable a proper evaluation of the effective use by:

i) Introducing the innovation that needs to be supported.
ii) Understanding whether this innovation achieves any results.
iii) Providing recommendations on how best to use the innovation.
iv) Strategies that can be used to improve the innovation that would encourage the usage thereof.
v) The quantification of the usage frequency of the innovation and the effectiveness and reliability of the implementation in line with the proposed guidelines and protocols.

By providing this conceptual outline in non-scientific language, the tool has provided the ability to understand the concept of IS and implement the pedagogical use thereof (Curran, 2020). Similar to the use of the tool above, the conceptual outline has the capability to support IS in the field of technological research.

Pivoting towards a taxonomical perspective, Nilsen (2020:10) identifies the purpose of IS as descriptively identifying the factors that influence evidence-based implementation, and rather than having a distinct model or framework to determine these, IS promotes the use of checklist factors that are relevant to the implementation. Nilsen presents three aims to use a theoretical model in the application of IS, as graphically depicted in Figure 1.2.

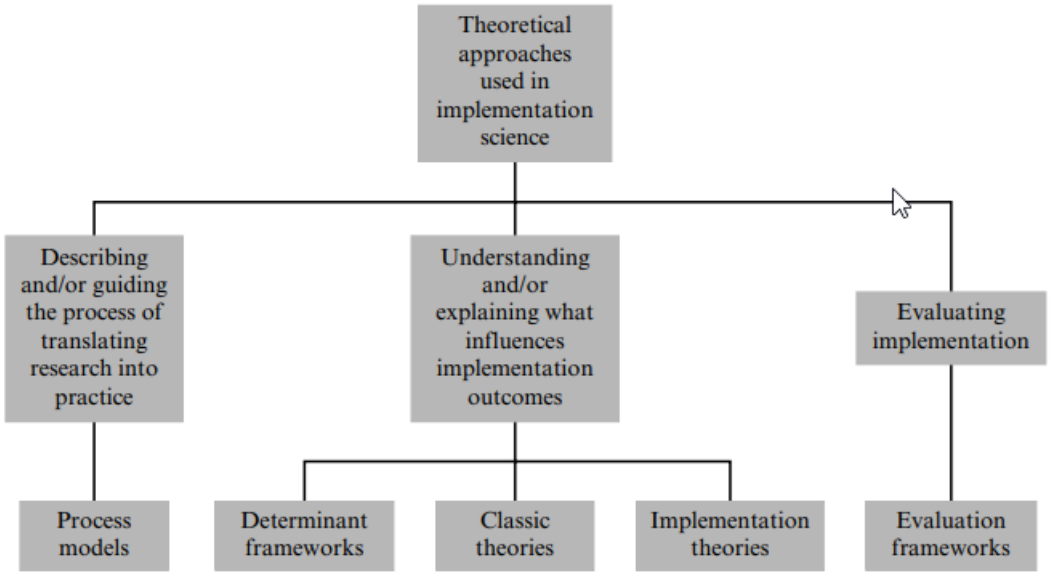

Figure 1.2: Theoretical approaches in implementation science (Source: Nilsen, 2020:11)

Nilsen (2020:10) describes the theoretical model as having three overarching aims that include: i) articulating how the research findings are translated into real-world use; ii) clearly defining the factors that would affect the outcome of the implementation; and iii) assessing the execution and outcome of the implementation. Furthermore, the author derives a subset of five theoretical approaches inclusive of: i) process models that provide detailed processes on the implementation and use of the research; ii) determinant frameworks that highlight the enabling factors or barriers in the implementation; iii) classic theories that already exist in the discipline of research and include the sociotechnical theory, among others; iv) implementation theories that facilitate the understanding of implementation aspects; and v) evaluation frameworks that identify the key factors contributing to the successful implementation (Nilsen, 2020:12).

Douglas and Burshnic (2019:4) posit that IS provides a lens through which inventions can be developed with the intended users in mind, while also being adaptable in various contexts in practice, and offers the opportunity to address challenges related to knowledge and skills gaps, resources and eventual implementation. Given that the integration of AI tools poses specific challenges, such as user engagement, content delivery optimisation, and resistance to change, IS offers a framework that can address these factors. Unlike the TAM and DOI models, which focus primarily on driving adoption, IS provides a more comprehensive approach.

Utilising IS as a theoretical framework in this research enables the application of various theoretical approaches to effectively determine the successful implementation of AI in customer service training.

1.7 Design, methodology and ethics

1.7.1 Research design

This study employed the case study design to explore the use of AI technology in the training environment to improve customer service. Case studies were used to explore a phenomenon in which 'an unknown' exists, leading to the ultimate development of a hypothesis and theory based on the study, particularly useful in the exploration of phenomena that adopt a systems approach (Gammelgaard, 2017:910,911). Ebneyamini and Sadeghi Moghadam (2018) concur that case studies are used to empirically study an event or real-life situation in order to understand a specific problem in its natural context. Welch et al. (2011:741) further support this by stating that case studies are perceived as natural experiments used to confirm theories and hold more explanatory power than other designs. The use of a case study design allowed for a comprehensive view of the current issues in customer service training and how these may be resolved with the implementation of a dynamic AI solution. Case studies are often conducted by means of empirical data collection obtained through a detailed investigation over a specified period of time and require the use of a well-defined case to provide an accurate analysis of the phenomenon (Rashid et al., 2019:5). The use of case studies is prevalent in a management environment, and more specifically favoured in the department of operations management due to its rigour and support in developing new theories (Ebneyamini & Sadeghi Moghadam, 2018).

This study was conducted utilising a small to medium-sized enterprise (SME) as case. Baškarada (2013:10) argues that the unit of analysis in a study should be taken into consideration, thus motivating the use of case studies when examining a group or organisation, as it may be difficult to obtain a large population sample in this regard. The following criteria were applied to ensure the applicability and credibility of the company in this case study: i) the company still uses conventional training techniques; (ii) no formal learning and development department exist in this company; (iii) the company agrees to be the subject of this case study and is willing to allow the deployment of the AI prototype for at least one week; and (iv) all employees selected to be part of this case study must participate willingly and with no coercion.

The criteria selected stem from current challenges that would make the company the most suitable candidate for a prototype AI implementation. The participants' experiences and opinions of the tool were evaluated using a single-group pre-test and post-test design assessment. The target population comprised a mixed group of staff members, including

experienced and new employees, to evaluate their respective experiences. To reflect an accurate representation of the SME's Operations department, the participants selected from the target population for the sample included both new and experienced employees.

The case study design proved best-suited to address the research objectives, as this allowed for a practical approach and comprehensive understanding of the exploration of AI technology in the training environment to enhance customer service offerings in a small to medium-sized company.

1.7.2 Methodology

Qualitative research enables researchers to understand the beliefs, experiences and perceptions of people, and are deep-rooted in the cultural anthropology, psychology and sociology of people (Mohajan, 2018:24). Mishra and Alok (2017:3) concur that qualitative research is focused on the in-depth analysis of a phenomenon and regards numerical and statistical analysis as irrelevant. According to Busetto et al. (2020:14), qualitative research is specifically used to explore the reasons behind certain trends, behaviour or phenomena. Considering the advantageous results that could be achieved based on the characteristics of the approach, this study sought to benefit from the use of qualitative research.

1.7.2.1 Method

Research methods refer to all the tools and techniques used to conduct the study (Mishra & Alok, 2017:1), which differs from the methodology that refers to the science of systematically studying how research is conducted. This study was conducted following a qualitative research approach to gain a thorough understanding of the experiences and perceptions of the integration of AI tools for learning purposes in the Operations department of a fintech company. This research method is recommended for its effectiveness in exploring experiences and various elements at play in the effective usage of the tool (Mishra & Alok, 2017:3; Busetto et al., 2020:14).

The study employed semi-structured interviews (SSIs) as its primary method of data collection. This study was conducted with a small to medium-sized company that lacked a structured learning and development department. The company selected is based in Cape Town, Western Cape. The participant group size considered was five to ten people, selected at random, who took part in the study based on informed consent. A set number of questions were posed to all participants (Ahlin, 2019:1,4). The questions were developed in a way that includes the main open-ended questions while also allowing for further probing questions by the interviewer, depending on the flow of the interview and allowing for a detailed insight into their experience (Adeoye-Olatunde & Olenik, 2021:1362). Notwithstanding the success of data

collection and analysis using SSIs, Adams (2015:493) stresses the need to acknowledge the disadvantages of the SSI method, e.g., it is time-consuming and requires intensive dedication of labour and sophistication on the part of the interviewer. However, qualitative data is enriched through interviews given its flexibility, which offers the researcher a suitable opportunity to explore the thoughts, feelings and emotions of the participants that would otherwise not be obtained (Alamri, 2019:66). Moreover, the SSI method ensures reliability and accuracy of the data collected while maintaining flexibility and providing a comprehensive overview of participants' experiences (Alamri, 2019:69).

The study included the development and deployment of an AI chatbot prototype for training agents in the Operations department of a Fintech company. This chatbot was used in parallel to their regular daily activities for one week. The prototype served as a tool for product and process training, incorporating a subset of the material covered by conventional training techniques. Following the week-long use of the AI prototype, interviews were conducted to gain insight into the experience, content retention and efficacy of the chatbot tool in terms of product knowledge and retention. Interview topics and guidelines were prepared by considering previous research and existing literature, or extracted from predefined methods (Busetto et al., 2020:16).

1.7.2.2 Data analysis

This study adopted a systematic approach to the analysis of the data collected from the SSIs. The data analysis was done in adherence to guidance provided by Chenail (2012:248), who describes the data analysis process as the ability to collect quality data and, in turn, being able to present this data and perform analysis on the data, The stability and control provided by a rigid data analysis process ensures that the findings presented are scientifically rigorous. The interviews conducted with participants were recorded and transcribed verbatim to uphold the validity of the responses collected. The study employed thematic analysis to enable the identification and evaluation of patterns, themes and key findings from the responses of participants, as concurred by Braun and Clarke (2006:80).

The data were analysed to evaluate the findings relative to the research objectives presented in section 1.3, which are restated here as follows: i) to examine the utilisation of AI support tools to enhance customer service; ii) to investigate and understand factors influencing the adoption of AI technologies to improve customer services within the organisation; and (iii) based on the findings from the objectives, to develop a framework that assists in the implementation and adoption of AI tools to enhance customer service. The focus was to evaluate the effect of deploying an AI tool into the training environment and assess the viability

of the AI tool as a potential replacement for human facilitators in terms of product and business knowledge.

The outcomes of the data analysis were used to evaluate the level of knowledge and retention that customer service representatives portray, which was ultimately used to gauge the success AI adoption may hold in terms of customer service improvement, more in-depth. The collective outcome of the analysis of findings resulted in the framework developed to guide future use of AI in customer service, based on the participants' experiences, what has worked, and failure points identified throughout the research process.

1.8 Ethics

Research is subject to ethical review and clearance prior to conducting the study (Soulsbury et al., 2020:1176). To ensure the integrity and protection of the research participants, ethical considerations were thoroughly adhered to during the study.

1.8.1 Permission and consent

Formal permission and approval were obtained from the Ethics Committee of the Cape Peninsula University of Technology. The Department of Informatics was required to issue the ethical clearance and consent letter for this study to be conducted. All the participants were required to provide their informed consent to participate in this study and confirm their understanding that inclusion is voluntary. Signed consent was obtained through consent forms.

1.8.2 Confidentiality and anonymity

The privacy and anonymity of participants were protected in the presentation of the data analysis and findings. No personal data or identifiers were made evident in the study. The data collected during the AI chatbot prototype deployment and interviews are kept anonymous.

1.8.3 Transparency

The objectives and implications of the study were declared to all research participants and stakeholders. All participants were made aware that they would undergo a two-stage approach, first comprising the tool usage, and second, the follow-up interviews scheduled thereafter. Participants were furthermore made aware that interviews would be recorded to ensure the accuracy of the data collected for detailed analysis. The were informed that the study would be conducted as part of a postgraduate master's programme at the Cape Peninsula University of Technology and that the data would be used exclusively for the purpose of the study, not being disclosed beyond relevant context.

1.8.4 Withdrawal

Reiterating the aforementioned voluntary participation, all participants who wished to withdraw from the study would be allowed to do so without any repercussions. All personal data acquired throughout this study are treated as confidential and data retention policies are being adhered to.

1.9 Delineation of the research

This research was conducted on the premise that the methodology selected would provide valuable insights into the adoption of AI technology for the purposes of improving customer service through effective training. The study included the deployment of an AI prototype tool, used for a minimum of a week and no longer than one month. Thereafter, interviews were conducted to ensure relevant qualitative data for the analysis and presentation of findings.

1.10 Significance of the research

This study explores the use of AI technology to improve customer service. The emphasis is on training, specifically learning and development, to ensure that customer service representatives have the necessary knowledge and skillset to adequately handle query management. The ultimate goal is the development of a framework that assists companies in the adoption and implementation of AI technology for comparable goals. The purpose of the framework is to provide insight into all aspects involved, success and failure factors, and best practice guidelines. For the company, using this framework may lead to superior customer service, leveraging the benefits that result from customer satisfaction. Finally, this research provides valuable information as the basis for future research in exploring the use of AI technology in commerce on a wider scale.

1.11 Structure of the thesis

This thesis is structured into five chapters that contribute to the exploration of the use of AI-enabled chatbots in customer service training within SMEs.

Chapter One introduces the study by providing a broad background on the general concept of AI and an overview thereof in the realm of customer service. It details the research problem, research questions, research objectives and rationale for the study. The chapter concludes with the research methodology and design, while also outlining the delineation and significance of the study.

Chapter Two provides a comprehensive review of existing literature on AI, highlighting the history of AI and its progression over time. It delves into the current use cases of AI and its role in customer service. The chapter also reviews the underpinning theory of the research.

Chapter Three presents the research methodology that was followed in the study. It details the philosophical assumption, research method and design, data collection and analysis mechanisms, and concludes with the ethical considerations of the study.

Chapter Four presents the analysis and findings of the data collected. It discusses the analysis techniques and coding done through the lens of the underpinning theory in relation to the research questions.

Chapter Five discusses the findings of the study. It also presents the ABIRM framework, which was developed as a practical contribution to knowledge.

Chapter Six derives the conclusion of the study. Furthermore, it presents the study's limitations and offers recommendations for future research.

1.11 Summary

This chapter provided the foundational premise of the study by contextualising customer service and AI. It presented a basis for the exploratory use of AI-enabled chatbots for the purpose of enhancing customer service training. The chapter argued the research problem that was identified, highlighting the current limitations faced in organisations with no formalised learning and development departments and the need for a more structured approach. The chapter presented the research questions and objectives set to be achieved.

Literature was reviewed to provide insight into the concept of customer service, the evolution and adoption of AI, and the current applications and efficacy thereof in business operations. The review provided background on IS as an underpinning theory to the study. Moreover, the chapter briefly outlined the research methodology the study followed, highlighting the research design, research method, data analysis and collection techniques followed. The case study design was employed, adopting the qualitative research method and making use of semi-structured interviews for data collection. Ethical approval and considerations were discussed. The chapter scoped the study by presenting the delineation, and concluded with the significance of the study and intended contributions thereof.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter provides a comprehensive literature review focusing on the relevance of Artificial Intelligence (AI) technologies for training purposes, specifically aimed at leveraging these technological advances in the realm of customer service within small to medium-sized enterprises (SMEs). It presents an understanding of AI at a broader level by exploring its evolution, the adoption of AI technologies for various purposes, and their common applications across different industries. The chapter then reverts to generative AI, delving into its purpose and use cases concerning customer service training. The key tenets of the literature include customer service, the benefits of AI, and its efficacy. The underpinning theory of the study is Implementation Science (IS), which is elaborated upon further in the chapter.

2.2 Overview of AI

AI has seemingly become popular in recent years for the many benefits and ease it offers in its users' daily lives (Trabelsi, 2024:142). AI refers to the imitation of human intelligence offered in computers and is amplified by the machine's ability to comprehend, revise and solve problems autonomously (Chen et al., 2024:546). Historically, AI was founded in the mid-20th century at the forefront of enabling machines to mimic cognitive functions that would otherwise be seen in human beings only (Elamin, 2024:1152). Elamin (2024:1152) further references a paper written in 1950 by Alan Turing on "Computing and Intelligence", which questioned the cognitive ability of machines in relation to human behaviour, acting as a catalyst to the innovation of AI. Thus, Sahoo et al. (2024:763) refers to the Dartmouth Conference of 1956, leading to the conceptualisation of AI, as the foundational objectives were outlined and included topics such as automated rationalising and the machine's ability to solve problems.

Alsaati (2024:1261) argues that AI is enabled by the use of large datasets used to engineer machines in a way that autonomously allows it to analyse the data and make decisions based on its' own experiences over time. Shrivastava et al. (2024:5501) concur that AI utilises data to automate repetitive learning and decision-making through algorithms that analyse data structures and frequencies in datasets, enabling AI technologies to self-learn how to play chess or provide online recommendations.

However, the reliance on large datasets with compromised quality threatens the integrity of the outcomes due to the biases that can occur when training AI models (Mondal & Lipizzi, 2024). This may pose significant challenges when using AI tools within training environments due to the responses that may be of a discriminatory nature as a result of biased training (Cerezo-Martínez et al., 2024).

Sahoo et al. (2024:765) highlight six aspects of modern AI technologies: i) machine learning (ML) that uses sets of algorithms to make informed decisions autonomously; ii) NLP that focuses on the ability to understand human language and interact accordingly; iii) computer visions using neural networks that enable facial recognition by interpreting visual data and make decisions based thereon; iv) the combination of robotics and AI which saw the introduction of autonomous vehicles and assistants; v) and reinforced learning that also makes use of algorithms to monitor patterns in behaviour and rectify actions and decisions by means of trial and error.

Figure 2.1 refers to some of the most common methods and techniques used to equip AI in machines to simulate human intelligence.

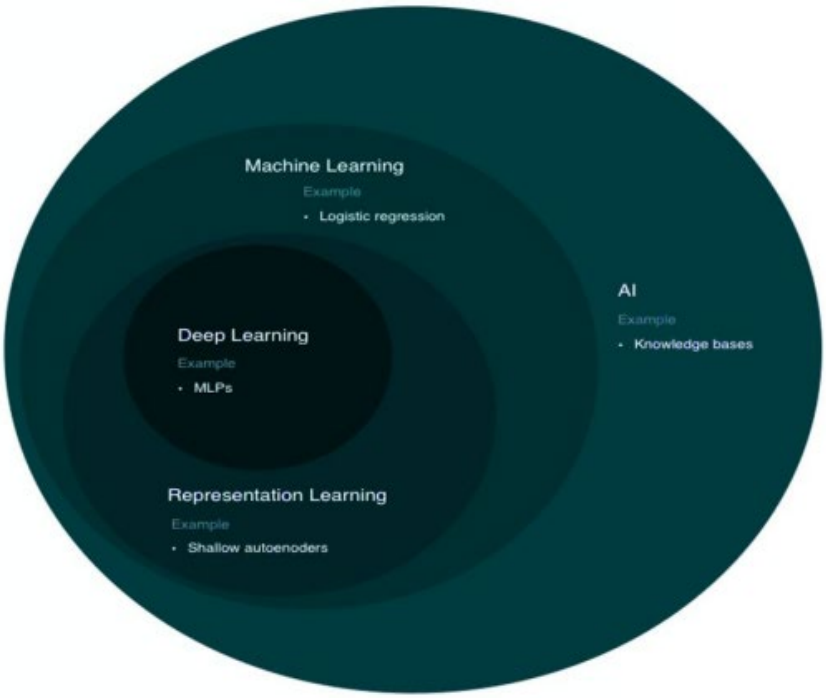

Figure 2.1: Methods in AI (Source: Shrivastava et al., 2024:5503)

As concurred by Alnuaimi and Albaldawi (2024:2)ML is a branch of computer science that focuses on self-learning capabilities enabled through the analysis of data using statistical modelling to determine relationships and predict outcomes based on this analysis. This is a continuous process that surpasses human-like cognitive abilities; however, it is limited in its ability to effectively extrapolate without generalised sample representation (Kapoor et al., 2024:9) .

Barbierato and Gatti (2024) explain the five paradigms of ML as follows: i) *imitation learning* is the process of recreating an action or response based on behaviour that has previously been

observed in a certain environment; ii) *reinforcement learning* involving the discovery of certain actions that would lead to a specific outcome; iii) *supervised learning* refers to training of the system or model through labelled datasets that is then used to correlate inputs with outputs; iv) *unsupervised learning* is driven by labelled datasets but uses algorithms to determine an outcome that is then arbitrated; v) *semi-supervised learning* is the combination of supervised and unsupervised learning techniques, which are trained using input-only and coupled input-output datasets to improve the model's performance. Despite its complexity, enabling the intended outcomes, Chai et al. (2024:50) argue that ML is still highly dependent on historical data for effective automated decision making.

Deep learning refers to the extensive analysis of big data, using neural networks, which is then processed for decision-making that enables functionality such as image recognition or autonomous physical action. Yadav and Yadav (2024:28) reference the current usages of deep learning in practice, which includes: i) diagnosis and treatment in the healthcare sector using algorithms in medical imaging; ii) mitigating fraud in the financial sector by identifying anomalies in transaction patterns; iii) the enablement of autonomous vehicles through object recognition and proactive decision making; iv) managing crop health in the agriculture sector by analysing satellite images; and v) virtual assistants through voice and speech recognition.

Degadwala and Vyas (2024:61) recognise that deep learning is achieved through computers that are trained using large sets of unstructured data, which are then used to form multi-layered neural networks. While these networks are integral in Big Data processing, there are limitations because of the lack of interpretability and transparency in the algorithms, which results in the complexity of knowing how an outcome was achieved (Barbierato & Gatti, 2024). Moreover, this poses challenges in diagnosing and correcting any bias that may occur as predefined criteria are hampered (Koçak et al., 2024:80). Obanewa and Olope (2024:2033) emphasise that widespread datasets are required to train neural networks for accuracy in order to ensure high-performing models.

Zhu et al. (2024:173:2) explain that representation learning is a subset of ML and contributes to the success of the techniques used to achieve human ingenuity in systems. Representation learning, closely linked to unsupervised learning and more commonly referred to as self-supervised learning, focuses on the automated discovery of raw and unlabelled data for predictive analysis and otherwise complex decision making (Kosaraju, 2024:70). Despite a reduced dependence on labelled datasets, representation learning models (RLMs) are susceptible to misleading outcomes due to the incompleteness of the datasets (Joseph & Uzondu, 2024:1739). This, therefore, contributes to the resistance to the adoption of AI technologies and can be detrimental to its use and purpose within an educational environment.

2.3 Artificial intelligence drivers

The growth of AI is a testament to a multitude of factors that has driven its innovation over time. These factors, considered the drivers of AI projecting its use and adoption in various sectors, include computational advancements, the availability of Big Data, the widespread adoption and improvement of ML, and the economic benefits of the use thereof.

2.3.1 Computational advancements

Computational power and enhanced processing are some of the key drivers of AI, given the ever-changing redevelopment of hardware that is used in AI developments. According to Shi (2024:97), hardware accelerators such as Graphics Processing Units (GPUs), Field-Programmable Gate Arrays (FPGAs) and Application-Specific Integrated Circuits (ASICs) have resulted in the processing of large amounts of structured and unstructured data more efficiently. Iqbal et al. (2024) further argue that hardware such as GPUs allow algorithms to perform at an elevated optimum level and perform complex tasks. While the optimism for these drivers is widespread, the limitations of hardware availability and lack of infrastructure play a major role in the accessibility of AI in less developed regions (Ade-Ibijola & Okonkwo, 2023:109). This ultimately hinders the global adoption and use of new AI technologies (Abanga & Dotse, 2024:17).

2.3.2 Big Data

Bickley et al. (2024:114) highlight the interdependent relationship between AI and Big Data by emphasising the co-dependency of AI models on the availability of large datasets, ultimately used to strengthen advanced predictive analysis. Olorunsogo et al. (2024:482) argue that the juncture of AI and Big Data has resulted in amplified data-driven approaches that far exceed traditional methods of the past. However, Padmanaban (2024:20) highlights the importance of the quality of Big Data, because poor data quality could result in inaccurate decision-making. A study conducted by Idoko et al. (2024:90) emphasises the importance and accuracy of Big Data by highlighting that data-driven algorithms enable automation and analysis that contribute positively to global markets in terms of efficiency and competitiveness.

2.3.3 Machine learning

AI models are dependent on ML techniques that enable human cognitive functions through ambiguous programming by facilitating pattern recognition, learning from past experiences, and then using the outcomes to aid deductive decision making (Alnuaimi & Albaldawi, 2024:2). Abd-Alhussain et al. (2024:191) aver that the learning, prediction and decision-making abilities are achieved through the use of mathematical models and technical procedures, while a standardised workflow of cleaning the data, feature selection, selecting the appropriate model, training the model using validation sets, and then testing the model all contribute to the overall

effectiveness of the practical use of AI (Maqsood et al., 2024). While studies prove the effectiveness of ML for the advancement of AI technologies, Kothamali et al. (2024:94) note that generalisation is still a challenge when learning models are presented with newer data sets. Furthermore, AI models driven by ML algorithms are challenged when it comes to context-specific reasoning, resulting in indecisive and broader than necessary reasoning (Saban & Dubovi, 2024:7).

2.3.4 Economic benefits

Organisations can benefit significantly from the integration of AI in their operations. Trabelsi (2024:143) references bank reports that emphasise the use of AI to improve productivity growth in the labour force, optimise service offering and quality, and utilise algorithms to detect fraud and suspicious activity. While Sultan and Sultan (2024:829) suggest that the correlation between the advances in AI and improved economic performance could result in the eradication of monotonous jobs, improved customer service in the financial sector, predictive maintenance and upskilling in scarce sectors, Tiwari (2023:1) argues that this automation could result in job displacement and the redundancy of lower-skilled workers. Moreover, the increased unemployment rate and income inequality can pose challenges to already struggling economies (Tiwari, 2023:5). Furthermore, Pimenow et al. (2024) highlight the increased energy consumption of AI-driven technologies due to the computational processing they require, posing significant economic and environmental challenges that can be globally detrimental.

2.4 Applications of AI

Sangwan and Bansal (2024:4) reference several sectors where AI has been deemed beneficial, e.g., healthcare, finance, the automotive industry, entertainment and education. In the healthcare sector, AI has been fundamental in automated disease surveillance that enables the rapid early detection of diseases and the identification and spread of infectious diseases (Olorunsogo et al., 2024:482). Ali et al. (2024:17) concur this by demonstrating the essential use of AI in cancer treatments that range from early detection of cancer cells to the projected outcomes, mainly to minimise the errors related to diagnosis and treatment. These studies underline the importance of the use of AI in the healthcare sector, however, not without its challenges.

While Shrivastava et al. (2024:5504) discuss the use of AI for ailment detection in medical imaging such as X-rays, CT scans and MRIs, and further use for personalised treatment plans and the analysis of drug efficacy, they failed to address limitations that may exist in detecting less common and not widely documented or researched diseases. A study conducted by Clark and Bailey (2024:11) found inconsistencies in disease detection using AI-powered diagnostic

systems that fail to generalise across different clinical settings, necessitating human oversight to ensure accuracy. The financial sector realises the benefits of the integration of AI with aspects such as fraud detection, autonomous credit scoring and trading using algorithms (Sangwan & Bansal, 2024:4).

Innovative AI solutions have equipped financial institutions with the tools needed to manage portfolios with the least amount of risk, and navigate overall risk related to credit scoring and fraud (Wu, 2024:18). Hidayat et al. (2024:125) concur with the use of AI for managing risk through fraud detection, and further details the additional uses for predictive analysis in investments, automated tax planning using company data, predicting the financial performance of a company, the ability to automate routine processes using AI-based robotics process automation, market analysis using external data sources, and providing personalised customer service using AI-enabled chatbots. While the uses of AI in the financial sector prove beneficial, studies fail to address the ethical concerns relating to algorithmic bias (Chai et al., 2024:52) that may lead to unfair credit and lending decision outcomes.

Lad (2024:374) describes the key uses of AI in the automotive industry as the ability to achieve precision in custom manufacturing through the optimisation of the tool path. While Salian (2024:66) argues the effectiveness of AI in automotive manufacturing by identifying inefficiencies in the supply chain and the ability to upscale while alleviating the risks involved, the practical difficulties in implementing AI solutions for this purpose in small or resource-constrained companies are not explicitly considered. Trabelsi (2024:149) vouches for the use of AI in manufacturing and production for control, self-correction of workflows and optimisation, but fails to acknowledge the substantial capital investments made by big corporates to advance AI technologies (Rahman et al., 2024:616).

AI video generation, made possible with text-to-video models such Sora AI and King AI, has gained popularity in the entertainment sector (Tian, 2024:52). Furthermore, AI has been remarkable in the animation realm for virtual character design, character animation, voice synthesis and acting, generating backstories for characters, and facilitating dialogue and interaction between animated characters (Pandit & Kirdat, 2024:2829). However, Sternberg (2024) argues that the overreliance on AI may hinder creativity due to the lack of mental expression often related to creative arts. The education sector has since benefited from the modernisation of AI. According to Alkan (2024:486), AI offers a personalised learning experience, at tailored speeds, which caters to the differing learning styles and levels seen in students. Tahir et al. (2024:1470) argue that AI is beneficial in the customised design and delivery of teaching content and can further be used in assessments to evaluate learner and group progress and provide valuable feedback.

Furthermore, the recognisable uses of AI include internal support offering in network operations. This can be seen in the case of a virtual assistant, dubbed AIOps, which is used to monitor computer systems by performing health checks, service operability and providing autonomous solutions to resolve network-related problems (Alsaati, 2024:1263).

2.5 Generative AI in training environments

Generative AI exists within the domain of AI technologies, enabling the processing of Big Data using algorithms and creating human-like responses in the form of images, text, audio content and graphics (Sahu & Grover, 2024). Al-Dahoud et al. (2024:405) highlight the most popular examples of generative AI built by OpenAI such as ChatGPT, DALL-E and GPT-4. The first instance of ChatGPT, i.e., GPT-3.5, uses a generative pre-trained transformer (GPT) architecture that enables NLP and output to simulate human conversation. GPT-4, succeeding the GPT-3.5 model, allows for more advanced and complex input processing that is applied to statistical and mathematical solutions, technical coding and generating empathetic responses. DALL-E uses the GPT-3 model to process natural language and generate images based on text (Al-Dahoud et al., 2024:406–407).

While the current generative AI model offering is deemed beneficial in educational environments because of its capability to automate instructional tasks and create focused and personalised content (AlAli et al., 2024:1020), Mimoudi (2024:274) questions the inclusivity of generative AI models due to the lack of empirical evidence of the same beneficial offering in languages other than English.

2.5.1 AI-enabled chatbots

Digital communication has been transformed with the introduction of AI-enabled chatbots given its benefits in the commercial sector, revolutionising the way in which businesses are now able to communicate with their customer base (Nze, 2024:35). According to Kurniawan et al. (2024:4), AI-enabled chatbots are beneficial in their ability to simulate human-like conversations using voice or text recognition. The offering is enabled by leveraging ML algorithms and NLP models that facilitate the behaviour seen in AI chatbots (Karyotaki et al., 2024:44; Ekechi et al., 2024:1266). While a study conducted by Rana and Jain (2024:332) found that AI-enabled chatbots are useful in making information available that is general in nature by providing context about a business and its product or service offering, they found that they lack the ability to address specialised queries. Despite its nuances, Ekechi et al. (2024:1263) attribute the popularity of AI-enabled chatbots in customer support environments to their ability to act as sophisticated virtual assistants, improving the support offer to customer bases and enhancing the customer experience.

2.5.2 Benefits of AI in training environments

The introduction of AI in learning environments have digitised and transformed the way content is delivered and consumed. According to a study conducted by Suntharalingam (2024:723), AI-aided learning resulted in improved academic achievements and knowledge retention, contributed positively to skills development seen in learners, and tailored learning styles through algorithmic feedback mechanisms. Bhandare (2024:2) concurs that the practical integration of AI is beneficial for immediate evaluation because of the real-time feedback received during interaction, which can be used to improve performance and motivate learners.

Rohde et al. (2024:121) highlight adaptive learning systems as an AI benefit, offering personalised learning plans that address individual learner needs as opposed to the generalisation of a larger cohort. Moreover, the nature of AI content delivery offers an enhanced user experience through flexibility, accessibility and practical demonstration, ensuing enriched engagement with the learning material (Rohde et al., 2024:122). Despite the justification for benefits such as learner engagement and tailored approaches, Elam (2024:88) and Tahir et al. (2024:1472) agree that reliance on AI-based outcomes may hinder learners' cognitive development by creating dependency and reducing critical thinking skills.

Nurjanah et al. (2024:1519) highlight the administrative benefits in pedagogy that aid facilitators with grading assessments, identifying learning deficiencies, and providing comprehensive and timely feedback. According to Bajpai (2024:1954), the benefits can be attributed to advancements such AI-powered virtual classrooms and remote learning enabled with chatbots, automated transcription and interactive tools alike. While Puri et al. (2024:90) argue that AI-enabled platforms facilitate continuous learning because of the ease of access and availability, it fails to account for the emotional and cognitive needs of learners to ensure a holistic experience.

2.5.3 Efficacy of AI

The integration of AI technology in various sectors has proved effective since its adoption. A study conducted by Huang and Lee (2024) found that the use of AI technology has seemingly provided better results than the traditional methods of content delivery and teaching methods. Ekechi et al. (2024:1262) visually present five grouped qualities and benefits of AI-enabled chatbots, depicted in Figure 2.2 below, which include: i) properties of scalability and flexibility of AI-enabled chatbots; ii) cost-saving benefits because of reduced human involvement; iii) accuracy and quality of outputs; iv) advanced analytics and security enabled through algorithms and learning models; and v) productivity and efficiency achieved through automation.

Figure 2.2: Schematic of chatbots quality and benefits (Source: Ekechi et al., 2024:1262)

The efficacy of AI technologies is dependent on the conjunction of the qualities and human involvement. While AI-enabled chatbots are effective when the user experience interacting with the chatbot is positive, Rana and Jain (2024:332) caution that poorly designed chatbots that fail to meet users' needs can drive them back to traditional support channels. Bhandare (2024:2) emphasises the importance of human experts in validating AI-generated material for accuracy and relevance, which results in achieving superior training programmes. While the tangible efficacy of AI technologies is observable in the benefits achieved, it is crucial that factors such as data quality, adoption, standardisation and regulation are also considered (Puri et al., 2024:90). Furthermore, the efficacy of AI can be realised by effectively managing challenges related to implementation, ethical concerns, and technical factors (Bhandari et al., 2024:3055).

2.5.4 Challenges of AI in training environments

There have been considerable benefits realised from the integration of AI tools in training environments; however, it is important to acknowledge the challenges that accompany its use. A study conducted by Vij and Agarwal (2024:42) found that while the personalisation of learning content offered by AI tools had a positive outcome on academic performance, the lack of proper infrastructure, including hardware, software and effective training of facilitators, could counteract the benefits achieved. Eden et al. (2024:10) emphasise infrastructure readiness as a concern, and underline the importance of investment into resources and development, adherence to regulation and legislation, and the prioritisation of inclusive design and development to precaution against bias. Challenges posed by algorithmic bias can result in

inaccurate responses that may disadvantage minorities; thus, it is imperative that AI models are trained using balanced datasets (Elam, 2024:88).

Despite the personalisation of content, failure to address bias can lead to unfair learning outcomes. AlAli and Wardat (2024:790) urge developers to be proactive in addressing the impact of algorithmic bias by training models using diverse datasets and introducing effective detection and correction methods. The digital divide poses additional challenges in training and educational environments, resulting in inaccessibility for certain demographics of students based on economic and social inequalities (Mafara & Shehu, 2024:110). Therefore, Joseph and Uzondu (2024:1739) encourage a concerted effort to address the inequalities when integrating AI tools into learning environments.

2.5.5 Ethical and practical limitations of AI in training environments

Data privacy is noted as a key ethical concern for the use of AI in education. AI tools are largely dependent on the availability of data to function effectively, thus requiring the collection of sensitive student data such as academic reports, learner behaviour and personal information (Mimoudi, 2024:277). Tahir et al. (2024:1472) concur that privacy can be compromised because of the susceptibility and overexposure of children through facial recognition and recommender programmes. Eden et al. (2024:10) argue that in order to ensure the deployment of AI tools ethically and responsibly within the education realm, stakeholders must consider principles such as fairness, inclusivity, transparency and accountability.

Elam (2024:90) raises the concern of the adoption of the AI tools by teachers and facilitators, citing that in their study, more experienced teachers were opposed to the use of newer technologies and more reliant on their own experience, while pre-service teachers were more open to the use of AI tools. Mimoudi (2024:276) further highlights the practical limitations educators face with adopting new complex technologies due to over-commitment with inadequate resources, which may hinder the adoption and integration of AI technologies into their stretched instructional responsibilities. Therefore, AlAli and Wardat (2024:788) argue the importance of redefining the roles of educators and facilitators to enhance capabilities, thereby ensuring effective integration of AI tools in learning and training environments and reducing the possibility of redundancy of traditional roles.

2.6 Implementation Science

Implementation Science (IS) is a framework focused on the promotion of systemic adoption into real-world settings through systematic and pedagogical evidence (Chu, 2024:281). Evidently used in a study of health-related system intervention, Chu (2024:282) describes the IS framework as effective in its means to understand how to integrate systems into practice

and analyse best practices to encourage implementation and sustainability of the system in an organisation. The unique appeal of IS, compared to other models that assess systemic acceptance, is that it also focuses on evidence-based long-term implementation and successful adoption strategies for new technologies (Ramanadhan et al., 2024:47).

In the scientific concept design by Curran (2020). THE THING is used to pose a series of questions that contextualise the process of adopting a new system for the purpose of sustainability. Figure 2.3 graphically presents the tenets of THE THING concept.

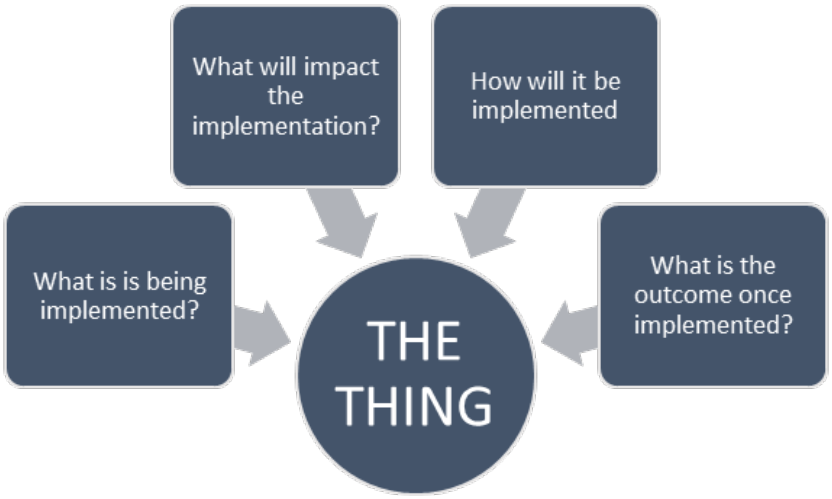

Figure 2.3: Visual representation of THE THING (as described by Del Pozo et al., 2024:4)

Del Pozo et al. (2024:4) dissect the concept of THE THING into four aspects: i) the first focusing on the actual change or innovation targeted for implementation; ii) the second relating to the impact of the actual implementation, which may include factors such as costs and potential barriers that could affect adoption; iii) third, the implementation strategies that address delaying factors and the implementation roadmap; and iv) lastly, the predictive evaluation of the implementation outcomes relative to user adoption and longevity of use, service-related outcomes highlighting internal effects, and, ultimately, the distal outcomes addressing the resolved need that drove the implementation.

Alternative traditional theoretical approaches can be argued for the use of AI for training and development, including models such as the Technology Acceptance Model (TAM) and Diffusion of Innovation (DOI) Theory. TAM focuses on user acceptance by measuring the perceived usefulness of the system and the ease with which a user is able to interact with the respective system (Reddy, 2024). Harryanto et al. (2019:38) cite the origins of the TAM model developed by Fred D. Davis in 1986, where the intent of the model was to assess the cognitive acceptance of technology to determine its effectiveness and usefulness. According to Prabowo et al. (2024), the model provides a framework to assess user behaviour that would lead to the

acceptance or rejection of technologies. While TAM proves valuable in assessing the initial user perception of a system, Kim (2024) argues that it does not adequately address barriers such as technological literacy, digital divide, data privacy, apprehension to change, and the integration of new technologies. According to FakhrHosseini et al. (2024:990), the TAM model is linear in approach and fails to acknowledge factors beyond a general context, not considering the specific contextual variables. Due to the complex nature of AI integration in training environments that includes ethical, regulatory, organisational and technological assessment (Ejjami, 2024), the sustainable integration and long-term use require a multitude of factors to be considered. The limitations of TAM to provide an expanded view, apart from usefulness and ease of use, deem it unsuitable for theoretical analysis on AI use and adoption.

The DOI theory categorises the perception of a new system or technology and the spread of innovation over time (Spinnewijn et al., 2024). The theory distinguishes adopters into five categories, namely: i) innovators, ii) early adopters, iii) early majority, iv) late majority, and v) laggards (Rogers, 2003). The five groups can be used to perceive the adoption rate of intended users of a system within a particular organisation (Chen, 2024:8). According to Wurster et al. (2024), the DOI theory is invaluable in mutually identifying person-related and innovation-related factors that influence the spread of the use of emerging technologies. This theory is effective in determining influential factors such as compatibility, complexity, trial-ability and observability (Chille & Mollel, 2024:34), however, it lacks the ability to address the factors related to the long-term sustainable use of new technologies.

The DOI theory does not provide useful mechanisms to strategise the effective implementation of new systems or services, therefore proving dissatisfactory in the analysis of long-term implementation and use of AI in training environments. Further supporting this, Sziklai et al. (2025) note that the DOI theory assesses a linear trajectory, which limits the level of analysis required for the dynamic nature of generative AI models.

Although predominantly used in health sector research (Shelton & Brownson, 2024:174), the IS frameworks can be deemed suitable for use in other areas as well. The integration of IS use into other sectors is supported in a study conducted by Younas and Reynolds (2024:115), which highlights the effective bridging of AI and implementation strategies to support IS-leveraged outcomes. Figure 2.4 presents the types of outcomes in the application of IS research.

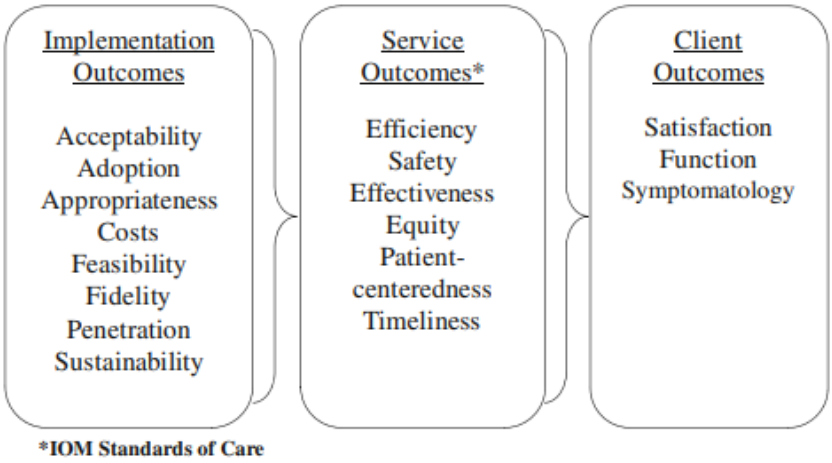

Figure 2.4: Types of outcomes in implementation research (Source: Proctor et al., 2011:66)

Chays-Amania et al. (2024:8) argue the effectiveness of the model presented by Proctor et al. (2011:66) in determining the use of IS to implement solutions based on empirical evidence rather than conceptualised evidence. Furthermore, they support their argument using the eight implementation research outcomes, namely: i) acceptability based on the satisfaction of the stakeholders; ii) adoption based on user assimilation of the innovation; iii) how the innovation appropriates to the need and context of the organisation; iv) the financial costs related to the implementation; v) the feasibility of the innovation in terms of use in targeted settings; vi) fidelity that looks at the accuracy of implementation according to the planned specifications; vii) how well the innovation has penetrated the environment often determined by the uptake of the innovation; and viii) assessing the longevity and sustainability of the innovation once in use (Chays-Amania et al., 2024:8). The dimensions of this model are considered useful in the iterative refinement associated with AI technologies (Reddy, 2024), leading to continuous improvement, which is rarely achieved with theoretical models such as TAM and DOI.

Therefore, IS as a theoretical approach provides the ability to use evidence-based outcomes to systematically analyse the efficacy of adoption and strategise the integration of a new system or change into a community (Chriqui et al., 2023:882; Chu, 2024:282). Moreover, in comparison with the TAM model and DOI theory, the IS framework offers a more comprehensive and robust approach to assessing technological and organisational readiness as well as the sustainability of technological systems over time.

2.7 Summary

This chapter comprehensively reviewed existing literature on AI research in various sectors. AI, its evolution over time and its widespread adoption were introduced. Attributed to the technological landscape development, AI is a culmination of various technological architectures, which include ML, NLP, deep learning and other algorithmic models. The

chapter highlighted the key drivers of AI advancements as the availability of Big Data and advanced computational improvements, which enable efficient data processing to deliver favourable outcomes. The combination of AI and Big Data is essential in the efforts to achieve greater efficiency and business process optimisation (Bickley et al., 2024:114).

The chapter furthermore detailed current applications of AI, explaining the benefits reaped in the healthcare sector, the financial industry, the automotive industry, the education sector and entertainment. The benefits varied from disease detection and monitoring, financial modelling and aided decision making, streamlined supply chain management and autonomous stock monitoring, personalised learning paths and feedback mechanisms, visual production based on text-to-image commands, to the overall economic benefits achieved by businesses. The chapter narrowed down to generative AI technologies and their current use and efficacy in training environments, with evidence mainly cited from studies conducted in educational teacher-student-based environments. In its current use, studies found that AI-enabled technologies provide outcomes such as the automation of administrative tasks, real-time feedback mechanisms, personalised learning paths based on interactions with the learners, and encourage continuous learning.

The existing body of knowledge demonstrated the effectiveness of AI technologies for educational settings but did not adequately contextualise the benefits of training environments in SMEs. While there is widespread agreement on the overarching benefits of AI-enabled training tools, nuances such as overreliance and interdependence on AI tools, data privacy, technological availability, infrastructure readiness, algorithmic bias and the cultivation of required skillsets raised areas of concern. Further highlighting this, the chapter delved into the challenges related to AI integration, such as technical readiness, resistance to change, and sustainability of AI technologies over time.

Recommendations for these challenges include the availability of resources, support, ensuring that data protection policies are established, and promoting transparency and accountability (Mafara & Shehu, 2024:110). This study aims to bridge that gap by developing a framework that can be used towards ensuring the considered and effective implementation of an AI-enabled chatbot for customer service training in SMEs. The chapter concluded with the use of AI as an underpinning theory that can be used as a guide for the effective implementation and sustainable adoption of technological systems. Developing the framework through the lens of the Implementation Science framework ensures a structured approach for effective implementation, sustainability and enhanced learning outcomes. The IS framework is traditionally used in the health sector as an evidence-based approach to implementing and adopting new systemic innovations. Despite the sparse evidence of using the IS framework as

a theoretical approach in technological research outside of the health sector, the framework offers beneficial principles that can be applied to other sectors. The efficacy of IS can form the basis of using the framework outside the health care sector, with the motivation of evidence-based outcome implementation as reasoning.

Unlike popular theoretical models such as TAM that assesses perceived use and ease of use, and the DOI theory that assesses factors that influence the spread of adoption, the IS framework provides an evidence-based approach to the effective implementation of emerging technologies. It offers a practical guideline to the adoption and sustainable implementation of an AI-enabled chatbot in training environments in SMEs, while considering longevity through iterative continuous improvement.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlines the methodological approach used to investigate the effectiveness of introducing an AI chatbot to enhance customer service training within small to medium-sized enterprises. The study aimed to evaluate the use of an AI tool in the customer service training environment and assess the viability of the tool as a potential enhancement to human-facilitated training techniques in terms of product and business knowledge. The methodology was also employed to answer the following research questions:

> How can the utilisation of AI support tools improve customer service training?
>
> What are the factors influencing the diffusion of AI innovations to improve customer service training within the business?
>
> What elements will contribute to a framework that assists in the use and adoption of AI tools to enhance customer service training?

Guided by the research onion model as adapted by Saunders and Tosey (2013), this chapter discusses the research philosophy underpinning the study, the research method, and the research design which details the structure of the study and provides the rationale for this approach. Thereafter, the chapter delves into the data collection and analysis, as well the ethical considerations guiding the study.

3.2 Philosophical assumption

This study is centred on interpretivism, which argues that reality is socially constructed by the experiences and perceptions of people that ultimately shape reality (Junjie & Yingxin, 2022:11; Balushi, 2018:726). The interpretivist paradigm is appropriate for this study, as the study investigates the experiences of customer service representatives making use of an AI chatbot to complement their training in an effort to improve their customer service offering in a live environment. This approach blends the elements of epistemology and ontology, equally applicable in the context of participant experiences relative to real-world scenarios. As cited by Fasco et al. (2024:2747), epistemology is concerned with the study of knowledge in terms of how participants of a study perceive and interpret their experiences using the AI chatbot. Ontology refers to the interoperability of nature with information systems (Guizzardi, 2020:184), highlighting the objective approach to introducing and implementing an AI chatbot into the organisational structure.

The study presents both the epistemological and ontological views, emphasising the participants' subjective experiences and the objective conditions required in the organisation's landscape to ensure successful adoption and use and an AI tool to enhance the current training

experience. The dual perspective allows for the understanding of the AI tool as a technological enhancement in conjunction with the impact perceived in the human experience.

3.3 Research method

This study followed the qualitative research method in line with the interpretivist paradigm. Qualitative research explores the behaviours and experiences of participants (Islam et al., 2021:2). The qualitative approach allows for researchers to gather and analyse data from the interactions with the participants through research techniques such as interviews, observations and focus groups (Alamri, 2019:65). The analysis may result in the ability to uncover patterns and insights from data that may not always be easily quantifiable with other research approaches, such as quantitative and mixed-method research (Busetto et al., 2020:14). The usefulness of this method for understanding user experiences in emerging and evolving topics makes the qualitative approach highly valuable for exploration in this study.

3.4 Research design

The case study design was selected in this study to contextualise a prototype of an AI tool, understanding its impact on improvement and performance in a real-world setting, and how it can be applied for customer service training.

The case study design was selected for more than one reason, namely, due to its usefulness when adopting a systems approach (Gammelgaard, 2017:910) and its ability to grasp the realistic dynamics of a phenomenon using a selected sample of participants Lavarda and Bellucci (2022:540). Ratnasari & Sudradjat (2023:430) suggest that case study design can include a variety of data collection techniques, which draw on interviews and participant observations, which serve as useful methods for this study. The data was collected from an SME organisation, Company X, allowing the researcher to gain insight into the behaviour of its customer service representatives. This single case study approach enabled a detailed exploration of the effectiveness of the AI chatbot in addressing the gaps identified in the organisation's training.

Purposive sampling was chosen to select participants based on their direct involvement with the chatbot prototype. Nyimbili and Nyimbili (2024:98) advocate that this sampling method involves selecting a sample from the population based on the researcher’s knowledge and experience related to the topic. The purposive sampling technique ensured a targeted sample of the population for effective data collection.

The initial selection was made by identifying potential participants according to their roles in Company X, specifically choosing only those in customer service. Subsequently, ten individuals were selected from this group to participate in the study. The purposive sampling

technique ensured a targeted sample of the population for effective data collection. In doing so, the participants provided a variety of perspectives on the tool's impact on training through their differing levels of experience.

3.5 Data collection

The study employed the experimental use of an AI chatbot prototype, followed by semi-structured interviews, acting as the primary data collection method. Semi-structured interviews allow for the combination of structured and unstructured interview formats to achieve flexibility in the conversation (Thille et al., 2021:546). As concurred by Balushi (2018:728), semi-structured interviews enable depth to be reached with the participants so as to fully grasp the context from their responses.

An AI chatbot prototype was developed and deployed for use to the ten participants selected for the study. While the study does not explicitly focus on the development of the AI chatbot prototype, the pilot prototype was tested with the participants to aid the framework developed in this study. The prototype was developed on a platform called Poe, powered by GPT-3.5-Turbo as the base bot. The Poe platform incorporates a knowledge base feature that enables the upload of documents, which include PDF and Microsoft PowerPoint (PPT) training documents of Company X. The conjunctional use of the generative base bot and established knowledge base ensures that the responses are tailored to organisational-specific processes and information.

Figure 3.1 presents the context diagram of the AI chatbot prototype that was developed using the Poe platform.

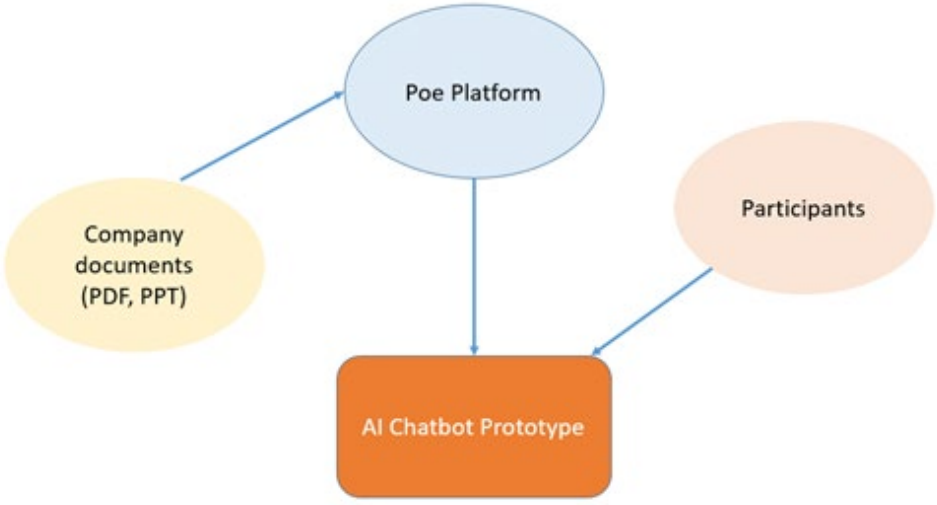

Figure 3.1: Context diagram of the AI chatbot prototype

The participants were required to use this chatbot for a week-long period in conjunction with their daily tasks and expectations. Each participant interacted and consulted with the AI chatbot at their discretion when assistance was required. Thereafter, each participant was interviewed to gather data on their experience following the use of the AI chatbot that was integrated into the systems they use every day. Data were collected post-assessment through semi-structured interviews, following the use of the prototype.

The research objectives and questions guided the development of the interview questions, ensuring a comprehensive set of interview protocols that allowed participants to provide a detailed perspective on their experience using the AI chatbot. The interviews were conducted virtually in May 2024. A series of 16 standardised questions guided the interviews to gauge perceived changes in training outcomes. Each interview lasted an average of twenty minutes and was audio-recorded with the participants' consent. The recorded audios were transcribed and analysed using the AI Toolbox modules of the AvidNote software. Thereafter, thematic coding was done using Excel spreadsheets to create a code book and tally the frequency of each coding category. This approach allowed for the systematic identification of key themes and corresponding codes from the collected data.

3.6 Data analysis

This study employed thematic analysis for the purpose of analysing the data collected. This method was selected as it is effective in the analysis of data collected from interviews given its systematic approach (Pearse, 2019:144), specifically semi-structured interviews in the case of this study. Thematic analysis is concerned with the process of analysing raw data to identify common patterns and themes that emerge from data collected (Ozuem et al., 2022:143). Further guided by Saunders and Tosey (2013), the analysis conformed to the deductive approach, which saw the eventual contextualisation of the key themes. The deductive approach anticipates a hypothesis, predicted theme or present theory, and is later confirmed through the results of the experiment or study (Szabó et al., 2023).

Thematic analysis was conducted in accordance with the six-phase analysis framework by Braun and Clarke (2006:92). Thematic analysis provides a methodical approach for identifying patterns across datasets to interpret participants' perceived experiences, behaviours and perspectives, drawing meaning therefrom (Clarke & Braun, 2017:297). The six-phase analysis acts a guidelines through the analysis process and is outlined as follows: i) familiarise yourself with the data to ensure depth and breadth by transcribing verbal data for understanding; ii) generating initial codes to highlight interesting aspects from the data; ii) searching for themes by arranging the codes into groups of potential themes and relationships between themes; iv)

reviewing themes; v) refining to derive defined themes; and vi) producing the report, which concludes the analysis and presents the findings of the study (Braun & Clarke, 2006:297).

Using the transcribed interviews, coding was conducted manually to generate the initial codes from the data. The codes were used for the systematic identification of patterns, organisation according to frequency, and interpretation of themes within the data set, which resulted in the code book used to validate the findings and discussions. Code books are particularly useful in structuring the information produced during the analysis phase (Thompson, 2022:1413). The code book and its tallied frequencies produced the study's refined key themes. Furthermore, the key themes were validated against the study's research questions to motivate validity and relevance.

Table 3.1 presents the codebook that summarises the recurring points highlighted by participants in the interviews. Table 3.2 presents the defined key themes, linking the codes to the overarching themes. Table 3.3 maps the key themes against the research questions to ensure coherence and relevance to the objectives of the study.

Table 3.1: Code book

Code	Description	Frequency
Addressing queries	Effective in addressing customer queries.	8
Traditional methods	Comparison to traditional training methods, i.e., traditional only versus hybrid versus chatbot only.	6
Business processes	Understanding of business processes with the use of the chatbot.	6
Boosting confidence	Boosting agents' confidence and ability to handle queries.	5
Accessing information	Effectiveness in accessing information previously known or unknown.	5
Content limitations	Limitations and challenges experienced when using the chatbot.	5
Long-term use	Long-term use of the chatbot in the functional environment.	4
Collaboration	Collaboration and knowledge sharing among colleagues while and after using the chatbot.	4
User-friendly	User-friendliness of the chatbot as newly integrated tool.	3
Streamlined processes	The ability of the chatbot to streamline existing and new processes.	2
Improved productivity	The productivity achieved with the use of the chatbot.	2
Convenience	The convenience of using the chatbot compared to methods currently being used.	3
Time-saving	The ability of the chatbot to save time.	3
Lack of Information	Lack of information in knowledge base.	3
General feedback	General feedback on the chatbot features and use.	3
Exceeded expectations	Preconceived expectations versus what was achieved using the chatbot.	2

Table 3.2: Key themes and corresponding codes

Key Theme	Corresponding Code
Access to information	• Accessing information • Lack of information
Ability to address queries and provide support	• Addressing queries • Boosting confidence • Content limitations • Exceeded expectations
Enhancing understanding	Business processes
Fostering collaboration and knowledge sharing	Collaboration
Saving time and increasing productivity	• Time-saving • Improved productivity • Streamlines processes • Convenience
Complement to traditional training methods	• Traditional methods • User friendly
Long-term viability	Long term use

Table 3.3: Key themes related to the research questions

Research Questions	Related Theme
1. How can the utilisation of AI support tools improve customer service training?	• Ability to address queries and provide support • Access to information • Saving time and increasing productivity • Enhancing understanding
2. What are the factors influencing the diffusion of AI innovations to improve customer services within the business?	• Saving time and increasing productivity • Complement to traditional training methods • Long-term viability
3. What elements will contribute to a framework that assists in the implementation and use of AI tools to enhance customer service training?	• Access to information • Fostering collaboration and knowledge sharing • Complement to traditional training methods • Long-term viability

3.7 Ethical considerations

This study followed rigorous ethical guidelines and considerations to ensure the safety and protection of the participants and protect the integrity of the research. Ethical considerations in research are important as they protect the rights of the participants, maintain the scientific and academic credibility of the findings produced from the study, and contribute to the validity of the research (Ederio, et al. 2023:2711).

The study applied the ethical considerations by obtaining ethical clearance and a letter of consent from the Department of Informatics Ethics Committee at the Cape Peninsula

University of Technology (see Appendix A). This approval was obtained to ensure the research considered factors such as participant consent, voluntary participation, minimising harm to participants, confidentiality and anonymity, and the ethical processing and use of the data collected.

Consent was obtained from the participants to be included in the study, as recommended by Kandi and Vadakedath (2022:43). Furthermore, as indicated by (Ederio et al., 2023:2714) all participants were informed that their participation was entirely voluntary and that they had the right to withdraw from the study at any time if they no longer wished to participate. Brittain et al (2020:931) state that the confidentiality and anonymity of participants are vital not only to ensure they feel secure enough to be open and honest during the data collection phase, but also to safeguard their privacy and interests.

Researchers should avoid exposing participants to any physical, social, or psychological threats during the study; therefore, attention must be given to minimising harm (Ederio et al., 2023:2715). All participants were anonymised by use of pseudonyms when collecting and analysis the data in order to adhere to ethical ideals. The participants made use of the prototype at their leisure, and the follow-up interviews were conducted at their preferred availability, and with complete confidentiality. Furthermore, all the data was solely used for the purpose of this study and no unauthorised individuals were given access to the raw data.

3.8 Data management

All audio recordings, transcriptions and other related documents were stored on a cloud server, adhering to password policies. This documentation is only available to the researcher, and academic supervisor on request. Each participant was assigned a pseudonym in the storage of the data and referred to by their pseudonyms when required. All identifying information was anonymised prior to analysis to protect the confidentiality of the participants. The data collected were exclusively used for the academic purpose of this study.

The management of the data adhered to the ethical standards of the Cape Peninsula University of Technology. Adhering to the institutional policy, the data collected will be retained for a period of at least five years. Thereafter, the data will be securely discarded to ensure alignment with security and integrity policies.

3.9 Summary

This chapter outlines the research methodology used to investigate the effectiveness of introducing an AI chatbot in enhancing customer service training within small to medium-sized enterprises. It further provides background on the philosophical assumptions, research design, data collection techniques, and data analysis procedures. The ethical considerations guiding

the study and the data management plan are also discussed. The analysis and findings of the study, along with the key themes identified, are highlighted in the next chapter.

CHAPTER FOUR: ANALYSIS AND FINDINGS

4.1 Introduction

The purpose of this study was to evaluate the use of an AI chatbot to enhance customer service training. Chapter Four presents the results of the data analysed and the interpretation of the results derived from the study. The analysis and findings of the study conducted are outlined, and the key themes identified are highlighted.

The study was conducted to answer the following research questions:

1. How can the utilisation of AI support tools improve customer service training?
2. What are the factors influencing the diffusion of AI innovations to improve customer service within the business?
3. What elements will contribute to a framework that assists in the implementation and adoption of AI tools to enhance customer service training?

Subsequently, the researcher conducted the study to achieve the following objectives:

1. To examine the utilisation of AI support tools to enhance customer service training.
2. To investigate and understand factors influencing the adoption of AI technologies to improve customer services within the organisation.
3. To develop a framework that assists in the implementation and adoption of AI tools to enhance customer service training.

A small to medium-sized enterprise (SME) was selected based on its size and learning and development structure. The chosen company did not have a fully operational learning and development department, thus making it relevant to the study. The researcher developed an AI chatbot prototype powered by a company-specific knowledge base in conjunction with GPT-3.5-Turbo. The AI chatbot prototype was developed using a platform called POE.com, which provides a low-code model to ensure ease and practicality for the prototype. The platform enabled the upload of content, such as PDF and Microsoft PowerPoint documents, to the knowledge base capability, which could be referenced in conjunction with generative AI to provide feedback to the user. The AI chatbot was privatised, restricting its use to only selected users.

The prototype was deployed to the company's Operations department, where ten customer service agents used it for a week-long period. Each participant was provided with a pseudonym profile to maintain anonymity and encourage free interaction with the chatbot. The researcher then conducted follow-up interviews with each of the participants to assess their experience

using the chatbot. The sample included a range of participants from legacy employees to new hires, contributing to a dynamic variation in the data collected. As the study focused on customer service training, the sample did not include any staff from other departments in the company. This ensured that saturation was reached in the responses received and data collected.

The research design and methods outlined in Chapter Three detail a case study method, together with semi-structured interviews as tool, to collect the data for analysis. According to Adeoye-Olatunde and Olenik (2021:1361), semi-structured interviews enable the researcher to achieve a comprehensive exploration of the research questions posed, ultimately resulting in a well-informed and insightful analysis. Protecting the anonymity of participants is important to avoid exposing individuals to unnecessary risks without any corresponding benefit (White, 2020:16). Hence, the researcher made use of aliases as required throughout the analysis, protecting the confidentiality of participants. As already stated, the participants selected were customer service agents from the Operations department of the selected company. The participants were chosen based on their role in the business and their involvement in customer service, ensuring that they were adequately equipped to interact with the chatbot.

The key themes, identified through coding of the data and thematic analysis, resulted in the following emerging themes: i) access to information; ii) ability to address queries and provide support; iii) enhancing understanding; iv) fostering collaboration and knowledge sharing; v) saving time and increasing productivity; vi) complement to traditional training methods; and (vii) long term viability.

The chapter concludes by explaining the benefits of the role of AI chatbots in the customer service environment, particularly access to information, saving time, increasing productivity, the ability to address queries and provide support, providing insight into the role of AI as a complement to traditional training methods, and long-term viability in customer service environments.

4.2 Access to information

Access to information emerged as a predominant theme, as the AI chatbot enabled access to vital information that customer service agents require to fulfil their daily duties in customer service operations. The data collected from the participants show customer service agents' significant appreciation for the chatbot's ability to provide quick and easy access to pertinent information. The use of the chatbot resulted in reduced time spent by customer service agents searching for relevant information, as the chatbot provided timely responses, which led to improved productivity.

Reducing the time spent retrieving information relevant to customer service agents can have a significant impact on the effectiveness of a business, as more focused time can then be dedicated to customer issues that require human engagement. In doing so, the productivity of the Operations workforce can be improved, resulting in increased customer satisfaction as queries are resolved more effectively and efficiently. The rapid delivery of information aligns with the fast-paced nature of society, enabling faster access to accurate information. Therefore, it can be deduced that the business is then in a better position to meet the evolving demands of customers.

Participant RP03 stated:

> *It was very easy for me to a point where I type in my question, then I do get an answer so that I can be able to attend to a client very much easier.*

Participant RP06 stated that the chatbot provided access to detailed information that would not have been available otherwise. The participants of this study were consistent in highlighting the chatbot's functionality in mitigating the time-consuming methods of acquiring information through traditional manuals or interaction with their human facilitators. The customer service agents were able to handle queries more effectively because of the immediate responses to various questions they posed to the chatbot. The chatbot was effective in providing immediate answers to questions without requiring the customer representative to manually search through documents.

Participant RP01 stated:

> *It makes more sense that there is one link with all the information in AI that is easier to access for the agents on the floor.*

The statement of Participant RP01 highlights the significant time savings and greater efficiency through the chatbot's utilisation. This aligns with the study conducted by Li and Miraj (2022), who found that AI-powered content delivery systems enable expansive accessibility to information. There were limitations noted in the content present in the knowledge base of the chatbot. Participant RP09 stated that the chatbot was particularly informative, however, it lacked some of the information required to answer certain queries, particularly for very company-specific information needed to assist the customer. Participant RP05 concurred that the bot lacked information in relation to certain queries and would be more effective with an advanced knowledge base to combat its content limitations. Rana and Jain (2024:332) concur that the generalisation of content produced by AI chatbots poses limitations due to the lack of complexity to handle nuanced inputs. Furthermore, one participant [RP01] highlighted the

importance of convenience by recommending a mobile application version of the AI-enabled chatbot for ease of accessibility.

4.3 Ability to address queries and provide support

The chatbot was able to address customer-related queries and provide an additional layer of support to customer service agents, hence identified as another key theme during the data analysis process. This factor proved beneficial as the chatbot could provide answers to a vast range of questions, thereby providing an enhanced level of support to agents. The domino effect of this resulted in adequate support being rendered to customers, contributing to the trust instilled in the chatbot to assist in their daily tasks.

Participant RP08 stated:

> *AI gives me confidence to answer the client's question back if I got the answer from AI. AI is there to assist with questions as well.*

Moreover, several agents emphasised the chatbot's ability to provide support that extended beyond simple queries, thus empowering customer service agents with the knowledge to address queries at all levels of complexity without having to rely on the intervention of their supervisors. According to Participant RP04, the chatbot was effective in assisting staff who are new or inexperienced, mitigating the need to resort to the help of their team leaders. The outcome is a testament to the amount of detail provided in the response to questions posed using the chatbot. As concurred by Participant RP10, the chatbot has the ability to answer almost every question and provides the information needed to support customers. Supporting the feedback from several agents, Participant RP03 found that their confidence in handling queries improved due to the prompt and informative nature of the responses provided. This feature assists in reducing the learning curve for new starters and enhances productivity by providing a support mechanism at their fingertips. It results in seamless nesting and team integration, facilitates a smooth onboarding process, and encourages continuous learning.

In contrast, Participant RP06 noted that the chatbot was not significantly different from other AI tools, delivering information already known to them; hence, RP06 did not actively use the AI-enabled chatbot to answer specific customer queries. This highlights the importance of ensuring relevance in the knowledge base and trained models to obtain quality outputs (Kruse et al., 2019:6410).

4.4 Enhancing understanding

Enhancing the understanding of business and process knowledge in customer service agents was identified as a theme during the data analysis stages. A recurring sentiment was that the chatbot enabled the understanding of simple and complex information, providing clear and

comprehensive information. An understanding of business-related information and processes equips customer service agents with the necessary knowledge and skills required to assist customers. The chatbot has the ability to fragment complex processes and wording and present it to the agents in a simple and comprehensible manner. The finding supports the observation made by Xu et al. (2020), who emphasise the output of contextually relevant responses supported by natural language processing (NLP).

Participants of this study, including RP10, noted that the chatbot was able to break down complex issues by using terms familiar within the organisation, thereby enhancing their understanding of products and services offered. Furthermore, the learning content was delivered in a standardised manner, ensuring that the information provided is accurate and uniform. One participant [RP01] noted that during a comparison with other participants, they all received the same answers to questions queried with the chatbot, reducing the potential for any human-related errors, miscommunication, or variance in information distribution. The standardisation is particularly important to new starters who are yet to become accustomed to the business processes and ways of work.

Moreover, enhanced understanding enabled by the use of the chatbot stands to promote a culture of continuous learning within the company, considering the chatbot’s capability to act as an easy and relevant information tool. A thorough understanding empowers customer service agents with greater autonomy and encourages self-directed learning and development, thus developing a more knowledgeable and capable workforce. Participants were able to benefit from the use of the chatbot, which reinforced learning and assisted with retaining knowledge, equipping the agents with the necessary understanding to address challenging customer queries over time.

4.5 Fostering collaboration and knowledge sharing

Several agents observed that the chatbot played a substantial role in fostering communication and collaboration among customer service agents. The nature and centrality of the chatbot encouraged information sharing and enhanced the collective understanding of the team. Participants who made use of the chatbot indicated that they were able to share information with other customer service representatives who were not necessarily included in the study. According to Participant RP09, the chatbot enabled the collaboration between agents and allowed for information to be shared among them.

The GPT-3.5-Turbo-powered chatbot used in this study was combined with the company's knowledge base. The elected technology ensured that the bot maintained accurate and relevant information, thereby providing customer service agents with the most up-to-date

information that could be shared among team members and across various sub-departmental structures. Furthermore, the chatbot provided a platform for agents not confident enough to ask for assistance from their supervisors or other staff members, thereby fostering a culture of collaboration, cohesion and inclusivity within the team and company, ultimately resulting in enhanced performance.

Participant RP04 stated:

> *The chatbot supports new employees by providing access to a wealth of knowledge and resources.*

Participants agreed that they were able to rely on the chatbot for guidance and answers, which provided a sense of support. They also felt more comfortable reaching out for assistance when required and sharing their experiences and insights. Inevitably, this fostered a culture of open communication and collaboration in the workplace. Participant RP05 emphasised that the knowledge gained from interacting with the chatbot and thereafter sharing this with colleagues could lead to improvement in servicing customers. Through its use, the chatbot can assist agents and management with identifying knowledge gaps and areas of improvement by analysing the trends in questions posed to the chatbot. However, Participant RP08 noted that interacting with the chatbot fostered independence in learning and assisting customers, reducing the need for them to interact with their colleagues.

4.6 Saving time and increasing productivity

Through the analysis of the data, saving time and increasing productivity produced another prominent theme. The automation of mundane tasks, such as manually searching for information or gaining access to a human resource, reduced the time customer agents took out of their day to understand business knowledge. The chatbot improved the efficiency and productivity of the customer service agents, enabling them to focus on more complex tasks. Employing automation and streamlining facilitated the removal of cognitive load from the customer service agents, which allowed them to manage their workload more effectively. This outcome is supported by a study conducted by Peng et al. (2022), who also found a reduction in training time and improved efficiency with the use of an AI bot.

4.6.1 Critical factors

Through the analysis of the data, certain critical factors influencing the theme of saving time and increasing productivity were identified. These factors included the ability of the chatbot to respond quickly to questions, which reduced the time previously required to address customer queries. This benefit was reflected in the responses received from participants, where the recurring factor was convenience in obtaining answers from the chatbot. The factor is in

contrast to the traditional methods that require manual searches in previously distributed hardcopy training manuals. Participant RP03 said the chatbot aided the rapid provision of answers that enabled faster resolution of customer queries.

Participant RP04 stated:

> *AI chatbot does that, it gives you efficient answers... it basically summarises everything you need to know in that short one minute of asking that question.*

Participant RP05 emphasised that the chatbot is especially beneficial to new starters because of its ability to provide immediate assistance, thereby reducing time wastage. The chatbot proved beneficial during peak volumes of queries, enabling customer service agents to respond quickly, leading to increased productivity.

The ability of the chatbot to provide consistent and accurate information ensured that all customer service agents received standardised quality information each time [RP01], which reduced the risks associated with human involvement. The analysis identified that participants noted the consistency and accuracy of the answers provided by the chatbot, resulting in time savings and the confidence achieved with using the chatbot.

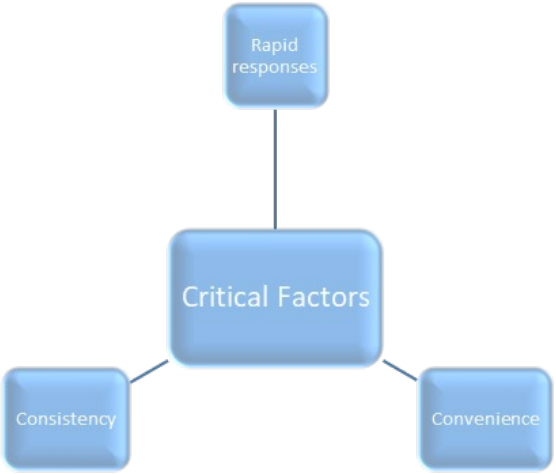

Figure 4.1: The critical factors identified in saving time and increasing productivity

Moreover, reducing the time spent on manual tasks significantly improved productivity. Standard queries requiring refreshing or quick responses were handled by the chatbot, allowing the agents to handle queries that were more complex and required human judgment and expertise. The effect was twofold, boosting the customer service agents' satisfaction and enhancing the quality of customer service provided. Participants [RP10, RP01, RP04] demonstrated collective agreement that they felt less stressed and more productive following the use of the bot, as the bot handled the routine queries where participants felt they needed

training refreshers. Although the majority of the agents boasted of time savings, Participant RP09 stated that the chatbot could not always answer the questions accurately or provide detailed information, resulting in them referring back to the company's website.

This feedback reveals inefficiencies in the chatbot that result in additional time spent locating relevant information. Furthermore, this scenario confirms the findings by Elam (2024:88) and Tahir et al. (2024:1472) that an overreliance on AI tools can affect cognitive development and hinder independent thinking.

4.7 Complement to traditional training methods

The chatbot was effective in contributing to knowledge gain and in providing support; however, the consensus among participants was that the chatbot would be beneficial in conjunction with traditional training methods. Traditional training methods are effective in providing foundational knowledge (Frank et al., 2020:2); the chatbot's capability ensures that it provides ongoing support and positive reinforcement. This capability ultimately ensures that customer service agents have continued accessibility to learning content, contributing to a self-sufficient learning culture. The chatbot bridges the gap between traditional formal training methods and the practical application of knowledge gained by providing on-the-job assistance instantaneously.

Participants [RP07, RP04, RP08, RP09, RP06] noted that the chatbot was effective in enhancing the way training is currently conducted, but emphasised that it will be more beneficial when combined with traditional methods. The chatbot was seen as beneficial in reinforcing training content and ensuring knowledge retention. Thus, the chatbot provides rapid and continuous access to information, which mitigates the need for repetitive training sessions.

The integration with traditional training methods created a learning environment that was more flexible and dynamic, allowing agents to feel more comfortable in upskilling. One participant [RP06] felt that the chatbot enabled independent learning and provided a platform for agents without requiring them to leave their workstations. The chatbot also allowed agents to engage with learning material more effectively. Therefore, the chatbot proved effective in complementing and reinforcing traditionally facilitated learning sessions. However, Participant RP08 stated that accessibility to a human facilitator would be beneficial to further enhance users' understanding of content produced by the chatbot. This statement aligns with Paranjape et al. (2019:7), emphasising the irreplaceable empathetic nature of humans in training environments.

One of the most important roles that the chatbot plays in customer service operations is that it addresses limitations that are associated with conventional training methods. It approaches factors such as delayed feedback and absent support by providing immediate access to

valuable resources. The chatbot's nature to provide immediate responses and support in real time clarifies any misconceptions and doubts in customer service agents, ensuring overall efficiency and enhanced productivity, leading to a more empowered and confident workforce.

4.8 Long-term viability

Long-term viability of the chatbot in the customer service training environment was also identified as a key theme in this study. The chatbot offered the ability to constantly keep the knowledge base updated with the most relevant information. AI chatbots are driven by machine-learning algorithms (Karyotaki et al., 2022:109), allowing them to process and adapt using the data collected. Karyotaki et al. (2022:111) further state that through pattern identification from large datasets, AI chatbots are designed to evaluate their feedback and performance and make the necessary adjustments where needed. These capabilities make the chatbot effective in the ever-changing customer service environment, enabling efficiency in the customer service agents' learning journeys. As customer service protocols and business policies evolve, the chatbot serves as a sustainable solution to ensure customer service agents' accessibility to the most current and accurate information.

Furthermore, the chatbot offers a cost-effective solution to evolving training needs. Traditional training methods often require expensive human resources and time spent away from daily operations in classroom-facilitated training sessions. Opportunity costs are involved in having customer service agents attend classroom-styled training sessions. Over time, the chatbot proves beneficial in cost savings as agents have access to training content at their fingertips, without needing to frequently attend classroom-based refresher training. According to Participant RP06, the chatbot could reduce the need for frequent training sessions.

Scalability is a key factor contributing to the long-term viability of the chatbot in the customer service training environment. The chatbot can concurrently handle large amounts of queries without degrading its performance and analyse semantics (Ismail et al., 2021), making it highly beneficial to growing organisations. During the period of the prototype deployment, the chatbot was able to handle the queries of all the participants at the same time, without sacrificing its effectiveness to any one of the participants. The ability to process multiple queries simultaneously is an invaluable feature compared to human facilitators who are susceptible to fatigue. Therefore, the chatbot is equipped to handle high-capacity requests during peak times, ensuring that agents remain efficient and productive in performing their daily duties.

Technical readiness is another factor that determines the longevity and viability of an AI chatbot within an organisation. Participant [RP02] stated that they had technical difficulties trying to access the chatbot due to their machine, which resulted in delays and minimal time spent using

the chatbot. Participant [RP10] experienced occasional downtime when trying to make use of the bot, which affected the overall experience and availability of the platform. The noted downtime highlights the need for reliability in the technology used within the organisation that supports the deployed enhancements. Figure 9 illustrates the features that contribute to the long-term viability of the integration of an AI-powered chatbot in the customer service training environment.

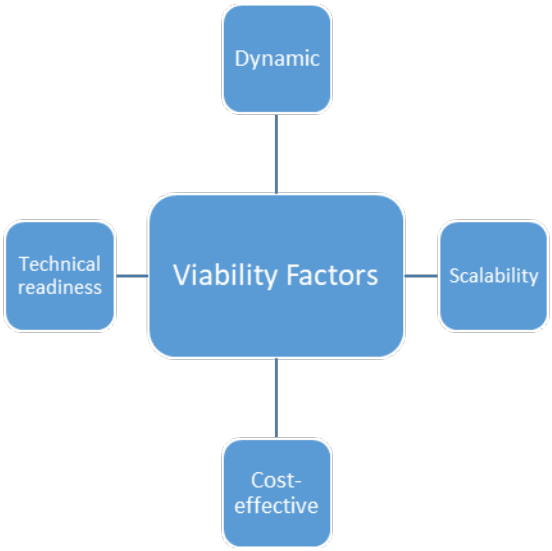

Figure 4.2: Features that contribute to the long-term viability of an AI-powered chatbot

4.9 Synthesis of findings

The findings produced from the study are consolidated in this section through a visual and tabular summary linking the key themes to the associated research questions. The intention of this visualisation is to illustrate the thematic impact on the aim of the study. Table 4.1 tabulates the key themes and interpretations relative to the research question and objectives.

Table 4.1: Summary of key themes and association

Key Themes	Characteristics	Associated Research Question
1. Accessibility to information	Provides quick, convenient and sufficient access to information.	RQ1
2. Saving time and increasing productivity	Automated responses to questions using generative AI remove the need to wait on resources and allow agents to focus on more complex issues.	RQ1
3. Ability to address queries and provide support	Addresses a range of queries relating to the business and products and provides accurate answers based on the knowledge base and AI engine.	RQ1 and RQ3
4. Enhancing understanding	Improves agents' understanding of various customer service and business-related processes and ways of work.	RQ1

5. Fostering collaboration and knowledge sharing	Encourages the sharing of understanding of business and product knowledge among agents and fosters intellectual conversation.	RQ1
6. Complement to traditional training methods	Offers continuous support and reinforcement of traditionally taught content.	RQ1 and RQ2
7. Long-term viability	Addresses learning limitations and is adaptable to remain relevant.	RQ3

Figure 4.3 illustrates the relationship between the key themes identified and the research question each theme addresses.

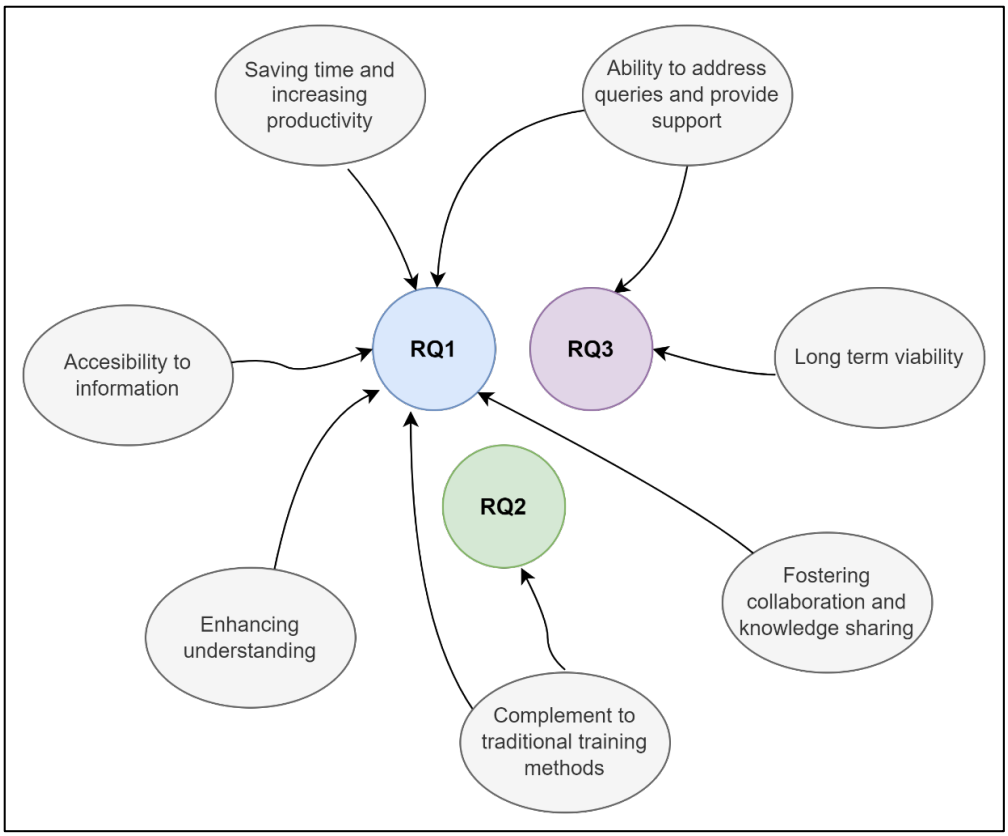

Figure 4.3: Relationship map of the key themes and associated research questions

4.10 Summary

This chapter provided a comprehensive analysis of the results following the use of an AI chatbot to improve customer service training in an SME. The effective implementation of the chatbot plays a crucial role in determining the successful use and integration of AI technologies with learning and development strategies. Several emerging themes determined the success of the AI chatbot for the intended use, which included access to information, saving time and increasing productivity, the chatbot's ability to address queries and provide support, and enhancing the understanding of customer service agents. The reliability and accuracy of the chatbot enabled trust in the customer service agents, resulting in job satisfaction and

minimising time wastage. Further benefits realised from the prototype implementation included the AI chatbot's ability to foster collaboration and enable knowledge sharing among agents, act as a complement to traditional training methods, and assess the long-term viability of implementing an AI chatbot for customer service training. The successful implementation of an AI chatbot for SME training initiatives is a testament to its scalability and adaptability, demonstrating that an organisation's growth can be rooted in its strategic ability to implement well-designed solutions.

CHAPTER FIVE: DISCUSSION AND PROPOSED FRAMEWORK

5.1 Introduction

The study aimed to evaluate the effect of using an AI chatbot in the customer service training environment and assess the AI tool's viability as an enhancement to human-facilitated training techniques in terms of product and business knowledge. An AI chatbot prototype was deployed in a chosen SME, followed by semi-structured interviews, which enabled the researcher to analyse the experiences, benefits and challenges encountered by the agents through the lens of the Implementation Science (IS) framework. This chapter discusses the findings from using an AI chatbot to enhance the traditional training techniques currently found within the customer service environment of an SME company. This chapter delves into the participants' experiences and the themes that emerged from the data. A framework is proposed for assisting SMEs in adopting and using AI tools within the customer service training realm. Furthermore, this chapter provides recommendations and explorations for further studies related to this topic.

5.2 Interpretation in relation to research questions

5.2.1 Utilisation of AI support tools to improve customer service training

The findings revealed the benefits realised from integrating and utilising the AI-enabled chatbot in the customer service environment of an SME. The improvement was noted in the accessibility of information, which resulted in enhanced productivity, increased confidence in addressing customer queries, and overall efficiency in daily tasks. The chatbot allowed for personalised learning journeys while maintaining consistency across participants' service delivery through standardised outputs.

5.2.2 Factors influencing the diffusion of AI innovations

The study effectively identified the factors that influence the diffusion and adoption of AI tools in customer service environments. The key factors included the reliability of technical infrastructure, organisational readiness and appetite to introduce a new innovation, usefulness perceived by the intended user, and the relevance and alignment of content produced by the chatbot.

5.2.3 Elements for a framework to support the implementation and adoption of AI tools

The analysed data contributed to the development of the ABIRM Framework, which provides a practical guide for organisations to ensure the successful implementation of AI-enabled chatbots in training environments. Aligning with agile principles for effective implementation and scaling, the framework presents various elements for consideration in this regard. Furthermore, the framework highlights the importance of considering organisational readiness,

how the new tool can impact existing processes and systems, the technical preparedness of the organisation to on board an innovation, and a phased yet structured rollout approach.

5.3 Discussion: Through the lens of the Implementation Science framework

As a subset of the IS framework, the Consolidated Framework for Implementation Research defines five domains that influence implementation within an organisational setting, namely:

I. intervention characteristics,
II. inner settings,
III. outer settings,
IV. individuals involved, and
V. the implementation process (Daniels et al., 2022:936; Damschroder et al., 2009).

Organisations can better understand the successful adoption and integration of new technologies through the structured approach offered by the mentioned domains. The data collected in this study were analysed using the IS framework, focusing on the use and adoption of an AI-technology tool in customer service training environments.

5.3.1 Intervention characteristics

The intervention characteristics are primarily concerned with the factors that are vital for the successful implementation of a new innovation, namely:

I. adaptability,
II. complexity,
III. costs,
IV. trialability of a solution (Damschroder et al., 2009).

These factors offer insight into how the tool can improve current traditional training methods, and the use and implementation of the AI chatbot should be assessed against these attributes. One of the favourable attributes of an AI technology chatbot is the customisability that allows for organisations to curate a tool that can effectively meet the needs of the business, as well as address the challenges that are encountered with existing methods and modes of content delivery. Furthermore, in order to ensure the sustainability of the implementation and long-term use, organisations must design for scalability in parallel with the organisation's growth.

5.3.2 Outer setting

Safaeinili et al. (2020:2) detail the outer setting as the critical analysis and examination of external factors that might have an effect of the overall design, implementation, rollout,

adoption and use of a new system within an organisation. According to Wienert and Zeeb (2021), the factors to consider include:

I. needs of the user,
II. market trends and standards,
III. professional associations,
IV. recommendations, and
V. external guidelines.

The perceived usefulness and interaction with the tool are influenced by a combination of these factors, which can negatively affect how agents engage with customers and collaborate with colleagues. Therefore, the AI chatbot's ability to provide standardised responses to questions enables agents to deliver consistent service to customers and fosters a cohesive working environment.

5.3.3 Inner setting

The inner setting domain concentrates on internal factors, namely:

I. culture of the organisation,
II. the compatatibility of the new innovation with the organisation's operational and technical structure,
III. the influence of existing resources on implementation and adoption of the innovation (DeSisto et al., 2019:190).

Therefore, the success of the implementation depends on the organisation's infrastructure and resource readiness. The AI technology chatbot requires consistent monitoring and iterative development to ensure its relevance in meeting the organisation's needs and combatting the gaps identified. By ensuring the tool maintains relevance, agents are granted access to the latest information that can assist them in addressing customer needs and improving the customer service experience. The long-term viability of the tool relies on its maintenance to keep it operational and fit for purpose.

5.3.4 Individuals involved

Wienert & Zeeb (2021) suggest that this domain relates to the traits of the individuals targeted to engage with the tool and the users' confidence in using the tool. The AI chatbot's ability to automate the training function and reduce the need for further human supervision ultimately leads to time-saving and improved understanding for agents. It provides a personalised learning experience that would otherwise not be achieved. However, the benefits thereof are

only realised through the positive attitudes of agents, an appropriate skill set, and the motivation to use the tool.

5.3.5 Process for accomplishing intervention

This domain is responsible for the long-term success of the implementation by focusing on the rollout procedures required to ensure success is achieved, and the active change process involved (DeSisto et al., 2019:190). To ensure the success of the implementation, the process looks at organisational adoption plans, continuous monitoring practices, and improvements made to ensure that the system is effective and relevant. To combat the organisation's ever-changing needs, the AI chatbot must be efficiently monitored and maintained to evolve with the organisation.

Table 5.1 shows the key themes identified during the data analysis and their relationship to the IS framework domains. The table depicts how the overarching IS framework acts as a guide to understanding how the key themes identified in this study can be categorised within the framework's domains. The relationship between these categories illustrates the connection between the theoretical model and the empirical evidence.

Table 5.1: Analysis of the relationship between the Implementation Science framework domains and the key themes identified in the study

Key Themes	Intervention	Inner Setting	Outer Setting	Individuals Involved	Process of Implementation
1. Access to information	The efficient access to information is enabled through the adaptable manner in which the AI chatbot is able to customise responses to various queries, resulting in agents being able to access information for easily.	The integration of the AI chatbot into the organisation's existing systems and toolkit enables streamlined access to company-related data and information.	The AI chatbot provides easy access to information, enabling agents to meet the ever-changing needs and demands of customers.	The AI chatbot provides agents with immediate access to information, thereby reducing the need for manual search tasks.	The AI chatbot must be incorporated into existing business processes and workflows where access to information is required.
2. Ability to address queries and provide support	The standardised manner in which the AI provides information ensures that agents receive the most accurate and consistent responses to varying customer queries.	The AI chatbot provides consistent support to the agents, equipping them to answer customer queries, reducing the need for constant supervision and intervention.	The AI chatbot contributes to the available toolkit, ensuring agents are best equipped to handle a range of different customer queries.	The AI chatbot enhances agents' confidence in addressing customer queries by providing instant and consistent responses.	The implementation of the chatbot should be focused on refining the tool's ability to address more complex queries, while also being supported by a comprehensive knowledge base.
3. Enhancing understanding	The AI chatbot's ability to enhance understanding is evident in the user-friendly and adaptable content delivery styles it produces.	The chatbot helps agents enhance their knowledge of business processes and offerings.	The AI-powered chatbot ensures that agents stay abreast of evolving customer expectations, expanding on the internal content produced within the organisation.	The AI chatbot fosters a continuous learning culture by offering a platform that enables agents to upskill on topics where further understanding is needed.	The learning progress and outcomes observed in agents should be analysed to refine the AI chatbot's ability to address the organisation's training needs.
4. Fostering collaboration and knowledge sharing	The AI chatbot serves as a centralised learning hub that fosters a collaborative learning culture within the organisation, leading to the encouraged sharing of information among agents.	The AI chatbot provides agents with an internal support tool that can be used to facilitate coordination and communication among team members.	The AI chatbot ensures that employees remain aligned to customer needs through its standardised approach in providing information.	The AI chatbot encourages collaboration by equipping agents with the knowledge that can be shared among team members, resulting in improved teamwork and problem solving.	The constant refinement of the AI chatbot ensures that the tool remains relevant with the most up-to-date information, which will be used by team members during meetings and discussions.
5. Saving time and increasing productivity	The nature of AI chatbots to automate repetitive tasks results in a reduction of time spent on mundane activities, leading to increased efficiency.	The AI chatbot increases productivity by providing a streamlined platform and virtual assistant, reducing the dependency on other staff members.	The AI chatbot assists agents with providing the correct information to customers upfront and in a timely manner, resulting in agents being able to manage their workload effectively.	The agents can focus on more complex tasks and upskill using the chatbot, saving time that would have been spent on manual activities.	The implementation of the AI chatbot provides an automated platform to assist agents and should be adopted with the goal of achieving productivity gains.

Key Themes	Intervention	Inner Setting	Outer Setting	Individuals Involved	Process of Implementation
6. Complement to traditional training methods	The AI chatbot provides a platform for real-time reinforcement of content previously taught by human facilitators, enabling the chatbot to enhance the learning and development practices of the organisation.	The AI chatbot offers an internal tool for referencing content taught during formal training sessions.	The AI chatbot competes with larger organisations' ability to have dedicated learning and development departments by providing a tool that can compensate for the structure and resources the organisation lacks.	The agents are provided with a supporting tool that enhances their current training method, ensuring a comprehensive learning experience.	The AI chatbot should be implemented in a phased approach to allow agents the opportunity to adapt and become accustomed to the change in the historic learning approach.
7. Long term viability	The AI chatbot is designed to meet the long-term needs of the organisation through its adaptability and scalability. The long-term viability is achieved through regular system updates, which scale according to the business needs throughout the organisation's evolution.	The AI chatbot can prove its long-term viability if the organisation ensures that the tool remains technologically compatible and supported.	The nature of the AI chatbot enables it to be built to meet the constantly changing needs of customers in the market, ensuring that the organisation remains relevant in its service component of the business.	Demonstrating the reliability and consistency of the AI chatbot ensures the continued use of the tool and enables positive long-term reliance on the tool.	To ensure that agents make use of the AI chatbot as a trusted resource, continuous improvement and maintenance are necessary to ensure the efficiency and effectiveness of the tool to be used by agents.

IS aims to promote the uptake of empirical findings that will lead to the improvement of people's lives (Wiltsey Stirman & Beidas, 2020:1034), aligning with the positive impacts seen in this study. Moreover, the framework provides a helpful view of how AI tools can enhance the way training is facilitated and enable improved performance among customer service representatives.

5.4 The ABIRM framework

The ABIRM Framework was developed based on the data analysis from the study. This framework introduces five scalable phases that present a practical guideline for SME organisations to adopt, implement, and utilise an AI chatbot for customer service training, namely:

I. Assess
II. Build
III. Implement
IV. Refine
V. Maintain.

The ABIRM is intended to structurally guide organisations in the implementation and adoption of AI technologies into the customer service realm, ensuring the success, scalability and sustainability of the practical rollout within the organisation. Furthermore, it supplies organisations with strategic direction to ensure the effective integration and longevity of the AI tool.

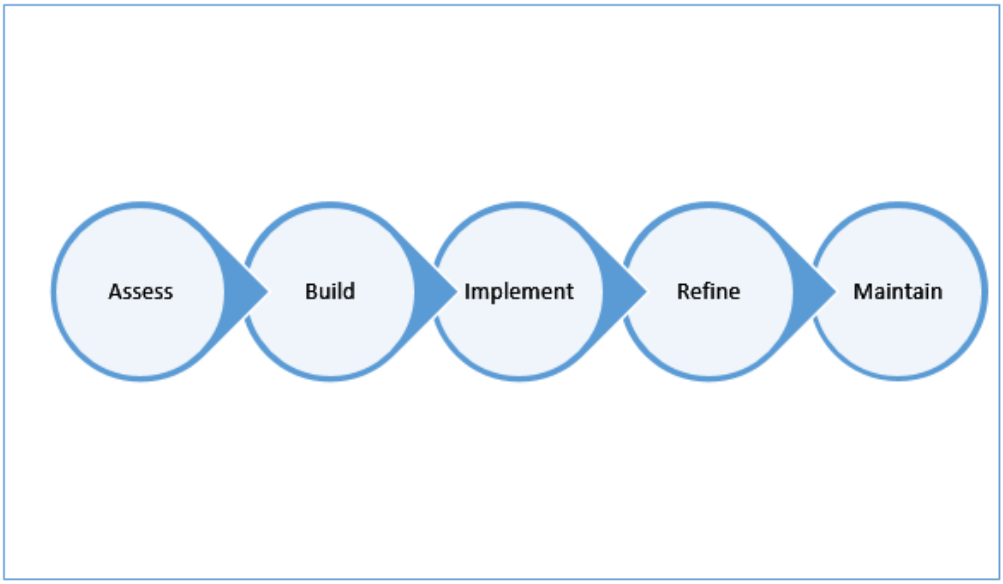

Figure 5.1: The ABIRM Framework for strategic AI adoption in SME organisations

5.4.1 Assess

The ABIRM Framework encourages the initial assessment of the current state and appetite of the organisation to implement and adopt AI technologies in its learning and development structure and policy. The as-is assessment requires the review of existing training methods in order to identify current pain points and areas of improvement that can be easily combated with the use of an AI technology chatbot. In conjunction with the gaps identified in current training methods and modes of delivery, organisations must also assess their technological readiness to consume a new innovation, such as AI tools. Supported by literature, Ogunyemi and Johnston (2012:5) concur that the organisation's readiness to adopt new technologies is supported by the state of existing technological infrastructure, the availability of resources for scale, and the enthusiasm to adapt in order to support the new implementation in a live environment.

5.4.2 Configure

The assessment phase directly feeds into the to-be design, where organisations must consider the plan to build and configure the AI technology chatbot in order to meet the business requirements arising from the first stage. Organisations must ensure that the build meets the requirements, and is developed considering the actual business need and the workforce that will ultimately utilise the tool. The ABIRM Framework recommends the development and configuration of the tool in a way that supports adaptive learning and ensures personalisation of learning journeys to support autonomy amongst the workforce. Aggarwal et al. (2023:9) emphasise that the nature of AI chatbots allows for real-time feedback, thus organisations must design with this feature in mind. Real-time feedback mechanisms ensure that employees can assess their level of understanding and highlight areas for personal improvement. Furthermore, by developing with the business need and workforce in mind, organisations can ensure that the tool meets requirements and is effective in the training environment, rather than just implementing a tool for the sake of keeping abreast with new technology.

5.4.3 Implement

The ABIRM Framework provides recommendations for a phased implementation strategy to ensure the gradual introduction of the AI technology chatbot in order to reduce risks associated with large-scale rollouts. This is supported by a principle in the Agile Manifesto that advocates for working software over comprehensive documentation (Kakar, 2023:21). The risks that are reduced with this approach include the minimisation of disruptions to current workflows and processes, as well as the strain that can be placed on technological resources. The phased implementation approach enables organisations to identify any challenges and detect any vulnerabilities that arise in the initial rollout stages, allowing for the re-evaluation of the rollout plan based on the outcomes. The implementation phase encourages employee support mechanisms, namely:

I. ongoing engagement with the workforce,
II. tool navigation training sessions, and
III. continued encouragement of tool use.

The study recommends facilitating an AI Engagement Forum during the initial rollout stages to provide a platform for employees to raise issues they encounter and make suggestions for improvement, while also ensuring that employees feel heard and supported.

5.4.4 Refine

In the ABIRM Framework, the refinement step enables organisations to build on the results from the initial adoption phase. Organisations can assess whether the AI tool has successfully addressed their needs and met the intended objectives of the implementation. The effective analysis of the data produced during the adoption and rollout phases enables organisations to address the challenges that employees face when using the tool. Furthermore, the data can assist in the effective prioritisation of fixes and bugs in accordance with the actual need and user experience. Aligning with the Agile Manifesto principles, organisations must respond to change rather than following a predetermined plan (Kakar, 2023:21).

5.4.5 Maintain

Fostering a culture of continuous improvement ensures that organisations remain relevant (Rodgers & Antony, 2023:645), thereby confirming that the technological investment remains effective in the long term. According to the ABIRM Framework, the success of the AI chatbot in the organisation's training realm depends on the tool's dynamic ability to evolve over time, relates to the maintenance and updates of the existing knowledge base aligned with organisational changes, and regular maintenance of the software and hardware components. Effective maintenance of the tool ensures that the organisation's investment is protected, that the tool is relevant in addressing the challenges faced, and that it conforms to emerging trends. Moreover, the tool's relevance fosters a continuous learning culture among the workforce, as it is always up to date with the most recent and relevant information.

5.5 Summary

This chapter presented the findings of the study and interpreted them in relation to the research questions, research objectives, underpinning theory and existing literature. The findings revealed that integrating an AI-enabled chatbot contributed positively towards enhanced customer service training in the SME through improving accessibility to information, boosting productivity and agent confidence, and supporting personalised learning by offering a platform for independent learning. The IS framework was used as a lens to analyse the utilisation of an AI-enabled chatbot across five domains: intervention characteristics, outer settings, inner settings, individuals involved, and implementation processes. The analysis aided in the factors

of consideration for an AI-enabled chatbot's effective introduction and sustainability in a real-world setting. Through the theoretical lens, the analysis provided a structured understanding of how the tool was received and highlighted the key themes in relation to the framework components.

Furthermore, the study identified key factors influencing the diffusion of AI tools and presented the elements that contribute to a practical framework for implementing and adopting customer service training in SMEs. The aspects for consideration include organisational readiness, technical infrastructure reliability, perceived usefulness of the tool, and the relevance of content presented as the chatbot's outputs. These findings informed the development of the ABIRM framework, which is proposed as a practical guide for SMEs to implement and roll out AI technologies. The framework proposes a sequential approach, following agile principles to Assess, Build, Implement, Refine and Maintain AI-enabled chatbots for customer service training.

CHAPTER SIX: CONCLUSION

6.1 Introduction

This chapter provides a detailed summary of the study, as well as related implications and contributions made to the field of AI in training, specifically focusing on enhancing training in SMEs. This study argued for the transformation of customer service training to address challenges and enhance training using chatbots. The integration of an AI chatbot prototype into an SME revealed several themes that align with the Implementation Science (IS) framework. The effectiveness of AI chatbots to enhance customer service training was motivated by these key themes, which included improved accessibility to information, time saving, increased productivity, the ability to address queries, the provision of support to customer service representatives, and fostering a culture of collaboration and knowledge sharing among agents. Furthermore, this study adds to the existing body of knowledge by presenting the theoretical and practical contributions, addressing the limitations encountered in this study, and providing recommendations for future research.

6.2 Summary of analysis and findings

The findings aligned with the studies by Andrade and Tumelero (2022:245) and Damioli et al. (2021:3) which revealed that a reduced cognitive load positively contributes to the productivity and efficiency realised in the workforce, namely, customer service representatives. The study was conclusive in finding that the AI-enabled chatbot acted as a welcome complement to traditional training methods, due to several contributing factors that included:

I. ability to provide real-time assistance,
II. offer consistency in content and mode of delivery, and
III. scale according to the organisation's needs and requirements.

Personalised learning experiences and the ability to maintain objectivity in the information output were additional callouts made by the participants of the study. The participants were able to maintain independence on their learning journeys by setting their own learning pace and focusing on their individual-specific areas that required upskilling, which was beneficial to the internal customer service process while positively contributing to external customer service as a whole. According Karyotaki et al. (2022:114), the autonomy achieved through personalised learning approaches creates a dynamic learning environment that caters to the needs of the audience.

However, while the integration of an AI chatbot yielded beneficial results, there were limitations that were highlighted with its introduction into the customer service environment. The factors that could pose a barrier to successful implementation and adoption included:

I. content constraints,
II. technical readiness, and
III. infrastructure reliability.

The study also found that the overall effectiveness of the chatbot in a live environment was hindered by technical disruptions. According to Meyer-Waarden, et al. (2020:39), technical reliability plays a major role in the perceived usefulness of the adoption, implementation and usage of AI chatbots. Li and Miraj (2022) support the notion that the success of adoption is inherently linked to the effectiveness of the tool. Therefore, it is imperative for organisations to ensure organisational and technical readiness and that the overall implementation is supported by effective change management practices and guided by strategic direction.

6.3 Contribution to knowledge

6.3.1 Practical contribution

The ABIRM framework was developed as a methodology for organisations to follow when implementing and adopting an AI-enabled chatbot to enhance their current training methods. The framework recommends a five-step approach to ensure that organisations address the essential factors that contribute to the successful implementation of the tool, and to ensure the business is safeguarded by protecting their investment in the tool. The framework provides a synopsis of the five phases, namely:

I. Assess
II. Build
III. Implement
IV. Refine
V. Maintain.

The purpose of the framework is to improve the way new technologies are rolled out in organisations, with a specific focus on how AI technology chatbots can be integrated into organisations for the purpose of training staff members. In order to ensure the effective maintenance of the AI tool, organisations must invest time and resources into gathering feedback that will enable the continuous refinement of the tool's offering. AI chatbot models that are backed by an external knowledge base require the knowledge base to be regularly updated in order to ensure the relevance of the information that is available for referencing. To stay abreast with evolving business and customer needs, the ongoing maintenance is imperative to ensure that the tool remains fit-for-purpose. The primary source of feedback on the tool's performance will be the users, namely the customer service representatives; thus, emphasis should be placed on gathering feedback from them. Considering the ABIRM framework recommendations, a phased rollout approach serves as the best way to minimise

disruptions and reduce impact on current processes. The phased approach also serves as a means for organisations to conduct regular check-ins with users, providing a platform to raise any potential issues or grievances at various stages of the rollout. This approach allows organisations to scale effectively and ensure successful implementation, achieving a defined strategy for full deployment.

Aligning with the Agile Methodology and the manifesto's principles, the recommended phased approach reduces risks associated with a large-scale rollout. The phased rollout approach also affords customer service representatives the time and opportunity to become accustomed to the new tool. Organisations must also acknowledge that the success of the integration of an AI tool into their existing architecture is highly dependent on the technical readiness and infrastructure compatibility. The technical assessment will ensure that organisations build towards the long-term viability of a tool that is able to scale with evolving business and customer needs. Adopting the ABIRM framework alongside these recommendations will ensure positive outcomes recognised in AI tool integration for SMEs. The benefits include increased productivity within teams, reduced operational costs, and the development of a skilled and knowledgeable workforce. This study significantly contributes to the field of AI in workplace learning by empirically demonstrating the effectiveness of AI-enabled chatbots for enhancing training and increasing knowledge in customer service environments.

6.3.2 Theoretical contribution

The study expands the existing body of knowledge on IS, which has predominantly focused on the healthcare sector. The application of IS in this study highlights its relevance for inclusion in broader corporate sectors and SMEs in the South African context. Furthermore, the ABIRM framework offers a practical methodology that guides the contextual implementation and adoption of AI tools in specific training settings. The framework aims to address the gap in existing literature by aligning modern technical innovation with strategic organisational direction.

6.4 Limitations

The study primarily focused on the adoption phases of the AI-enabled chatbot in the learning and development realm. It did not proceed beyond the initial phases of the prototype's use. The study used a relatively small sample size, which limited the depth that could have been realised with a larger sample size. Furthermore, the study was focused on the context of SMEs, which may affect the generalisability of the findings.

6.5 Recommendations for future research

This study was conducted with a pilot group in an SME organisation. It is recommended that comparative studies be conducted across various business sectors with larger organisational

contexts. Further research should be conducted with a focus on the impact of the long-term use of AI chatbots as a complement to enhance current customer service training methods. Moreover, the effect of the use of an AI chatbot on employee satisfaction, knowledge retention and employee performance should be explored. Finally, application of the ABIRM framework should be studied to explore its effectiveness in the implementation and adoption of AI technologies within the corporate sector to enhance customer service training.

6.6 Final conclusion

This study has demonstrated the potential of AI-enabled chatbots to transform and revolutionise customer service training. The study achieved success in improving information accessibility and enhancing understanding, which contributed positively towards enhancing customer service agents' ability to address queries and provide support, improving efficiency and productivity, and proving effective as a complement to traditional training methods. While the benefits are compelling, the findings highlight the importance of organisation and technical readiness, content availability and reliability, and strategic alignment for successful AI adoption.

The integration of the IS framework to aid in the development of the ABIRM framework addressed an identified gap in the literature while providing practical and scalable guidelines for AI technology adoption. The study offers practical and theoretical contributions to the field of AI within workplace learning. It lays the groundwork for continued innovation and deeper exploration of technological innovations in corporate training environments.

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APPENDIX A: ETHICS APPROVAL CERTIFICATE

PO Box 1906, Bellville,7535 Symphony Way, Bellville, Cape Town, South Africa
+ 27 (0)21 959 6767 www.facebook.com/cput.ac.za info@cput.ac.za www.cput.ac.za

Office of the Research Ethics Committee
Faculty of Informatics and Design
Room 2.09
80 Roeland Street
Cape Town
Tel: 021-469 1012
Email: ndedem@cput.ac.za
Secretary: Mziyanda Ndede

26 March 2024

Ms Raeesah Mc Niel
c/o Department of Information Technology
CPUT

Reference no: 216153972/2024/2

Project title: Enhancing customer service training with an AI technology chatbot

Approval period: 26 March 2024 – 31 December 2025

This is to certify that the Faculty of Informatics and Design Research Ethics Committee of the Cape Peninsula University of Technology approved the methodology and ethics of Ms Raeesah Mc Niel (216153972) for Master of Information Communication and Technology.

Any amendments, extension or other modifications to the protocol must be submitted to the Research Ethics Committee for approval.

The Committee must be informed of any serious adverse event and/or termination of the study.

Prof L.J. Theo
Chair: Research Ethics Committee
Faculty of Informatics and Design
Cape Peninsula University of Technology

APPENDIX B: PERMISSION LETTER FROM COMPANY

Mobicred Proprietary Limited
10th Floor, 22 Bree Street, Bowmans Building
Cape Town, South Africa, 8000
Tel: +27 (0) 21 126 0700

11/03/2024

To whom it may concern

RE: Support for Research Project: Enhancing Customer Service Training with an AI Technology Chatbot

I would like to inform you of our decision to support **Raeesah Mc Niel, 216153972**, in conducting her research titled "Enhancing Customer Service Training with an AI Technology Chatbot" as part of her pursuit of a Master of Technology degree in Information Technology at the Cape Peninsula University of Technology.

Mobicred recognises the importance of research and innovation in advancing technology and improving business practices. We are therefore pleased to provide Raeesah with access to our company resources, including technical expertise and staff support, to facilitate the successful completion of her research. Raeesah will have access to relevant company resources, including but not limited to technical infrastructure, data, and expertise from our staff members, to conduct her research effectively. We trust she will handle these resources with care and adhere to all relevant company policies and guidelines.

Should you have any questions or require further information regarding the research project or our company's involvement, please do not hesitate to contact me.

Thank you for considering our support for this research project. We look forward to the outcomes of the research and the potential impact it may have on our industry.

Sincerely,

Jason Sive

CEO

Mobicred (Pty) Ltd.

APPENDIX C: PARTICIPANT CONSENT FORM

Cape Peninsula
University of Technology

FID/REC/ICv0.1

FACULTY OF INFORMATICS AND DESIGN

Individual Consent for Research Participation

Title of the study:	Enhancing Customer Service Training with an AI Technology Chatbot	
Name of researcher:	Raeesah Mc Niel	
Contact details:	email: 216153972@mycput.ac.za	phone: 072 693 8798
Name of supervisor:	Prof. Johannes Cronje	
Contact details:	email: cronjej@cput.ac.za	phone: 082 558 5311

Purpose of the Study: To evaluate the effect of the use of an AI tool in a customer service training environment and assess the viability of the AI tool as a potential enhancement to human facilitators in terms of product and business knowledge.

Participation: My participation will consist essentially of the use of an AI chatbot prototype for a week-long period, followed by semi-structured interviews to relay my experiences of using the technology.

Confidentiality: I have received assurance from the researcher that the information I will share will remain strictly confidential unless noted below. I understand that the contents will be used only for the Master of ICT Dissertation and that my confidentiality will be protected by maintaining anonymity of names or any other information that can be used to identify me. This will be done by making use of generalised naming conventions and labeling.

Anonymity will be protected in the following manner: my name will be replaced with pseudonyms or generic labels. In addition, although not required, any visual data that may be used in this study will have any identifiable features blurred.

Conservation of data: The data collected will be kept in a secure manner. All digital data obtained in the study will be securely stored on password-protected devices with restricted access. Any physical documents will also be securely stored with access solely granted to authorised personnel providing valid reasoning.

Voluntary Participation: I am under no obligation to participate and if I choose to participate, I can withdraw from the study at any time and/or refuse to answer any questions, without suffering any negative consequences. If I choose to withdraw, all data gathered until the time of withdrawal will be destroyed.

Additional consent: I make the following stipulations (please tick as appropriate):

	In thesis	In research publications	Both	Neither
My image may be used:				
My name may be used:				
My exact words may be used:				
Any other (stipulate):				

Acceptance: I, (print name)_____

agree to participate in the above research study conducted by Raeesah Mc Niel of the Faculty of Informatics and Design, Information Technology Department at the Cape Peninsula University of Technology, whose research is under the supervision of Prof. Johannes Cronje.

If I have any questions about the study, I may contact the researcher or the supervisor. If I have any questions regarding the ethical conduct of this study, I may contact the secretary of the Faculty Research Ethics Committee at 021 469 1012, or email naidoove@cput.ac.za.

Participant's signature: _____ Date: _____

Researcher's signature: _____ Date: _____

APPENDIX D: EDITOR'S CERTIFICATE

15 July 2025

RAEESAH MC NIEL
Faculty of Informatics and Design
Cape Peninsula University of Technology
District Six, Cape Town

CERTIFICATE – EDITING OF MASTER'S THESIS

I, the undersigned, herewith confirm that the Master's thesis of RAEESAH MC NIEL titled, *"ENABLING CUSTOMER SERVICE TRAINING WITH AN AI-TECHNOLOGY CHATBOT"*, has been completed.

The final thesis and editing certificate have been submitted to Me. Raeesah and cc'd to Dr. Errol Francke on 15 July 2025.

Sincerely

Professor Annelie Jordaan
DTech: Information Technology
Ph: 065 990 3713

Member: SATI 1003347

SATI
South African Translators' Institute

APPENDIX E: INTERVIEW QUESTIONS

Experience and Effectiveness of the Chatbot:

1. Can you describe your experience using the AI-powered chatbot during the week-long period?
2. What were your initial expectations on the effectiveness of the chatbot in assisting customer service agents?
3. Did the chatbot equip you to address customer queries and provide support?
4. Can you provide examples of where the chatbot helped to resolve a query?
5. How did the chatbot compare to traditional training methods you have gone through in the past?
6. How did the chatbot assist you in understanding the business, products and services?

7. Was the chatbot able to assist you in your daily activities and improve your ability to handle queries?
8. Did the chatbot affect your confidence and ability to address customer queries?
9. Was the chatbot able to assist you with accessing information needed to assist customers?
10. Were there any instances where the chatbot could not meet your expectations to address queries effectively?
11. Were there any challenges or limitations you encountered while using the chatbot?

Long-term Use and Improvement of the Chatbot:

1. How do you see the long-term use of the chatbot in customer service training?
2. What role do you traditional trainers play in addition to the chatbot in the training and development?
3. Were you able to collaborate and share knowledge with other customer service agents following the use of the chatbot?
4. Did you have any issues with the usability and functionality of the chatbot?
5. Based on your experience, how would you like to see the chatbot improve?