A managerial framework for implementing chatbots in e-commerce businesses

J van Heerden

 **orcid.org 0000-0001-7347-2111**

Mini-dissertation accepted in partial fulfilment of the requirements for the degree *Master of Business Administration* at the North-West University

Supervisor: Mr JC Coetzee

Graduation: May 2020

Student number: 12174300

ABSTRACT

Title: A managerial framework for implementing Chatbots in e-commerce businesses

It is becoming increasingly important for South African e-commerce businesses to recognise how Chatbot technology can aid in providing a positive customer service experience. If successfully implemented, Chatbots offer businesses the opportunity to gain a competitive advantage in a fast-changing business and technology landscape. However, leveraging this technology typically presents itself as a challenge due to its inherent complexity and diverse resource demands during development.

South Africa's ITC infrastructure enables e-commerce, but there are also unique challenges that need to be considered. To overcome all these challenges, management needs to look intensively at IT management models and how to effectively implement Chatbot technology.

The aim of this study is thus to develop a managerial framework that provides guidance for e-commerce businesses in South Africa who wish to implement Chatbot service technology. The framework is primarily focused on the business-to-consumer e-commerce industry where a Chatbot service is to be implemented as a technology and business solution.

Content analysis and thematic analysis methods were used as part of this strategy to analysis the collected data. The best managerial practices were identified in local and international e-commerce businesses where Chatbot technologies have been successfully implemented as part of their client operational processes. Technology management methodologies were also evaluated with a specific focus on IT service management, IT project management, and IT governance models.

A managerial framework for the implementation of a Chatbot service within an e-commerce business was then finally developed based on a comprehensive literature study and the derived empirical findings.

Key terms: Chatbots, e-commerce, ITIL, COBIT, managerial framework, information technology

ACKNOWLEDGEMENTS

I would like to express my sincere thanks and appreciation to everyone that supported me during my studies. I would especially like to thank:

- My girlfriend, Zané, and the boys Leandry and Cayden for their love, support and understanding.
- My parents, Christa and Johan, for the support and motivation.
- My grandmother, Magriet, for her support throughout my studies.
- My supervisor, Johan Coetzee, for his guidance and support during the study.
- My colleague, Wikus Pienaar, for the coffee breaks and his interest in my study.
- The North-West University, for funding my studies.
- Jaco du Toit for his proofing and language editing assistance.

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LIST OF DEFINITIONS

Key term and phrases presented in this study:

Key term	Definition
Artificial intelligence	"The theory and development of computer systems able to perform tasks that normally require human intelligence, such as visual perception, speech recognition, decision-making and translation between languages" (The Oxford Dictionary of Phrase and Fable, 2005).
Blockchain technology	"Blockchain serves as an immutable ledger which allows transactions take place in a decentralised manner" (Zheng *et al.*, 2017:557).
Bot framework	A platform that allows developers to build Chatbots for use on a variety of messaging platforms.
Business-to-consumer (e-commerce)	"Business-to-consumer is an Internet and electronic commerce model that denotes a financial transaction or online sale between a business and consumer" (Techopedia, 2019b).
Chatbot	"Chatbot is a piece of software that responds to natural language input and attempts to hold a conversation in a way that imitates a real person. Some Chatbots are used for entertainment, while others are used for business and commercial purposes" (Reshmi & Balakrishnan, 2016:1173).
Dialogue system	"A dialogue system is a computer system intended to converse with a human, with a coherent structure" (Papalkar *et al.*, 2018:566).
E-commerce	"Electronic commerce is a type of business model, or segment of a larger business model, that enables a firm or individual to conduct business over an electronic network, typically the Internet" (Bloomenthal, 2019).

Intelligent agents	“An intelligent agent is an autonomous entity, which observes through sensors, acts upon an environment using actuators and directs its activity towards achieving goals” (Elmahalawy, 2012:2).
Machine learning	Machine learning is an application of AI that provides systems with the ability to automatically learn and improve from experience without being explicitly programmed.
Natural language processing	“Natural language processing is a computational method for processing text to extract information using the rules of linguistics” (Liao *et al.*, 2015:1855).
Information technology service management	“All the activities, policies and processes that organizations use for deploying, managing and improving IT service delivery” (Hertvik, 2017).

LIST OF ACRONYMS AND ABBREVIATIONS

Acronyms and abbreviations utilised in this study:

Abbreviation	Meaning
AI	Artificial intelligence
B2C	Business-to-consumer
COBIT	Control objectives for information and related technologies
ICT	Information and communications technology
IOA Model	Institutional and organisational assessment model
IT	Information technology
ITIL	Information technology infrastructure library
ITSM	Information technology service management
King IV	The King Report on governance for South Africa, 2016
NLP	Natural language processing
SaaS	Software-As-a-Service
SDLC	Software development lifecycle
UI	User interface

CHAPTER 1 NATURE AND SCOPE OF THE STUDY

1.1 INTRODUCTION

Technological infrastructure affects the culture, efficiency and relationships of a business and its influence is becoming increasingly apparent as technology is incorporated into various aspects of the business environment. Digital communication is one such application that can prompt public relations to evolve by way of greater customer coverage, the building online relationships, and by improving corporate reputation (Yaxley, 2012:411). Technology allows for an accessible communication channel that if properly utilised can encourage stronger customer relationships through its ease of use and short response time. Ideally, businesses should be able to respond to customers' demands as effectively as possible which can be established by providing services across a variety of digital platforms.

The traditional approach for e-commerce business has been to employ call centres and websites to communicate with customers, but as new technological innovations arose these services were either supplemented or eventually replaced with voice or chat assistant software. Unfortunately, the first and second generation of voice and chat assistants have failed to live up to their marketing promises. The majority of past chat assistant software has been an ordinary chat or voice-based user interface (UI) augmented onto a keyword search engine resulting in a rudimentary machine-learning system.

As technology continues to evolve, the third generation of voice and chat assistants that are based on the latest artificial intelligence (AI) technology have begun to surface and are referred to as Chatbots or intelligent agents. These systems are computer programs that use AI to replicate an intelligible conversation with humans. Users can ask questions, make requests and respond to Chatbot questions and statements using natural language (IBM Cloud Education, 2019). Chatbot services can be used to automate business processes across various industries, including the e-commerce industry. The Chatbot service industry is expanding rapidly with

Chatbot services now being implemented as a Software-As-a-Service (SaaS) solution (D'silva *et al.*, 2017:411).

Chatbot technology has the potential to disrupt current operation models as in the case of human-to-human interaction between businesses and its customers. It is therefore important to be aware of the risks, benefits, and challenges that may arise with the implementation of such technology. E-commerce is by nature highly digital and South African e-commerce businesses are not immune to this technological disruption. It is therefore essential for South African e-commerce businesses to understand how Chatbot services should be implemented to ensure that it enables its customer service rather than impede it.

1.2 PROBLEM STATEMENT

The boundaries between retailer and manufacturer will continue to blur, as companies evolve to meet their customers' needs (World Economic Forum, 2019). With this in mind, Chatbot services could hold the potential to become a transformative technology. The complex nature of the Chatbot design requires that e-commerce businesses pursue specialised research programmes that can support the adequate development and implementation of Chatbot technology that could ensure they persist in a fast-changing commercial landscape.

Continued low adoption and high underutilisation of information technology has deprived organisations of the benefits (both tangible and in-tangible) that information technology can offer (Jasperson *et al.*, 2005:526). Yet, the venture to capitalise on novel innovations may be considered too great a risk for some organisations given the financial implications and uninsured pay-off for new technologies. The same is true for innovative SaaS solutions which are becoming progressively expensive to implement as the technology grows in its complexity like in the case of Chatbots. According to Ian Aitchison, CEO of COPC Inc. (an industry giant that specialises in customer experience) states that for many businesses, justifying these types of expenditures could be a challenge since "few metrics or benchmarks are available to help businesses understand bots' impact" (Korzeniowski, 2017).

Currently, South African customers are able to make use of available international Chatbot services, however Chatbot's services are generally limited in this country. This can be attributed to the challenge that the diversity of South Africa's population holds when it comes to implementing such automation technologies. South Africa's 11 official languages presents e-commerce businesses a unique landscape to engage customers – one that may prove to hold great opportunity once addressed. Notably, most of the country's citizens are not only bilingual, but also multilingual. According to latest census results (2011) by Statistics South Africa, 90.4% of South African citizens are non-native English speakers and therein lies a significant opportunity for e-commerce business to conduct business in their customer's native language.

For these reasons, the process involved in deploying such intelligent agents requires an interdisciplinary approach between management, software developers, and computational linguists. Chatbots are a unique form of technology and thus require an infrastructure with its own unique components and processes dedicated to its intended industry sector and end-users. Despite the growing demand and importance of Chatbot services in South Africa, minimal effort has been made by e-commerce's businesses towards establishing a managerial framework. The current implementation processes surrounding Chatbot services is vague with almost no references to the unique South African business environment. The research question that arises from this situation is thus: How should a business-to-consumer (B2C) orientated e-commerce business in South Africa go about implementing a Chatbot service and be of value?

1.3 RESEARCH OBJECTIVES

Based on the preceding research problem, the following research objectives can be formulated:

1.3.1 Primary objective

The primary objective of this study is to develop a managerial framework to provide guidance for e-commerce businesses in South Africa that wish to implement

Chatbot service technology. The purpose of the managerial framework is to create a practical framework of best industry practices that can be applied to implement a successful Chatbot services in the South African context.

1.3.2 Secondary objectives

The secondary objectives which follow support the primary aim of this study in that the research will assume the following related tasks:

- Investigate and describe the factors that need to be considered for successful implementation of a Chatbot service for a B2C perspective.
- Investigate the current best practices in technology management models applicable to the implementation of a Chatbot service.

1.4 RESEARCH METHODOLOGY

The research methodology in this study consists of two sections, namely the literature study and the empirical study.

1.4.1 Literature study

The aim of this literature study is to establish what characteristics and requirements a managerial framework should constitute in order that it may be of value to e-commerce businesses in South Africa. The literature study attempts to gain theoretical knowledge on the fundamentals of Chatbot technology. The study also evaluates different technology management methodologies with specific focus on IT service management, IT project management, and IT governance models.

1.4.2 Empirical study

The aim of the empirical study is to collect real-world information in the e-commerce industry. To collect this information, semi-structured interviews were developed and then conducted with industry experts and academic specialists. The data collected from the semi-structured interviews were analysed at length to formulate impartial conclusions relating to the implementation of Chatbot services technology. More detail on the research methodology can be found in Chapter 3.

1.5 SCOPE AND DEMARCATION OF STUDY

The study is designed from an IT service management (ITSM), IT project management, and IT governance perspective but is examined from an e-commerce perspective. The study primarily focuses on the B2C e-commerce industry, with a Chatbot service as technology and business solution. The focus will be on specific activities related to the implementation of a Chatbot service. Industry standards on software development and other non-related management protocols and processes will be excluded in the study. The results are to be used to develop a managerial framework to provide guidance for e-commerce businesses in South Africa.

1.6 LIMITATIONS OF THIS STUDY

The following areas of concern have been identified as limitations for this research study:

- Limited prior academic research had been conducted in the implementation of a Chatbot services, specifically within a South African context;
- Chatbots represent an ever-evolving technology and there is a limited understanding of its future impacts in the business models of the e-commerce industry.

1.7 IMPORTANCE OF THIS STUDY

Strategic, operational, and marketing managers in the e-commerce industry have an interest in studies that investigate progressive retailing platforms supported by Chatbot technology. The research study could shed light on how to develop and market such a service more effectively and accelerate the rate of adoption by their customer base. One of the most fundamental changes in the e-commerce industry in recent years has been the consumer's movement away from traditional shopping methods to more e-commerce-based methods (Qinghe *et al.*, 2014:77). The findings of this research could provide senior management with pertinent information and a framework that would help establish am implementation process for Chatbot technology and, as a result, also improve customer relations by providing a means

to foster effective customer engagement. The study will also identify important factors that should be considered for successful implementation of Chatbot services within the South African context.

1.8 LAYOUT OF THE STUDY

The study is divided into four chapters. A summary of the content for each chapter follows:

Chapter 1: Nature and scope of the study

This chapter provides a general introduction to the study together with the formulation of the problem statement. The primary and secondary objective are both explained. Finally, the scope, limitations and the study's layout are defended and discussed.

Chapter 2: Literature study

This chapter consists of a literature study on the fundamentals of a Chatbot services and evaluates different technology management methodologies with specific focus on IT service management, IT project managements and IT governance models. The benefits of technology transfer in the Chatbot implementation context is also discussed.

Chapter 3: Research methodology and results

This chapter describes the research methodology used, including an outline of the semi-structured interviews, population size, target population, data collection process, and research criteria. The employed data analysis methods and subsequent results are described in detail.

Chapter 4: Conclusions and recommendations

This chapter consists of a detailed summary of the conclusions derived from the research study where a proposed managerial framework for the implementation of

a Chatbot service with practical recommendations is presented. The chapter then concludes with recommendations for future research studies.

1.9 CONCLUSION

It is clear from this introductory chapter that the incorporation of technology can contribute greatly to a business and its operations. One could argue that businesses should be encouraged to adopt contemporary technology but should be especially conscious of how such technology can impact their current business models. Technological change can affect all aspects of a business, yet it is technological innovation that has the potential to significantly influence how businesses interact and trade with potential and existing customers. This is particularly relevant to the e-commerce industry where technological change can make a significant difference in operational and strategic strategies. This extends to South African e-commerce businesses which too need to remain competitive in an extremely complex and fast-changing business landscape.

These arguments raised in this chapter provides motivation for the introduction of Chatbots technology so that e-commerce businesses can remain competitive and provide additional value to the customers. Chatbot technology is complex in nature and integrating such a system into existing business structures can be difficult to accomplish. The purpose of this research study is to create a practical framework of industry best practices that can be used to implement a successful Chatbot service in South Africa. This research will thus provide senior management with pertinent information and a framework that would help to establish a reliable implementation process.

The conclusion that can be inferred from this chapter is that successful application of a managerial framework geared toward the implementation of a Chatbot service can result in a sustained competitive advantage for an e-commerce business. In addition, this study's findings may also contribute to the body of knowledge.

1.10 CHAPTER SUMMARY

An introduction was given about the impact of technology on e-commerce businesses and what role Chatbot technology can play in such a business. The problem statement sets out the following question: “how should a business-to-consumer (B2C) oriented e-commerce business in South Africa go about implementing a Chatbot service to be of value?”

The primary and secondary objectives are formulated and set out together with the research methodology that will be employed. The scope, outline, and importance regarding this research study were also highlighted. The layout of the study was presented to provide the reader with an overview of the intended research.

CHAPTER 2 LITERATURE STUDY

2.1 INTRODUCTION

This chapter presents a literature study regarding solutions for problems identified in the introductory chapter. This literature study is generally theoretically orientated. The consulted literature discussed throughout this chapter is chiefly made up of academic journals, technology surveys, information management magazines, and technology management model guides.

2.2 FUNDAMENTALS OF CHATBOTS

Whether customers realise it or not, the “people” they interact with online are not all people. Customer support and commercial social media interactions are increasingly managed by intelligent agents, many of which have even been developed with human identities and personalities (Simonite, 2017). A Chatbot system (also known as an intelligent agent, Talkbot, Cleverbot, dialogue system, or an artificial conversational entity) is a sophisticated piece of software that responds to natural language inputs in an attempt to interact with humans in a natural, human-like manner. There exist various other definitions for Chatbot systems, some of the most notable are listed below:

Table 2-1: Chatbot definitions

Source	Definition
IBM (IBM Cloud Education, 2019)	“A Chatbot is a computer program that uses AI to have a conversation with humans. Users can ask questions, make requests and respond to Chatbot questions and statements using natural language.”

Cambridge Dictionary (Cambridge Dictionary, 2019)	“A computer program designed to have a conversation with a human being, especially over the Internet.”
Google Inc. (Google LLC, 2019)	“Chatbots, or “bots” for short, are computer programs that interact with people in a way that mimics human interaction to some degree. The interaction can vary in complexity from simple keyword-driven queries to elaborate conversational systems using natural language processing and AI techniques.”
Techopedia (Techopedia, 2019a)	“A Chatbot is an artificial intelligence (AI) program that simulates interactive human conversation by using key pre-calculated user phrases and auditory or text-based signals.”

One of the main goals of Chatbots has always been to imitate humans by mimicking our use of language in order to hide their artificial nature when interacting with a user (Reshmi & Balakrishnan, 2018:267). In recent years, Chatbot technology has evolved significantly and the impressive progress has garnered the interest of the business community. Recent developments in AI and natural language processing have allowed for Chatbots to understand human language much better than before. E-commerce businesses are now more readily adopting Chatbots in their operations for services such as customer support, product enquires, and interactive checkout transactions (Lo & Lee, 2018:635). Adoption of the technology has allowed customers to have a transaction fulfilled simply by interacting with the Chatbot and providing any required information. In other instances, it has been utilised to respond to customer services queries. In each instance, the customer directly interacts with the Chatbot service via a medium of either text or speech in a natural manner.

The degree of interactivity is dependent on the complexity of the Chatbot itself. Its response mechanism may be based on simple pattern matching used to generate a reply, or it could extend to a network of interdependent sophisticated artificial intelligence techniques and complex conversational state tracking (Deloitte, 2018). Regardless of the underlying complexity, Chatbots share an underlying operational structure as illustrated in Figure 2-1 below:

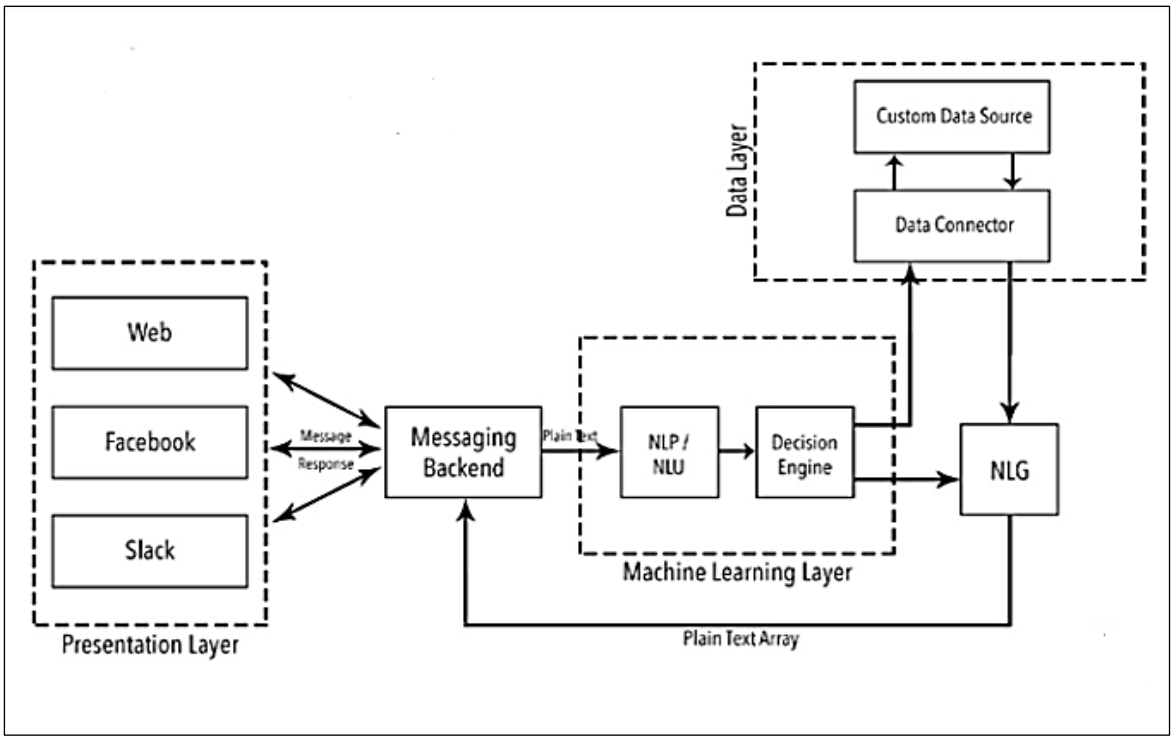


Figure 2-1: Basic architecture diagram for a Chatbots service

Source: *Fernandes, (2018)*

The workflow diagram can be explained as follows:

Step 1: The customer interacts with the presentation layer by sending the Chatbot a message or request which is then received by the messaging backend.

Step 2: By using natural language processing methods, the messaging backend processes this simple text request into codified commands.

Step 3: The codified commands are sent to a decision engine, where predetermine criteria must be met to exit the conversational loop.

Step 4: Depending of the type of message or request, the codified commands are then sent to a natural language generator or to the data layer.

Step 5: The natural language generator then converts structured data into text. If needed, data is also retrieved from the data layer.

Step 6: The natural language generator feedback reverts to the messaging backend and is shown to the customer in the form of a response or question. The conversational loop then reiterates until the customer is satisfied with the interaction.

According to (Fernandes, 2018), these steps represent the layout of a basic Chatbot service. The layout and functionality of a Chatbots service may differ according to the needs of the e-commerce business.

2.2.1 History of Chatbots

The development of Chatbots commenced in the early 1960's. Current technological advances has transformed the methods available for use in Chatbot development, particularly methods made popular with the rise of AI technology, but regardless of these changes, the goal has remained the same which is to create an instrument that can interact naturally with humans, either through speech or text. The history of Chatbot technology is visually presented in Figure 2-2 below:

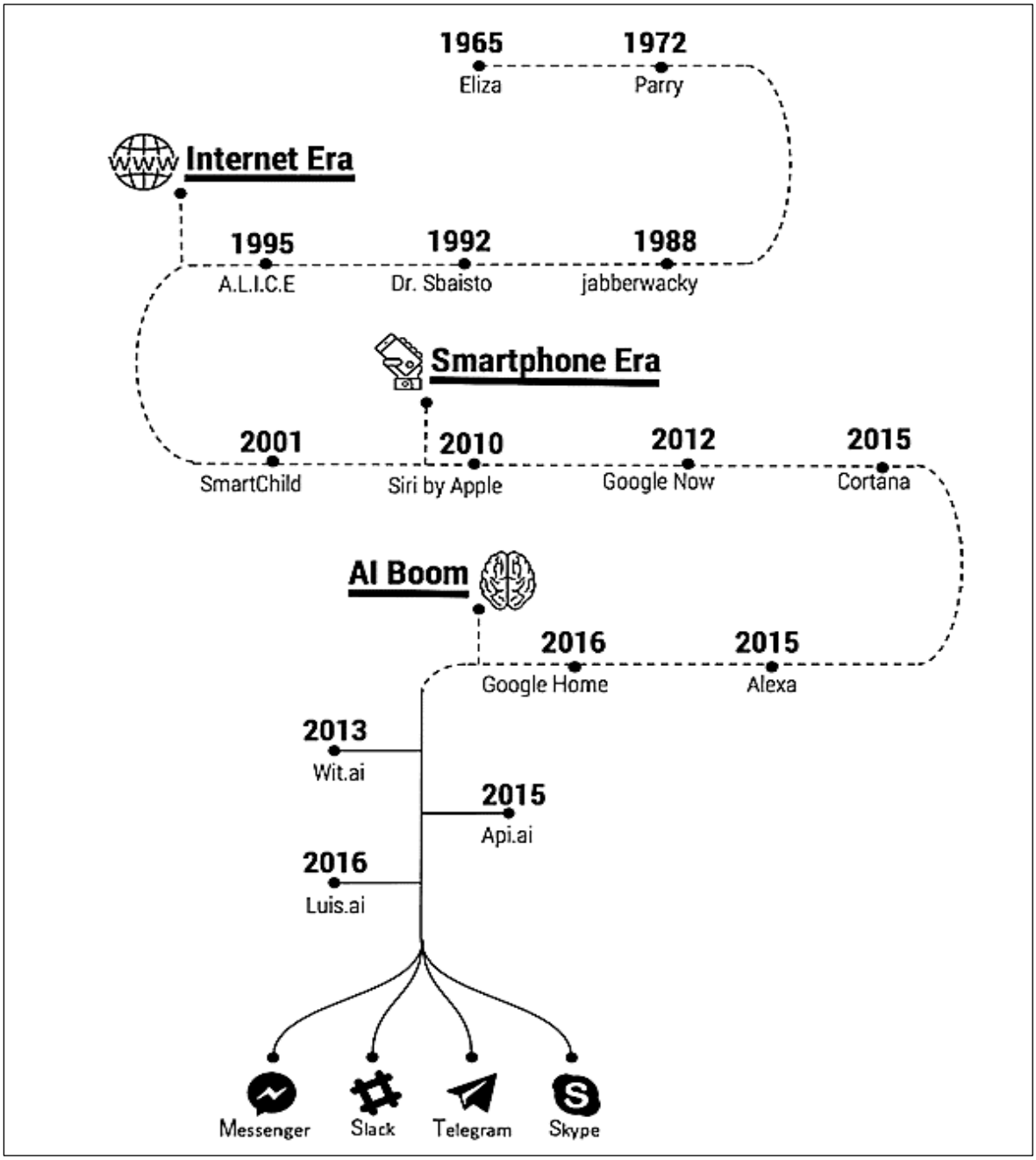


Figure 2-2: Timeline of Chatbots technology

Source: *Khan and Das, (2017)*

ELIZA was the first Chatbot created in 1965 by the Massachusetts Institute of Technology. ELIZA worked on pattern matching and end-user responses to pre-written scripts (Khan & Das, 2017). Chatbot iterations then since evolved and developed with high profile Chatbot projects like PARRY in 1972 and JABBERWACKY in 1988. Through the 1980s and 1990s, the technology was then

deployed in automated telephone systems that used very simple decision trees-based methods. In 1995, ALICE was developed and due to its heuristic capabilities, it was able to interact with humans more efficiently (Khan & Das, 2017).

In the smartphone era Chatbot technologies like Siri by Apple, Google Now, and Cortana were all launched. Chatbot technology has now since expanded into social and business applications as indicated by the corresponding branching logos. Much can be contributed to the introduction of IBM's Watson in 2009 which brought about a revolution in natural language processing (Khan & Das, 2017). In the years following, Amazon Inc. introduced Alexa and Google LLC developed a dialog agent known as Dialog Flow which offers natural language processing capabilities. Google's agent provides a single platform integration with Chatbot frameworks of Facebook, Twitter, Skype, Cortana, Alexa, and Slack. Opening up this platform to developers allowed businesses to develop cost effective Chatbots using the provided frameworks again furthering the development of this technology (Khan & Das, 2017).

2.2.2 Chatbot for e-commerce

The market share of e-commerce is continually growing as humanity entrenches itself in the digital age. According to cumulative data from Statista (Clement, 2019), 2017 retail e-commerce sales worldwide amounted to 2.30 trillion US dollars and is projected to double to close to 4.87 trillion US dollars in just 4 by the year 2021. The following is a summarised graph of estimated retail e-commerce sales worldwide from the year 2014 to 2021, as obtained from Statista.

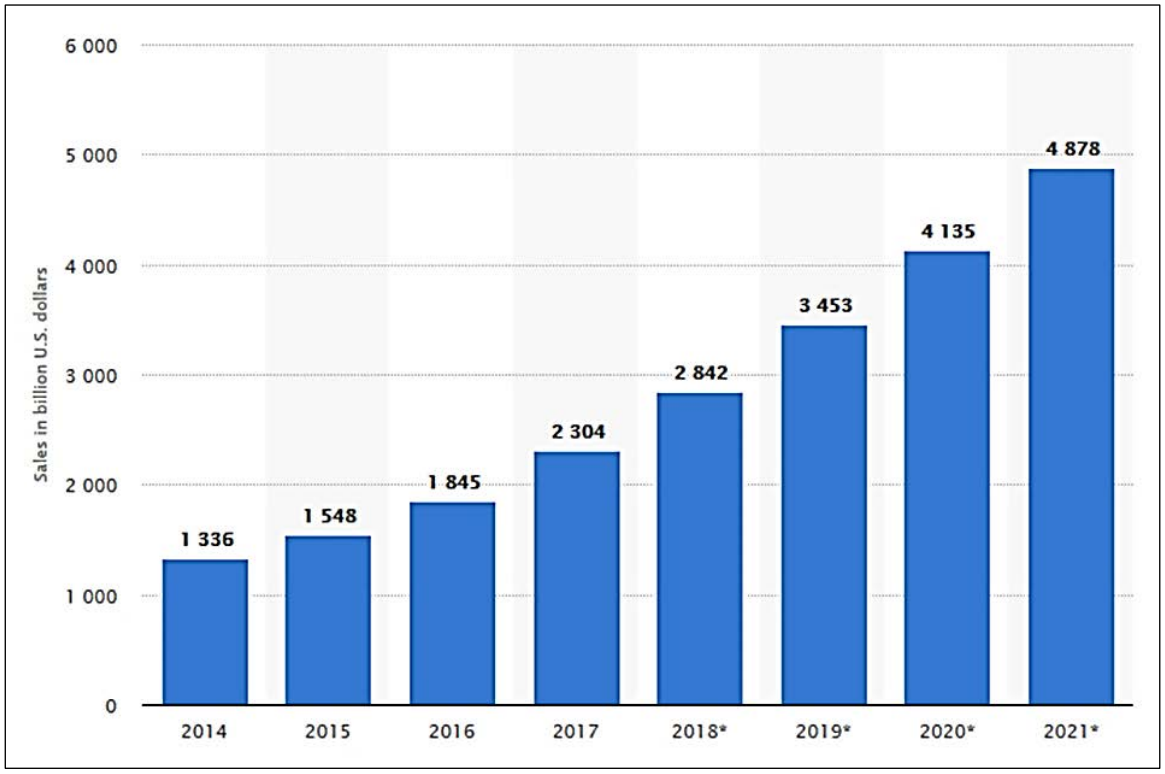


Figure 2-3: Retail e-commerce sales worldwide from 2014 to 2021

Source: *Clement, (2019)*

The increasing volume of online sales brings with it the need for e-commerce business to streamline their operational management processes. These operational processes are predominantly based on advanced technological applications which could, for example, include electronic warehouse management applications to manage the inflow of inventory, or more impressively, Chatbot applications to manage and assist the outflow process. E-commerce businesses are now discovering new and innovative ways to leverage AI-powered Chatbots services to support both internal and external interests. Internally, this involves acquiring more potential customers, improving sales figures, and retaining customer loyalty. Their external interests entail effective management and improvement of the business's supply-chain processes.

Generally, e-commerce Chatbot services mainly focus on improving the performance of e-commerce search and recommender systems. These systems utilise knowledge graphs to support e-commerce and sales-related functions while

also aiding the development of innovative question-answering and bot-based solutions that benefit the user in connecting them to relevant products. An example of an e-commerce Chatbot service is illustrated in Figure 2-3 below:

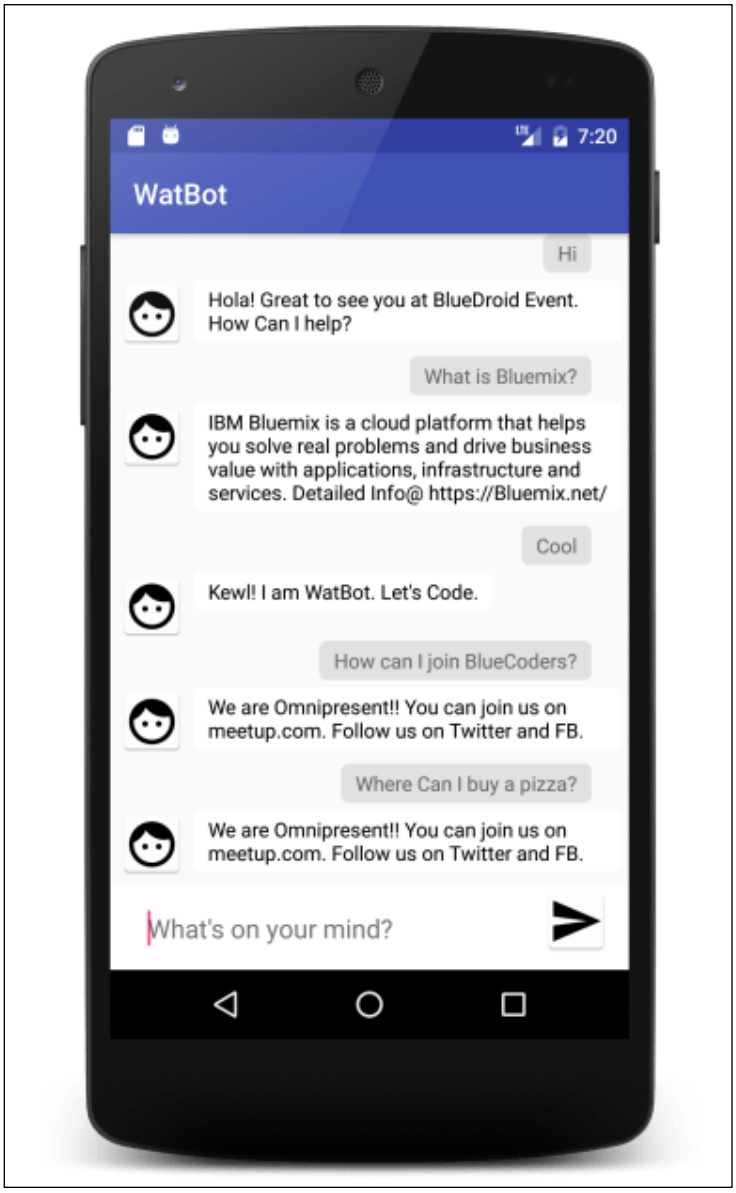


Figure 2-4: WatBot: A voice-enabled android Chatbot

Source: *Machupalli, (2017)*

Chatbot services can be implemented into e-commerce websites to perform the following functions:

- *Shopping helper:*
  E-commerce websites have the capacity to typically provide the user with a wide range of products which results in a substantial and complex database. These products are spread across numerous web pages and categorised according to their type and other shared criteria. Navigating through these web pages to locate relevant results, according to the user's specifications, can be non-intuitive, time consuming, and even exasperating. A Chatbot can address the above-mentioned issues by presenting a different, more intuitive way of interacting with the website and its catalogue (Gupta *et al.*, 2015:1483).
- *Customer care:*
  Repetitive or frequently asked questions can be answered around the clock and on any day of the week without the need of a human agent.
- *Payments:*
  The complete purchase process can be conducted via the Chatbot service. Although payment integration is possible, there are many security aspects to consider when implementing such service.
- *Shipment tracking:*
  A Chatbot service can automate responding to most enquires regarding an item's shipment.

The above-mentioned features are just a few examples of how a Chatbot can be implemented. As more Chatbots are successfully incorporated into various business industries, their appeal may lead to new and innovative ways for them to be employed. In addition, the rapid advances in technologies such as Blockchain, NLP, and AI may yet be incorporated into a Chatbot's underlying network of operations further expanding the potential for new Chatbot applications. Chatbot technology is a rising trend and improvements that drive their effectiveness will only further demonstrate their value in providing better customer experiences with low costs (Rahman *et al.,* 2017:78).

2.2.3 Chatbot frameworks and platforms

Chatbot frameworks provide developers with a general software development kit for developing complex Chatbot services. Major multi-national software companies including IBM, Microsoft, Google, IBM, and Facebook have released and made advanced development tools and frameworks available along with immense amounts of lexical research data. These Bot frameworks can dramatically reduce development costs through the specialised tools that they provide which supports different types of interactions with end-users, enabling businesses to develop dedicated Chatbots. An example of such a framework is the Microsoft Bot framework which is a set of tools for creating Chatbot services on multiple platforms, including Skype, Slack, and Telegram. Multinational companies like CNN News, 1-800-Flowers, Starbucks, Master Card, and Pizza Hut started using these Bot frameworks to develop intelligent agents that can communicate with their customers. Facebook's Bot framework is another platform that allows developers to build Chatbots for use on a variety of messaging platforms, including Facebook.

Chatbot platforms are online eco-systems where Chatbot services can be deployed to interact with customers and with other platforms. While these frameworks are effective in helping to design simple Chatbot applications, the user still requires advanced technical knowledge to define complex interactions for more versatile conversations (Daniel *et al.,* 2019:177). Creating Chatbot services on a platform such as Facebook Messenger could be an excellent proposition for e-commerce businesses because of Facebook's immense customer base with 2.38 billion monthly active customers (Facebook Inc., 2019).

2.2.4 Benefits of Chatbot technology

Chatbot applications have the potential to save costs and increase efficiency, especially in e-commerce-orientated businesses. All research linked to Chatbot development is now moving towards the common goal of improving the interaction experience of the user. This involves allowing customers to have a more natural, human-like experience when communicating with the business through its Chatbot.

Companies ultimately aim to build longer and more profound connections this way by providing efficient and friendly customer care.

Gartner Incorporated, a leading international research and advisory company, has published a research report advising larger companies to embrace Chatbots in their business operations (Moore, 2017). According to a consumer experience index report from Aspect Software Inc. (2018), two thirds of consumers appreciate being able to handle a customer service issue without having to talk to a person. Consumers are demonstrating an increasing acceptance of the self-service experience, with millennials showing the highest rate of adoption. A Chatbot service saves business time and resources if it needs to communicate with consumers in any way. For example, the State Bank of India's AI-powered Chatbot service, known as SBI Intelligent Assistant, will help customers with everyday banking tasks just like a bank representative. Instead of responding to e-mail or phone calls, a Chatbot answers most questions and gives consumers relevant information. SBI Intelligent Assistant has been set up to handle nearly 10,000 enquiries per second, or 864 million in a day, which is nearly 25% of the total queries processed (The Economic Times, 2017). According to AI Multiple, the benefits of Chatbot services to the customer and businesses can be summarised as follows (A.I. Multiple, 2018).

The benefits of Chatbot services for the customer:

- It is available twenty-four hours and can assist customers by resolving queries more efficiently;
- It provides instant and consistent answers;
- It improves overall customers experience;
- The possibility for continued improvement exists through the use AI and machine learning methods, which can allow a Chatbot to become smarter over time as it learns from experience and respond to customers more effectively.

Benefits of Chatbot services for the e-commerce business:

- It optimises costs by delivering cost-effective services to consumers;
- It leads to improved customer satisfaction when it correctly addresses customer needs;
- It can lead to increased customer interaction and sales;
- It can optimise information management;
- It provides an efficient method for manual task automation;
- It can assist with reaching and procuring new customers;
- It can provide the business with detailed records of the customers' concerns & feedback which can be an aid in helping the business improve its products and services.

The above-mentioned benefits are just some of the most apparent benefits. Due to the rapid improvement of Blockchain, NLP, and AI technology, even more benefits may exist that are yet to be discovered.

2.2.5 Chatbots in South Africa

South African consumers predominantly still purchase goods in-store, but the trend is steadily shifting towards e-commerce. According to a global e-Commerce company, eShopWorld (Wadolowska, 2017), there are currently 18.43 million e-commerce end-users in South Africa, with an additional 6.36 million end-users expected to be shopping online by the year 2021. Chatbot's services are limited in South Africa with only a few South African-based companies involved in Chatbot development. According to IT Web's business editor, Discovery Health, Absa and Mercedes Benz South Africa have all claimed to be first in their respective industries with Chatbot research and development projects (Moyo, 2016). Investment in Chatbot projects are gradually increasing with financial services software developers like FinChatBot recently garnering 7 million rand in funding to develop intelligent agents for their clients (Tech Central, 2018).

2.2.6 Multilingual Chatbots

Businesses segment their consumers according to geography, demography, and a host of other criteria which also includes preferred language. The ability to provide a service in a consumers' native language is likely increase their participation and meet customer satisfaction in much the same way as perceived socialisation increases customer participation in services (Wu, 2011:875). Reaching out to consumers in their native language is an important step when involved in a linguistically diverse, international marketplace made possible through the Internet. E-commerce businesses have struggled to do so on a large scale, until the arrival of multilingual Chatbots.

The implementation of Chatbot technology has proven to have multiple advantages. One of these is its ability to serve consumers in their own native language. Nelson Mandela once said: "If you talk to a man in a language he understands, that goes to his head. If you talk to him in his language, it goes to his heart." Gibson (2017) carries the same sentiment arguing that engaging with customers in their native language is essential to delivering meaningful experiences. Interactive technologies like natural language processing, speech recognition, AI, and robotics are being sought after by businesses across numerous industries. For example, in Japan a Tokyo-based software developing company is in the process of developing a multilingual Chatbot service (Bespoke Inc., 2017). The object of this Chatbot service is to overcome linguistic and cultural barriers for its increasing number of tourists. This innovative Chatbot operates based on a combination of various human chat services and contemporary AI techniques which can present information to the user on all of Japan gleaned from its many exclusive databases.

2.2.7 Technology management

At present, management encompasses several dimensions including human resources, financial resources, and technological resources. Another area of management is IT management which is a combination of two branches of study, information technology and management (Ayat *et al.*, 2009:369). With the advent of new innovative technologies, companies often find it necessary to incorporate such

advancements into their business in order to remain in a competitive position within the greater market. Managing these technologies can be complicated and often requires changes to the organisation's IT infrastructure and business processes. The South African e-commerce market is no exception and will continue to be impacted in the years to come by emerging technology such as Blockchain, AI, augmented reality, and Chatbot services all the while still striving to meet evolving customer demands. South African e-commerce business will too need to manage how they adopt or adapt to new technology.

2.2.8 Information technology (IT) service management

IT Service Management (ITSM) is a process-based practice that endeavours to organise the delivery of Information Technology services to meet the requisites of an enterprise and maintain service-related benefits to customers (Berrahal & Marghoubi, 2016:3). ITSM is driven both by technology and the huge range of organisational environments in which it operates, it is therefore in a constant state of evolution.

2.2.8.1 Information Technology Infrastructure Library (ITIL)

ITIL is widely accepted as a preferred approach to IT service management across the world. With its adoption growing globally, it is worth examining what benefits the ITIL processes can provide an organisation. The ITIL lifecycle strategy is an internationally recognised and accepted approach to service management frameworks. ITIL provides a cohesive set of best practice, drawn from the public and private sectors that can assist individuals and organisations to realise business change, transformation, and growth (AXELOS Limited, 2019). The ITIL service lifecycle is visually illustrated in Figure 2-5 below:

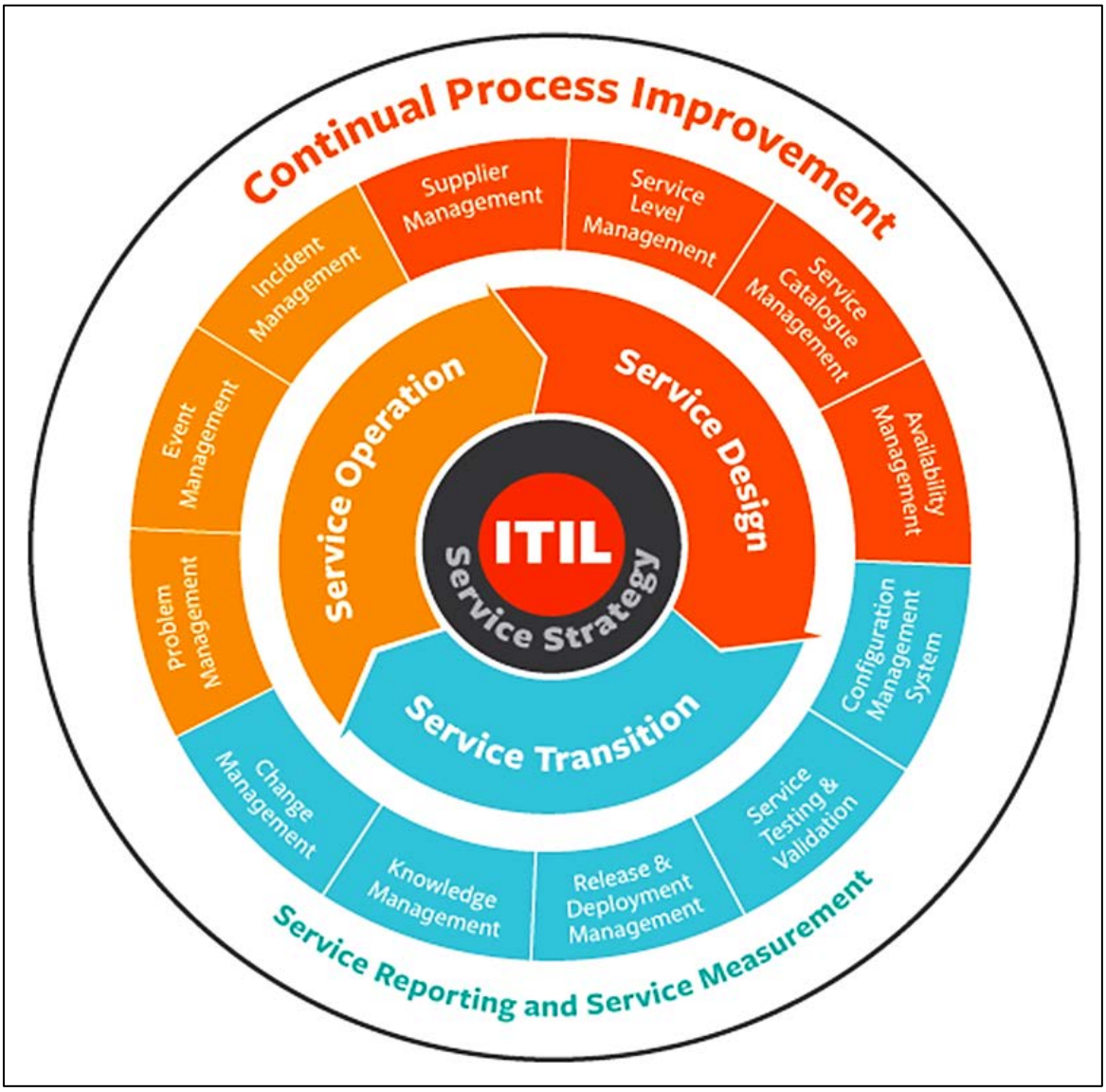


Figure 2-5: ITIL service lifecycle

Source: *BMC Education, (2019)*

The ITIL service lifecycle frameworks depicted in the figure are well established and considered to be the gold standard in the information and communications technology (ICT) industry.

2.2.9 Information technology (IT) project management

Project management is a valuable tool that is practised to convert business opportunities into value and assets. When a company successfully manages its projects, it can increase its revenues, reduce cost, and spend less capital to achieve goals (Lavingia, 2001:23).

2.2.9.1 Project Management Body of Knowledge (PMBOK)

The Project Management Institute in its Guide to PMBOK (Project Management Institute, 2013:3) defines a project as a "temporary endeavour undertaken to create a unique product, service and service". Managing project activities requires skills, tools, and techniques to meet the project's requirements (as posed by the relevant stakeholders) and to fulfil the demands for scope, time, cost, risk, and quality (Project Management Institute, 2013:14).

The degree of projectisation, project resource strategies, and investment in IT project management capabilities must fit the organisation's specific business dynamics and is thus subject to change over time. The current business situation of an organisation determines the IT projects' scale and complexity (Ng *et al.*, 2013:144). PMBOK identifies five project management process groups. Figure 2-6 visually illustrates these distinct elements with defined interfaces which interact with each other.

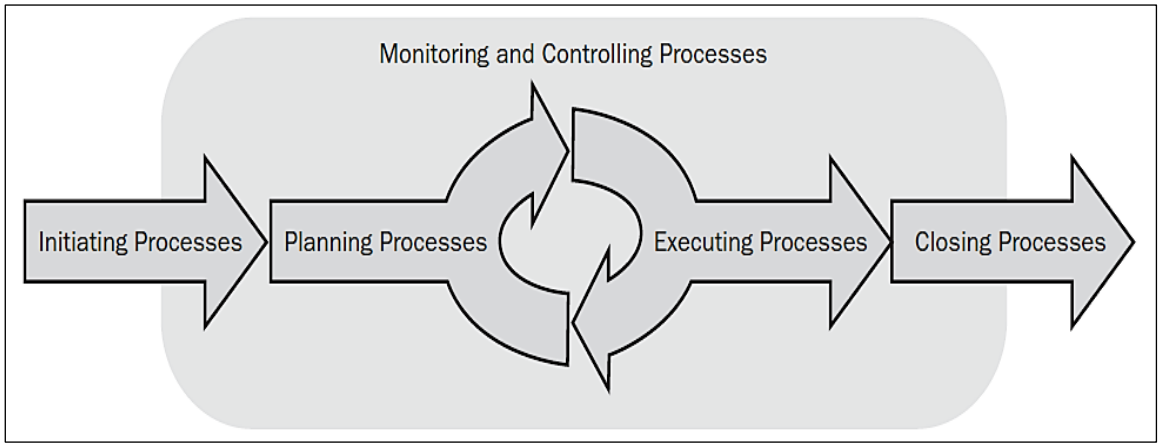


Figure 2-6: Project management process groups

Source: *Project Management Institute, (2013:41)*

Project managers must apply and revise some of these repeatable processes based on their project's unique complexity, risk, size, time frame, project team's experience, resource access, amount of historical information, organisation's project management maturity, and industry area (Project Management Institute, 2013:39). The PMBOK processes creates a foundation that can be used by e-commerce businesses when they want to implement a Chatbot service.

2.2.10 Information technology (IT) governance

Investing in the e-commerce industry requires substantial capital and holds much risk. For this reason, e-commerce businesses should have a measure that can be used to thoroughly analyse the involved risk, yield, and benefit of any potential project. One way of achieving this is for e-commerce businesses to implement effective IT governance tools (Iskandar *et al.*, 2010:308).

IT governance is a formal framework that offers a structure for organisations to make sure that IT investments are aligned with strategic business objectives. This framework helps ensure that investment opportunities are rigidly reviewed but can only be relied upon if it is fundamentally incorporated into the company's governance structure where it resides as both management's and the board of director's primary responsibility. According to the IT Governance Institute there are five focus areas for IT governance which are defined in the IT Governance Institute practice guide for decision makers as follows (ISACA, 2019):

- *IT strategic alignment:*
  These criteria highlight any linkage between IT plans and existing business plans whilst defining, maintaining, and validating the potential IT value propositions. In the end, IT will be aligned with enterprise operations.
- *IT value delivery:*
  These criteria ensure that the intended benefits result from the proposed IT through the controlled execution of the value propositions by way of the delivery cycle.
- *Risk management:*

Risk awareness is maintained in the organisation by its senior officers by embedding risk management responsibilities. The senior officers should demonstrate a sure understanding of the organisation's desire for significant risk and maintain a clear transparency with regards to the organisation's investment operations.

- *IT resource management:*
  Deals with the proper management and optimal investment of IT resources which includes the organisation's infrastructure, information, applications, and people.
- *Performance measurement:*
  Involves monitoring and tracking the implementation of projects and strategies.

2.2.10.1 COBIT: Framework for IT Governance and Control

Control Objectives for Information and Related Technologies (COBIT) is an IT governance framework and supporting toolset that allows managers to bridge the gap between control requirements, technical issues, and business risks (ISACA, 2019). COBIT provides a guide for what should be covered in IT service management processes and procedures. The COBIT IT governance framework is visually represented in Figure 2-7 below:

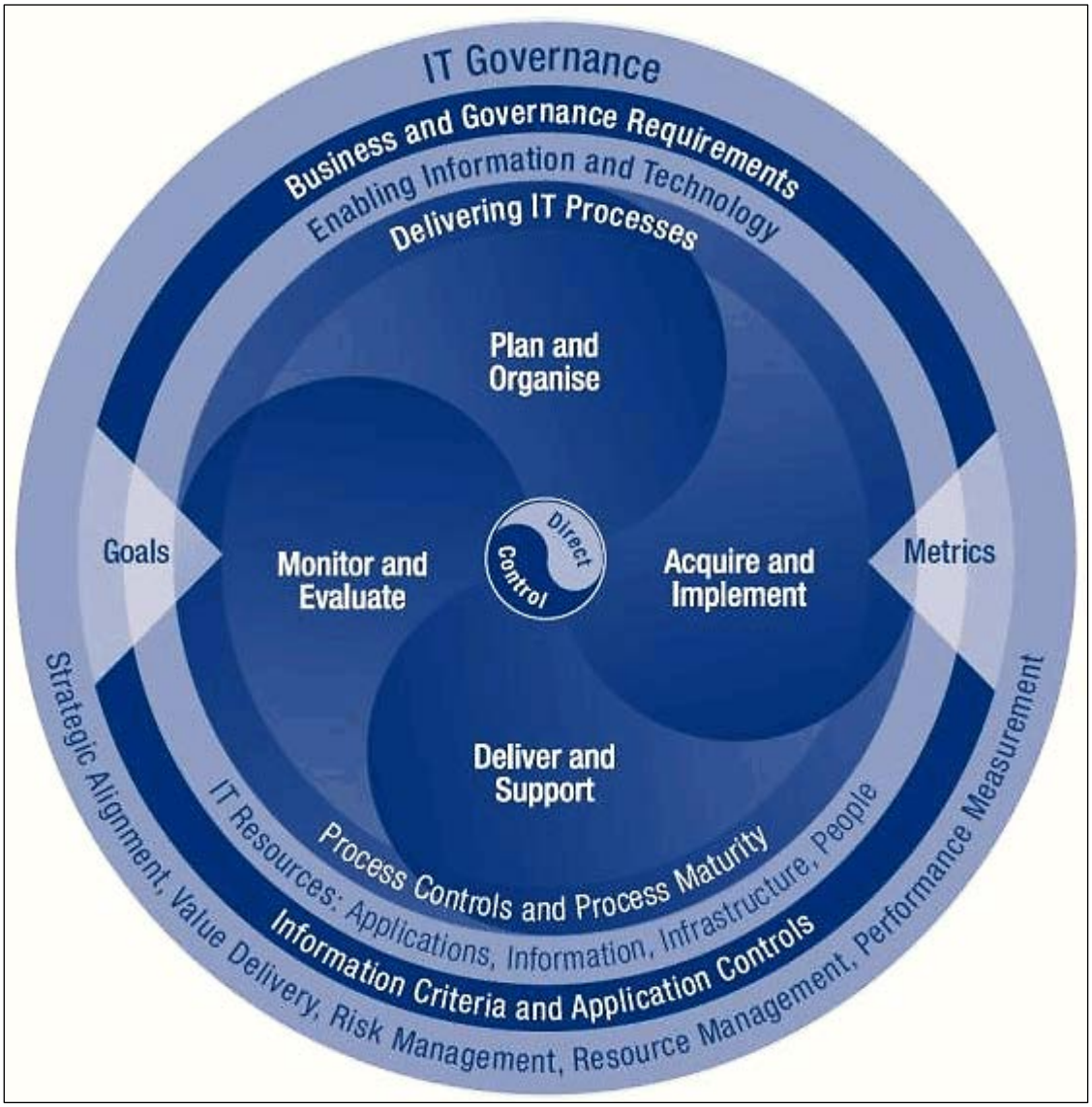


Figure 2-7: COBIT IT governance framework

Source: *ISACA, (2019)*

The guiding principles of COBIT IT governance framework are as follows (ISACA, 2019):

- Meeting the needs of stakeholders.
- Covering the whole enterprise from end to end.
- Application of a single integrated framework.
- Ensuring a holistic approach to business decision making.
- Separating the governance from the management.

The COBIT IT governance framework creates a foundation that can be used by e-commerce businesses when they want to implement a SaaS solution.

2.2.10.2 King IV code on IT governance

The King Report on Corporate Governance details the intended benchmarks for information and technology governance in a South African context. The purpose for the code set out in the report is to support South African businesses in setting clear objectives by providing formalised assessment processes based on a set of best international practices. The fourth and latest revision of the report, namely King IV (King Committee on Corporate Governance, 2016), recommends that the organisations governing bodies should:

- Assume responsibility by setting the direction for how the organisation should approach and address IT;
- Approve policy to give effect to the direction,
- Effectively delegate to management the responsibility of managing IT;
- Oversee the management of IT;
- Consider receiving periodic independent assurances on the organisation's IT arrangements, including outsourced services;
- Disclose the organisation's governance and management of IT, including an overview, its focus areas, the actions taken, and the existing plans.

Although Chatbot technology can be considered unique and mostly developed internationally, the implementation of such services in South Africa are to still adhere to the King IV code on IT governance.

2.3 TECHNOLOGY TRANSFER

Technology and technology transfer are very important factors in economic growth. In today's age, the ever-present gap between developed countries and developing countries is getting wider due to the rapid advances being made in technology and the disproportionate access to these technologies (Mahmoud *et al.*, 2012:623). According to Arenas and González (2018:7), the traditional elements of a

technology transfer can be described as including a transmitter (donor or sender), receiver (transferee), transfer object, and mechanisms. The technology transfer process is visually illustrated in Figure 2-8 below:

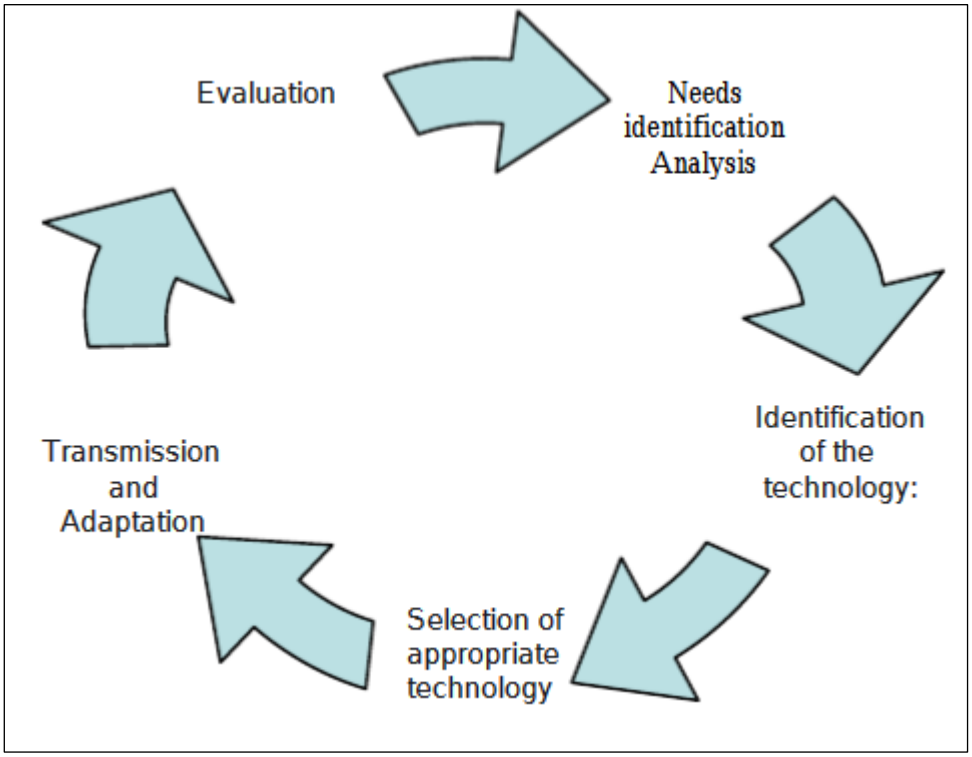


Figure 2-8: Technology transfer process

Source: *Mahmoud et al., (2012:622)*

For technology transfer to succeed, it needs to be coordinated by its participants and directed from various angles. This requires the collaboration and incorporation of education institutions, available infrastructure, training programs, and policies and rules. The absence of adequate and basic infrastructure, socio-economic disparity, and the lack of government and national ICT strategies have created a significant barrier in the adoption and growth of e-commerce among developing countries (Lawrence & Tar, 2010:23). To at least partially overcome these barriers e-commerce businesses in South Africa can adopt a technology transfer strategy. As time progresses, so too does the importance of technology transfer with the growing need for modern technologies, innovation, inventions, and research and development. There are many models that can describe the process of technology

transfer and the selection of such a strategy is dependent on the country's given state of progress.

2.4 CONCLUSION

The conclusion drawn from this chapter is that e-commerce-orientated businesses are becoming progressively complex and implementation costs are excessive. Chatbot technology on the other hand has the potential to save costs and increase efficiency in e-commerce-orientated businesses. Chatbot development is moving towards the goal of improving interaction experiences with the customers to yield more profound connections with its customer base. However, in order to implement such a complex technology, it is important to take note of the best practices in technology management. Established technology management models can be used to implement and manage such new technologies in an e-commerce business. ITIL and PMBOK provide a good and well-established framework that can be used by e-commerce businesses which are suggested for the incorporation of new technology. To manage risk, IT governance frameworks are a viable resource to consider. Relevant and comprehensive frameworks are provided by COBIT and King IV which support businesses with IT governance processes. Technology transfer plays a significant and important role in the implementation of new technology in an e-commerce business. When undertaking technology transfer, it is important to encourage businesses to embrace the latest technology to remain competitive in an ever-changing technological environment.

2.5 CHAPTER SUMMARY

This chapter explained the consumer trends in the e-commerce industry with a brief history of local and international Chatbot development projects and the factors behind its growing popularity. The benefits and limitations of Chatbot technology was analysed with a focus on the South African context. Technology management methodology was introduced which included IT service management, IT project management, and IT governance concepts. In addition, an overview was given on the importance of technology transfer practices. The next chapter will discuss the research methodology and results.

CHAPTER 3 RESEARCH METHODOLOGY AND RESULTS

3.1 RESEARCH METHODOLOGY

3.1.1 Introduction

This research's aim involves the collection and analysis of informative data to create a practical managerial framework that provides guidance for the use of industry best practices in order to implement successful Chatbot services. To achieve this goal, a qualitative research approach was adhered to. According to Bryman *et al.* (2016:53), a qualitative research approach is one in which the researcher and the client collaborate in the diagnosis of a problem and in the development of a solution based on that diagnosis. In like manner, the research conducted consists collaborating with participants to identify these industry best practices.

3.1.2 Research approach

A survey-based research approach was used to gather data. This process involved designing and then conducting semi-structured interviews with industry experts and academic specialists. Purposeful sampling methods were used to identify meaningful sources of data. Purposeful sampling is widely used in qualitative research for the identification and selection of information-rich cases related to the phenomenon of interest (Palinkas *et al.*, 2015:540). Such information-rich sources are reflected in the diversity of participants considered as part of the interviews. The data collected from these semi-structured interviews were extensively analysed to formulate an impartial conclusion on the best manner of implementation regarding Chatbot services technology. These conclusions form the foundation from which a managerial framework is to be developed.

To effectively conduct this study, purposeful sampling was employed as way to benefit from its key advantages in that it is cost and time effective. However, other challenges emerged when assembling the sampling pool. A selection of participants was established from central figures involved in different Chatbot-related projects, however the diversity of these projects demonstrated different stages of

development for each project as influenced by their current progress or intended Chatbot service. To constrain the influence of these factors on the collected data, a criteria checklist was used to regulate the information collection process and ensure that the same type of information was exhumed from each participant. The interview prompts and questions thus all focus on the following key themes as set out in the adoption factors and implementation steps of ITSM (Ayat *et al.*, 2009:371).

- Management commitment and involvement
- Tool selection
- Organisation assessment
- Planning
- Staff training
- Implementation
- Continuous improvement

It is these above-mentioned themes that were used to set out the main themes in the designing of the semi-structured interviews.

3.1.3 Data collection

As the Internet has evolved, a new mode of research has become available in the form of e-research which was the primary research method used in this study. This same vehicle for e-research has however also resulted vast amounts of data being collected, compiled, archived, and which is now easily accessible for research albeit not for the original intended purpose of its owner. According to Bryman *et al.* (2016:354) despite practical difficulties, secondary content analyses offer rich opportunities as qualitative researchers can generate large and unwieldy sets of data, which may leave much of the material under-explored. It is for this reason that secondary analysis, as employed as part of the research approach, required the use of advanced search engine methods to identify relevant and meaningful information regarding the study's intended unit of analysis from the vast body of stockpiled data available on the Internet.

3.1.3.1 Population size

According to Bell and Bryman (2015:198), the absolute of a sample is important, not its relative size. This is taken into account by way of purposeful sampling where the sample size was limited to only five successfully implemented Chatbot projects as the study's interview participants. Given the recent significant growth in the Chatbot industry, it has now become challenging to determine the overall size of the industry, especially in South Africa. Since many business sectors are likely currently investigating the possibilities of Chatbot technology to determine if it can be of benefit to them. Thus, the selected projects rather represent the broad spectrum of possible project types and not necessarily the broadest possible coverage of the industry. In addition, the number of projects to be analysed is limited since the most significant projects are intended to represent their industry sector – this again exemplifies the cost and time effectiveness of purposeful sampling and reduces the time required to complete the research.

3.1.3.2 Target population

The study's population under observation is made up of local and international e-commerce businesses and Chatbot software developers that have implemented Chatbot technologies in their own operational processes or in a client's. The representative population can be grouped in the following categories:

- *Established Chatbot projects:*
  Includes established e-commerce businesses that have applied Chatbot technologies in their operational processes and are in the operational stage of their projects.
- *International Chatbot project:*
  This includes international businesses that have applied Chatbot technologies in their operational processes or are in the process of testing a pilot project.

- *Chatbots research project:*
  These organisations undertake projects aimed researching, developing, or improving Chatbot dialogue systems or artificial conversational entities technologies for commercial use in an e-commerce-related context.
- *Local Chatbot project:*
  Includes South African-based business who have applied Chatbot technologies in an e-commerce related field as part of their operational processes or who are in the process of testing a pilot project with a similar intent.

This study made use of the criterion sampling research strategy, as guided by the before-mentioned categories, to select the relevant Chatbot services projects. In a similar manner, studies considered as part of the literature review were selected according to predetermined criteria which are presented in the succeeding section.

3.1.3.3 Research criteria

In addition to the empirical research of existing projects from a population of possible participants, a literature study is undertaken to support or clarify its findings. Meline (2006:21) states that a fixed set of criteria should be used to determine the inclusion of studies based on how consistent they are with the operational definition of the given problem under observation. Such criteria also help provide a clear guideline to determine the most relevant literature. The established eligibility criteria are presented below and was liberally applied in the beginning of the literature review. Evaluating the potential studies against the set criteria ensures that relevant studies were considered for further investigation, while studies that undoubtably met one or more of the exclusion criteria were excluded without further consideration. It is this selection process detailed by Meline (2006:21) that is intended to yield eligible studies for review.

The inclusion criteria for this study is as follow:

- Various types of studies and different literature formats were considered, namely academic articles, technology surveys, official newsletters, opinion papers and reviews published.
- Theses and dissertations are deliberately included to counteract any research limitations of information bias.
- Studies which used different types of research methodologies applied in different contexts and project backgrounds were included to provide a more comprehensive perspective.
- Studies that addressed the research question and which pertained to the research subject of intelligent agents were included.

The exclusion criteria for this study is as follow:

- Duplicates or progressions of studies where only the most recent version of the study was included.
- Studies with minimal or no relevance to the research question and research subject were excluded.
- Textbooks were excluded since they contain secondary data and are considered non-research material.

3.1.3.4 Data collection techniques

The aim of the empirical study is to collect real-world information in the e-commerce industry. A qualitative research method was used and most of the data collection processes were conducted via e-research methods.

3.1.3.5 Interviews

A set of comparable semi-structured interviews were designed as the format in which the intended interviews were conducted. The following methods were used in the interviewing process: telephone calls, video calling services, and in-person interviews. The following guidelines obtained from Bell and Bryman (2015:198) were adhered to during the interviews:

- A compressed and informative introduction was given to the interviewees.
- The questions were relevant to the interviewees.
- The questions were clear and comprehensible without any unnecessary jargon.
- The questions were structured as open-ended to avoid yes or no answers.
- The interviews contained a mixture of probing, specific, and direct questions.
- The interview process allowed for additional comments if unexpected themes and issues arose.

3.1.3.6 Interview structure

The ITIL framework has become common practice for implementing ITSM and as a result is also now the preferred framework in most organisations. The steps required to implement ITIL in the target organisation is visually represented in Figure 3-1 below:

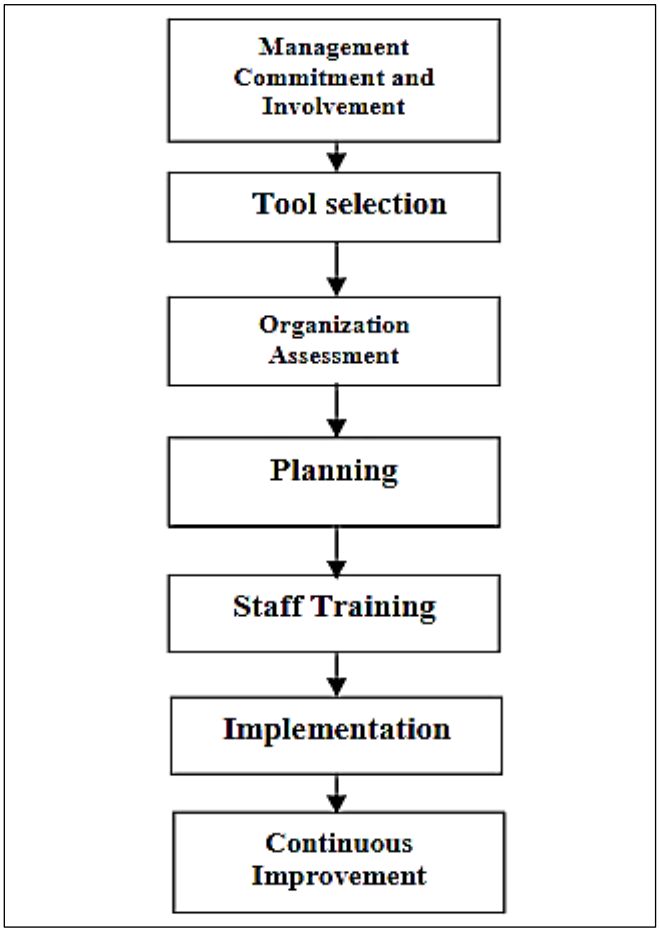


Figure 3-1: Adoption factors and implementation steps of ITSM

Source: *Adoption factors and implementation steps of ITSM in the target (Ayat et al., 2009:371)*

There are several managerial frameworks available that can serve as a basis for constructing a questionnaire. The ITIL model was chosen because it is an established ITSM model but also covers various aspects related to the implementation of new technology such as in the case of a Chatbot service.

3.1.4 Data analysis

Qualitative content analysis is a strategy used to search for the communicative characteristics of language by focusing on the content's underlying theme and meaning behind the text (Bryman *et al.*, 2016:106). Content analysis and thematic analysis methods were used as part of this strategy to analysis the collected data. The responses obtained in the semi-structured interviews were rich in variety given the distinct backgrounds of the interviewees which included industry and academic experts. Their responses were summarised and sorted according to relevance. The data was then analysed by the Microsoft Power BI business analytics service and the derived results were supplemented by a review of existing Chatbot services. By making use of a data matrix, the participants' Chatbot projects could be compared to determine if there was a shared set of characteristics that could lend themselves to establishing value-adding processes and practices.

3.1.4.1 Rigour, validity and reliability

The sourced data was validated to ensure that it is authentic and of acceptable quality. Due to distinctive attributes and underlying complexities of qualitative research, necessitate a quality approached qualitative research design. A quality framework was implemented to ensure quality and rigour as set out in the applied qualitative research design guide (Roller & Lavrakas, 2015:3).

3.1.4.2 Research risks and provision for alternatives

Risk awareness is important in any research study. Throughout this study, risk identification and risk management techniques were practiced. The employment of Chatbots services in e-commerce business is a relatively new trend and only limited Chatbot projects exist. This in itself can be considered a risk to the comprehensiveness of the study regarding e-commerce Chatbots employed within a South African context. This manifests as limited availability of applicable resources in the form of relevant Chatbot projects. Attempting to mitigate this risk by considering alterative Chatbot projects may only further compound the risk. The situation was actively monitored and where possible, alternative start-up e-commerce businesses or new Chatbots projects were identified and examined to determine their relevance to this study. Alternative Chatbot projects in other related industries could however be considered if all alternative projects are exhausted. However, one should remain aware of the risk involved when making use of alternative Chatbot projects particularly the possibility of negative effects on costs and added time consumption.

3.1.5 Ethical considerations

Ethical issues pertain to the concerns and dilemmas that arise when conducting research to ensure reliable and sincere conduct, with marked importance placed on preventing any harmful conditions for the subjects of inquiry (humans) in the research process (Schurink, 2005:43). Ethical conduct was adhered to in that all research was carried out according to the North-West University's Code of Ethics. In addition, anonymity was granted to all participants so as to ensure confidentiality of their responses

3.2 INTERPRETATION OF RESULTS

3.2.1 Introduction

Content and thematic analysis methods were used to analyse the data collected from the semi-structured interviews regarding the participants' Chatbot service

projects. The responses were transcribed to more accurately analyse and interpret the results. The responses were then systematically coded and categorised to allow the labelled data to be processed by the Microsoft Power BI business analytics service using the provided grouping and binning function.

3.2.2 Respondents

Table 3-1: Table of respondents

Project identification	Organisation description *(as explained in 3.1.3.2)*	Channel
Chatbot project 1	Established Chatbot project 1	Video call (Skype)
Chatbot project 2	Established Chatbot project 2	Telephone call
Chatbot project 3	International Chatbot project	Video call (Skype)
Chatbot project 4	Chatbots research project	In person interview
Chatbot project 5	Local Chatbot project	Video call (Skype)

3.2.3 Criteria

The semi-structured interviews were designed to address the main themes of the adoption factors and implementation steps provided in ITSM as previously discussed in 3.1.2. The relevant businesses processes were derived from the literature study which constitute the content and topics of the interview questions the. The addressed themes and sub-themes as derived from the ITSM framework are as follows:

Section A: Background information

- Nature of the business and industry
- Operational status of Chatbot service
- Intended capabilities of Chatbot service

Section B: Management commitment and involvement

- Top (strategic) management commitment
- Top (strategic) management involvement

Section C: Tool selection

- Business analytics tools
- Technology management tools
- Software development tools

Section D: Organisation assessment

The sub-theme is derived from the institutional and organisational assessment model (IOA Model) (Universalia, 2019).

- Organisational performance
- Organisational capacity
- Organisational motivation
- External environment

Section E: Planning

- System planning (Chatbot analysis and design)
- Management and resource planning

Section F: Staff training

- Technology management training
- Change management training
- Technical training

Section G: Implementation

- System (Chatbot) implementation strategy

Section H: Continuous Improvement

- Business model evaluation
- System (Chatbot) capability evaluation
- Technology management evaluation

3.2.4 Data processing

A systematic approach was taken to code and categorise transcribed interview responses in a bid to allow for its thorough analysis and the extraction of useful information. The following steps detail the analysis process:

Step 1:

All the recorded interviews were transcribed, and the individual responses were categorised according to the themes set out above in section 3.2.3.

Step 2:

The data was then uploaded to Microsoft's Power BI. The transcripts of text data were coded and analysed utilising the Power BI grouping and binning functions to obtain an indication of the what reoccurring themes are present in the data and any other patterns that can be identified. The results were then converted to excerpts.

Step 3:

Category matrixes were then formulated to help summarise and understand the patterns underlying the extracted information in an attempt to link the derived conclusions to the research objectives.

Step 4:

The conclusions were categorised and measured against the following contexts to derive general indications of what patterns are reflected in the existing frameworks:

- IT services management context (ITIL framework);
- IT Project management context (PMBOK process groups);
- IT governance context (COBIT framework).

Step 5:

Finally, a thematic map was developed as a visual aid that helps visualise and emphasise the themes, codes, and their relationships.

3.2.5 Content analysis

In addition to the applied systematic coding and categorisation of the transcribed interview response based on the research questions, the themes and ideas were also categorised according to IT service management, IT project management, and governance models. The aim was to gain a broader perspective of the management process that the respondents used in their own projects and to identify managerial patterns when implementing a Chatbot service in an e-commerce business. Some of the identified themes and ideas overlap in the selected models but their categorisation changes according to each model's unique requirements and workflow.

3.2.5.1 IT services management context.

This matrix was created using the ITIL framework stages to help understand their relevance in the ITIL lifecycle. Each identified theme was analysed against the framework's five stages to help identify at which point of the implementation process it is most relevant. At each of these points, a category label was assigned. The information from this matrix was used to further develop the proposed managerial framework proposed in Chapter 4. See Table 3-2 for categorisation of themes surrounding the ITIL framework:

Table 3-2: Categorisation of concepts in the ITIL framework context

ITIL framework stages	Excerpts
Service strategy	• Define business goals and objectives • Conduct market analysis • Conduct business impact analysis • Analyse and understand business processes • Analyse IT infrastructure • Identify best areas for Chatbot implementation • Define product scope or redefine product scope • Compile assessment report • Select software development methodology
Service design	• Specifying hardware and system requirements • Defining overall system architecture (select platform and framework) • Systems design specification • Consider IT support requirements • Develop content strategy • Develop conversational framework • Define the detail of conversational flow • Define Chatbot character • Define approach for AI-based implementation • Define strategy for Chatbot training • Identify technologies for AI development • Define requirements for integration • Select the live agent platform • Define the launch approach • Define client out-boarding strategy • Define specific environments for NLP engine

	• Analyse IT infrastructure
Service transition	• Select deployment options • Adapt existing e-commerce software services and business processes • Select testing strategy • Gather corpus of data • Select software development tools • Develop beta version (Chatbot)
Service operation	• Deploy beta version (Chatbot) into existing infrastructure and business processes • Perform testing • Analyse testing results and implement improvements • Develop final version (Chatbot) • Perform staff and stakeholder training
Continual service improvement	• Perform business model and process analysis • Perform Chatbot capability evaluation based on analytics • Evaluate technology management process • Perform customer satisfaction survey

Issues identified in the interview data that were not covered in the ITIL matrix were again examined and instead categorised using the PMBOK process groups and COBIT framework matrixes as presented in the succeeding section.

3.2.5.2 IT project management context

This matrix was created based on the PMBOK process groups in a bid to better understand their relevance in the project management context. Each identified theme was analysed against the five process groups to identify at which point of the

implementation process it is most relevant. A category label was assigned at these points and are presented in accordingly below. The information from this matrix was also used to help develop the proposed managerial framework in Chapter 4. See Table 3-3 for categorisation of themes around the PMBOK process groups:

Table 3-3: Categorisation of concepts in the PMBOK process groups context

PMBOK Process Group	Excerpts
Initiating	• Define business goals and objectives • Conduct market analysis • Conduct business impact analysis • Define the Chatbots business case • Identify best areas for Chatbot implementation • Define the Chatbots AI abilities • Define product scope or redefine product scope • Identify Chatbot channel (platform)
Planning	• Select software development tools • Define the detail of the conversational flow • Define Chatbot character • Define approach for AI-based implementation • Define strategy for Chatbot training • Select framework • Identify technologies for AI development • Gather corpus of data • Select management tools • Define requirements for integration • Select the live agent platform • Define client out-boarding strategy • Define specific environments for NLP engine

	• Analyse IT infrastructure • Define the launch approach
Executing	• Establish product development team • Deploy beta version (Chatbot) into existing infrastructure and business processes • Create content for conversation flow • Develop test cases • Perform testing • Analyse testing results and implement improvements • Develop final version (Chatbot) • Annotate training set • Add context to the conversation (create training phrases) • Create unit tests • Deploy alpha version into existing infrastructure and business processes • Create unit tests for external components • Execute the test cases (execute conversational test cases and make changes) • Perform staff and stakeholder training • Perform live agent training
Controlling	• Perform Chatbot functionality evaluation • Evaluate technology management process • Evaluate performance against original goals
Closing	• Transfer management responsibility • Conduct post-phase reviews • Document the lessons learned • Update or create information management assets

Issues identified in the data that were not covered in the PMBOK process groups were again examined and categorised using the ITIL framework and COBIT framework matrixes which are presented in the succeeding section.

3.2.5.3 IT governance context

This matrix was created by using the COBIT framework to understand their relevance in the IT governance context. Each identified theme was analysed against the four domains to understand at which point of the implementation process it is most relevant and assigned with a category label. The information from this matrix was used for developing the proposed managerial framework in Chapter 4. See Table 3-4 for categorisation of themes around the COBIT framework:

Table 3-4: Categorisation of concepts in COBIT framework context

COBIT framework	Excerpts
Planning and organisation	• Define business goals and objectives • Conduct market analysis • Conduct business impact analysis • Define the Chatbots business case • Identify best areas for Chatbot implementation • Define the Chatbots AI abilities • Define product scope or redefine product scope • Identify Chatbot channel (platform) • Define product scope or redefine product scope • Select software development methodology • Define the detail conversation flow • Define Chatbot character • Approach of AI implementation • Define strategy for Chatbot training • Define the best technologies that work for AI projects

	• Gather corpus of data • Select development tools • Define requirements for integration • Select the live agent platform • Define client out boarding strategy • Define specific environments for NLP engine
Delivering and support	• Deploy beta version (Chatbot) into existing infrastructure and business processes • Create content for conversation flow • Develop test cases • Perform testing • Analyse testing results and implement improvements • Develop final version (Chatbot) • Annotate training set • Add context to the conversation (create training phrases) • Create unit tests • Deploy alpha version into existing infrastructure and business processes • Create unit tests for external components • Execute the test cases (execute conversational test cases and make changes) • Perform staff and stakeholder training • Perform live agent training
Acquiring and implementation	• Deploy beta version (Chatbot) into existing infrastructure and business processes • Perform testing • Analyse testing results and implement improvements

	• Develop final version (Chatbot) • Perform staff and stakeholder training • Create content for conversation flow • Annotate training set • Add context to the conversation (create training phrases) • Create unit tests • Define test cases for NLP • Create unit tests for external components • Define the launch approach • Execute the test cases (execute conversational test cases and make changes)
Monitoring and evaluating	• Perform Chatbot functionality evaluation • Evaluate technology management process • Evaluating performance against original goals • Transfer management responsibility • Conduct post phase reviews • Document lessons learned • Update or create information management assets

Issues identified it the data that was not covered in the COBIT framework were analysed and categorised by using the ITIL framework and PMBOK process groups matrixes.

3.2.6 Thematic analysis

Thematic analysis is a method of identifying, analysing, and reporting on patterns (themes) within data. It is described as a descriptive method that reduces the data in a flexible way that coincides with other data analysis methods (Castleberry & Nolen, 2018:808). The thematic analysis method is used to help supplement the content analysis method. A visual representation in the form of thematic map was

developed to clearly illustrate and emphasise the themes, codes, and their inter-relationships. The thematic map of the identified themes, codes, and their relationships is presented in Figure 3-2 below:

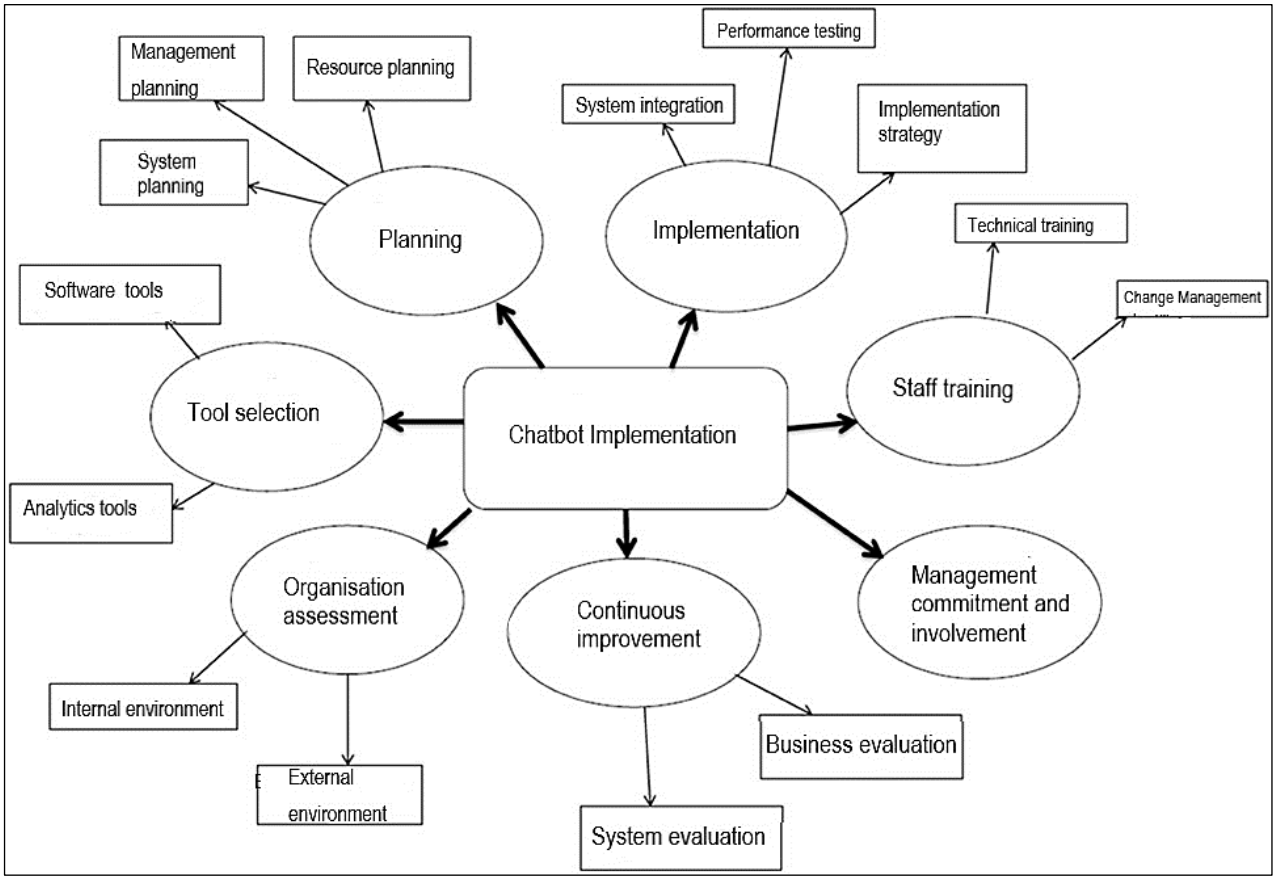


Figure 3-2: A thematic map of the identified themes, codes, and their relationships

Source: *0wn*

The information from this thematic map figure 3.2 was also used to aid in the development of this study's proposed managerial framework which is presented in Chapter 4. The detail will be discussed in Chapter 4.

3.3 CONCLUSION

This chapter detailed the processes followed in the gathering and analysis of empirical data that would be utilised in the eventual compilation of a practical managerial framework consisting of industry best practices geared toward the

successful implementation of Chatbot services. This foundation was established by deriving conclusions from personally conducted semi-structured interviews with industry experts and academic specialists. The data collection focused on the key themes as set out in the adoption factors and implementation steps of ITSM. Content analysis and thematic analysis methods were used to analysis the collected data. The key themes and ideas within the study's participant population were captured, analysed, and categories into various matrixes and a thematic map was developed to potentially highlight any specific set of characteristics shared between the various participant projects in an attempt to identify any value-adding processes and practices. The information in these matrixes along with the findings made in the literature study were all used to aid in the development of a managerial framework that is to provide guidance for e-commerce businesses in South Africa that wish to implement Chatbot service technology.

3.4 CHAPTER SUMMARY

This chapter covered the research approach, data collection methods, and data analysis strategy. Research limitations and ethical considerations were also discussed. Discussion of the results opened with an overview of the respondents and their related projects and an explanation of the criteria considered when designing the questions for the semi-structured interviews. The methods used to process and analyse the participant's responses were explained. Finally, the data was categorised according to the ITIL framework, PMBOK process groups, and COBIT framework contexts. The next chapter, provides a detailed discussion on the conclusions and recommendations that will conclude this study, accompanied by suggestions for further research.

CHAPTER 4 CONCLUSIONS AND RECOMMENDATIONS

4.1 INTRODUCTION

This chapter discusses the conclusions that were drawn from this research study. The focus remains centred on the activities and best practices surrounding the implementation of a Chatbot service in an e-commerce business. Prior to developing the framework, a list of requirements and specifications was compiled which was formulated based on the combined insights derived from both the literature and empirical study.

4.2 STUDY CONCLUSIONS

The requirements and specifications are discussed in an identical order as the adoption factors and implementation steps of ITSM (Ayat *et al.*, 2009:371).

4.2.1 Background information of respondents

Comparable semi-structured interviews were conducted with five hand-picked respondents. These participants take the form of managerial staff members employed in both local and international e-commerce businesses and Chatbot software development companies. The respondents all have experience related to the integration of new Chatbot technologies into a business's operational processes in either their own companies or in that of a client's. It was also of importance that the majority of respondents be involved in sophisticated projects with a high maturity level. This quality contributed greatly to the objective of the study in obtaining insights into the factors that need to be considered for the successful implementation of a Chatbot service from a B2C perspective.

4.2.2 Management commitment and involvement

100% of the respondents revealed that management commitment and involvement is a key driver in the success of implementing a Chatbot service. It is necessary for management to grasp what value a Chatbot service offers the business and to understand how it can benefit with the strategic mission and vision of business. In

addition, 80% the respondents indicated that management is responsible for ensuring that the necessary support be provided when implementing a Chatbot service so as to anticipate and reserve enough resources that may be required.

4.2.3 Tool selection

100% of the respondents indicated that different tools are required at different stages of the implementation of a Chatbot service. The required tools thus need to be selected at each stage as new needs or challenges arise. However, the choices made must be thoroughly considered since it can result in cost and time implications. With regard to relevant tool selection, each respondents' feedback is summarized and explained as part of the following categories:

Business analysis tools: Insights from the literature study detail how it is important that business analysis be done before the development of a Chatbot service commences. 60 % of the respondents suggested existing business analysis tools for e.g. IOA model or Microsoft Office Suite be made use of since they are generally well established and sophisticated tools.

Technology management tools: As determined in the literature study, there exist several technology managements tools. However, the investigated research provides a diverging set of opinions with no absolute consensus on which available technology management model or implementation method is best to adopt when implementing a Chatbot service. 80% of the respondents on the other hand make use of a combination of technology management models for e.g. COBIT, ITIL, MSF and rely on their professional experience to implement a Chatbot service.

Software development tools: The selection of the software development tools is dependent on the complexity of the planned Chatbot service and the expertise of the development team e.g. the degree of complexity behind the Chatbot's AI technology and the skill levels of the staff members. At the moment, there are no standardised development tools available, same of the tools used for development are Python, C++, Java and Scala. 60% of respondents indicated that no formal stipulated criteria were considered when deciding on what type of software

development tools to use. 40% of the respondents indicated that they do follow a formal list of criteria, but it is inadequate and needs to be refined over time.

4.2.4 Organisation assessment

A consensus exists among all the respondents in that organisation assessment is considered a vital process and that it is to be regarded as the first step towards the implementation of a Chatbot service. Discussions with the respondents revealed the following tasks as being important to consider when conducting an organisation assessment:

Internal environment analysis: Define business goals and objectives, define the Chatbots business case, analyse and understand business processes, and identify most suitable areas in the business processes for Chatbot implementation. 60% of the respondents suggested using existing business analysis tools for e.g. IOA model or Microsoft Office Suite.

External environment analysis: An external analysis of the unique South African e-commerce business market should be done. The respondents all advocated for this type of market analysis and suggested that formal environmental analysis tools be employed for this task; a modified version of PASTEL analysis was recommended.

4.2.5 Planning

The literature study revealed the existence of various IT service management and IT project management models all of which are available for use in the development and implementation of a Chatbot service. For most of these models, there are a few shared aspects where these models correspond with one another. All these models have an extensive planning stage. This is supported in the empirical study which revealed that there are many factors to consider during the planning stage. Due to the complex nature of Chatbot technology, thorough planning should too be made use of to minimise cost and time wastage.

During this stage, the team prepares the functional specifications, works through the design process, and prepares work plans, cost estimates, and schedules for the various deliverables. The planning stages' activities can be defined as follows:

System (Chatbot) planning: The starting point of the Chatbot design process depends on the ecommerce business and their decided intent for the Chatbot service in terms of where and how the Chatbot service will be integrated into existing operational management processes. From the respondents' feedback, there are a few matters to consider during the design process

- Define product scope or redefine product scope
- Select software development methodology
- Define the details of conversational flow
- Define Bot character
- Approach of AI implementation
- Define Chatbot training strategy
- Define the best technologies that work for AI projects
- Gather corpus of data

Management and resource planning: The management process selections also depend on the purpose of the Chatbot service and where and how the Chatbot service will be integrated into the business's existing operational management processes. In like manner, the design features also influence the managerial position selection. 80% of the respondents indicated that these influences typically take the form of the choice of platform, development framework, and the decision to develop the Chatbot internally or externally. 80 % of the respondents also indicated that the selection of technology management and implementation tools is an important topic to consider during the management and resource planning stage, further demonstrating the extent of its influence.

4.2.6 Staff training

60% of the respondents consider staff training to be an important part of the implementation process. The skill level of staff members can be a leading factor in

whether the implementation of a project or product will be successful. It is thus recommended that a training plan be compiled and implemented for the company's staff. Within the context of Chatbot development, the required training would chiefly revolve around intelligent agent operational concepts with a special focus on its internal functions and how its capabilities are realised. This form of technical skills training is necessary when development work is to be done in-house to ensure that the development team are all equally equipped.

In addition, 40 % of the respondents indicated that live agents need to also be trained so that they may provide assistance during the system's launch stage. If necessary, training can be provided to the marketing staff on how a Chatbot service will integrate into the business's marketing strategy.

4.2.7 Implementation

60% of the respondents indicated that one would typically rely on the project or product manager's involvement in the project to increase at this stage of the Chatbot's development. The integration of the Chatbot software is at the core of the implementation process which involves coordinating resources and staff members, a task reserved for management. Effective management thus requires good project management and IT governance practices since the manner in which this stage is executed may likely determine whether the Chatbot is successfully deployed. The respondents emphasised the following tasks that form an important part of the implementation process:

Implementation of Chatbot software:

- Deploy beta version (Chatbot) into existing infrastructure and business processes
- Perform testing
- Analyse testing results and implement improvements
- Develop final version (Chatbot)
- Create content for conversation flow
- Annotate training set

- Add context to the conversation (create training phrases)
- Create unit tests
- Define test cases for NLP
- Create unit tests for external components
- Define the launch approach
- Execute the test cases (execute conversational test cases and make changes)

All the respondents indicated that they are aware of industry best practices, 60% of them agree with the notion of industry best practices while 40% somewhat disagree. What's more, 40% of the respondents indicated that they implement industry best practices while 60% choose to develop their own practices unique to their situation.

4.2.8 Continuous improvement

The literature study shows that no software product or service is a static entity. Due to its need to dynamically adapt to the needs of its users and owners, most IT management models recommended that continuous support and improvement be provided to ensure the product or service's success and continued use. Chatbot development is no exception to these directives.

80% of the respondents suggested that procedures should be implemented to manage the continuous improvement process, while 20% disagree and suggested an organic growth-style approached to continuous improvement. From the respondents' feedback, there are a few topics to consider during the implementation process:

- Continuous improvement of the solution based on analytics
- Implementing customer satisfaction survey function in the Chatbot
- Evaluating performance against original goals

4.3 LIMITATIONS OF CHATBOTS

In the past, experiences with Chatbots services have sometimes failed to meet customers' expectations. Chatbots are limited in their ability to have an extended

goal-directed discussion and can offer little in the way of common history or shared experience (Hill et al., 2015:49). Chatbots services can only provide responses based on what it is programmatically encoded in its knowledge base. These systems cannot make decisions or resolve complex queries. Often, conversations with Bots can lack flow, feel clumpy, and they may fail to resolve the central issue at hand. Chatbots services generally have complex interfaces since they are expected to understand a number of inputs that can be articulated in a variety of ways. This may lead to a customer having to write or speak more clearly or in longer terms in order to ensure they are understood, which makes the interaction more time-consuming and cost ineffective than if they were to interact with a human.

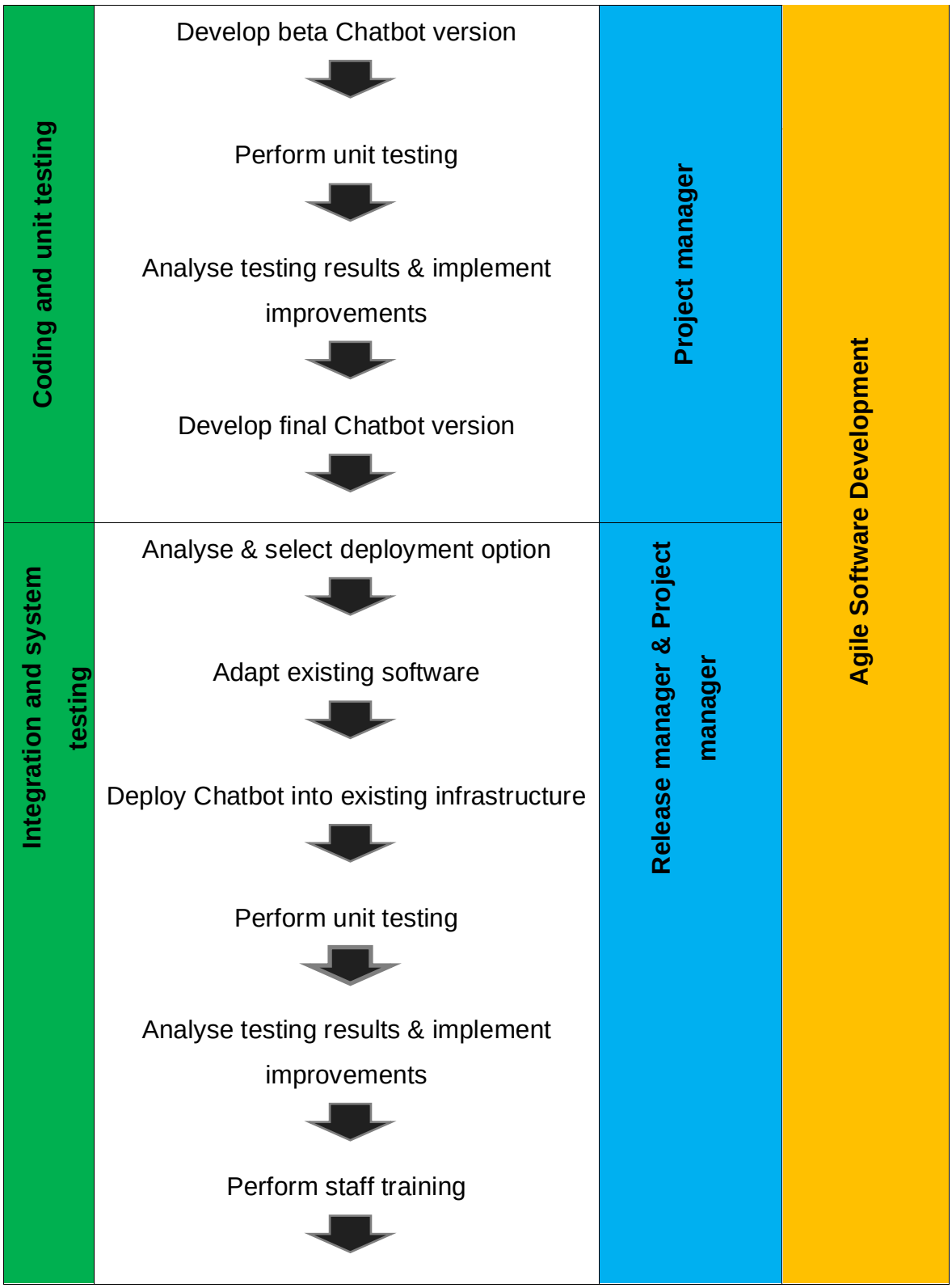
4.4 RECOMMENDATIONS

Conclusions derived from the empirical results detailed in chapter 3 were used to form the foundation of the proposed managerial framework. It is these results and the insights gleaned from the literature study that facilitated the formulation of a feasible framework geared toward the implementation of a Chatbot service within an e-commerce business. Although the needs and circumstances differ from business to business this framework serves as a guide to assist with the implementation process.

4.4.1 Proposed management framework

The proposed managerial framework is visually presented in Figure 4-1 below:

Phase	Managerial framework	Responsibility	Methodology
Feasibility study	Perform environment analysis ↓ Define Chatbot business case ↓ Define scope & implementation area ↓	Top management	IOA Model
Requirement analysis and specification	Analyse & select interface ↓ Analyse & select the framework ↓ Analyse & select the type of Chatbot ↓ Analyse & select development options ↓ Perform requirements feasibility test ↓ Finalise requirements & specification sheet ↓	Product manager	COBIT (Plan & Organise)
Design	Develop content strategy & collect corpus data ↓ Develop conversational framework ↓ Select development tools ↓	Product manager & Project manager	


Coding and unit testing
Develop beta Chatbot version
Perform unit testing
Analyse testing results & implement improvements
Develop final Chatbot version
Project manager
Integration and system testing
Analyse & select deployment option
Adapt existing software
Deploy Chatbot into existing infrastructure
Perform unit testing
Analyse testing results & implement improvements
Perform staff training
Release manager & Project manager
Agile Software Development

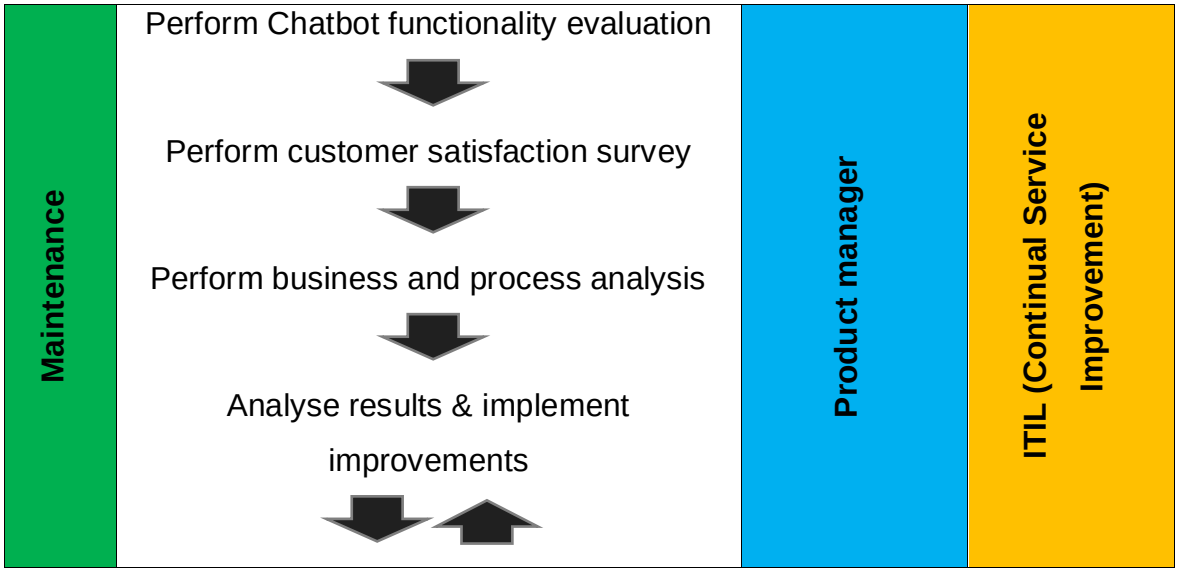


Figure 4-1: A managerial framework for the implementation of Chatbots services

Source: *Own*

The managerial framework is outlined and described according to the phases of an iterative waterfall model in the SDLC. Phases and activities are executed sequentially according to the indicated technology management methodology. A responsible manager is assigned to each phase.

Feasibility study

The feasibility study phase consists of three sequential activities:

- Perform environment analysis
- Define Chatbot business case
- Define scope and implementation area

Top management is responsible for the execution of this phase and the activities are managed according to the IOA Model.

Requirement analysis and specification

The requirement analysis and specification phase consist of six sequential activities:

- Analyse and select interface
- Analyse and select the framework
- Analyse and select the type of Chatbot
- Analyse and select development options
- Perform requirements feasibility test
- Finalise requirements and specification sheet

The appointed product manager is responsible for the execution of this phase. The activities are managed according to the planning and organising stage of the COBIT framework.

Design

The design phase consists of three sequential activities:

- Develop content strategy and collect corpus data
- Develop conversational framework
- Select development tools

The appointed product and project manager are responsible for the execution of this phase. The activities are managed according to Agile Software Development methods.

Coding and unit testing

The coding and unit testing phase consist of four sequential activities:

- Develop beta Chatbot version
- Perform unit testing
- Analyse testing results and implement improvements
- Develop final Chatbot version

The appointed project manager is responsible for the execution of this phase. The activities are managed according to Agile Software Development methods.

Integration and system testing

The integration and system testing phase consist of six sequential activities:

- Analyse and select deployment option
- Adapt existing software
- Deploy Chatbot into existing infrastructure
- Perform unit testing
- Analyse testing results and implement improvements
- Perform staff training

The appointed release and project manager are responsible for the execution of this phase. The activities are managed according to Agile Software Development methods.

Maintenance

The maintenance phase consists of four sequential activities:

- Perform Chatbot functionality evaluation
- Perform customer satisfaction survey
- Perform business and process analysis
- Analyse results and implement improvements

The appointed product manager is responsible for the execution of this phase. The activities are managed according to the Continual Service Improvement processes of the ITIL service lifecycle.

4.5 CRITICAL EVALUATION OF THE STUDY OBJECTIVES

The success of this study can be measured in terms of the primary and secondary objectives formulated in the first chapter.

4.5.1 Conclusion from the primary objective

The primary objective of this study was to develop a managerial framework to provide guidance for e-commerce businesses in South Africa that wish to implement Chatbot service technology. The purpose of the managerial framework is to create a practical framework of best industry practices that can be applied to implement a successful Chatbot services among the South African e-commerce businesses. A set of characteristic attributes that such a framework requires was established through a comprehensive literature study and empirical findings derived from conducted interviews. These qualities are now expressed in the proposed managerial framework.

4.5.2 Conclusion from the secondary objectives

The secondary objectives of this study were to research, explore, and describe the following topics:

Objective: To investigate and describe the factors that need to be considered for successful implementation of a Chatbot service for a B2C perspective.

This objective was achieved mainly through of the empirical study. The respondents in most cases described at length what should be considered for successful implementation of a Chatbot service. The feedback from the respondents clearly indicated that there are some consistent factors that are important for success. These identified factors were considered when constructing the managerial framework.

Objective: To investigate the current best practices in technology management models applicable to the implementation of a Chatbot service.

This objective was achieved by analysing existing technology management models and studying the responses provided in the semi-structured interviews. It was clear from the respondents' feedback that 80% of them were using existing technology management models. However, there is no consensus on which technology management models are the best. 60% of the respondents use a combination of

models to aid them in the implementation of Chatbot services. Based on their individual responses and overlapping answers, it could be deduced what some of the current best practices among technology management models are provided the context of their associated Chatbot-related projects. These identified best practices were considered when constructing the managerial framework.

4.6 SUGGESTIONS FOR FURTHER RESEARCH

Limited research has been performed on Chatbot technology as an opportunity in South Africa, what's more Chatbot technology is still relatively new based on its rate of adoption. This allows much room for possible future research to in at least the following four areas:

- This study can be replicated in the future when the use of Chatbot technology is more established in South Africa which could yield new insights and conclusions. Chatbot technology is still in the early stages of development, as the technology improves, the management process will also improve and become standardised. It is worth considering whether the newly proposed managerial framework will still be effective in the future?
- The cost-effectiveness of multilingual Chatbots for South African languages can be investigated. What impact will the improvement of NLP technology have on management's decision-making processes?
- An investigation into the socio-economic impact that the implementation of Chatbot technology can have in South Africa can be conducted. Will Chatbot technology lead to employment opportunities?
- The technology adoption patterns of the South African e-commerce consumer can be examined. In general, e-commerce businesses are still hesitant to adopt the Chatbot technology. What are the reasons behind the slow adoption of Chatbot technology in South Africa?
- The influence of Chatbot technology within an e-commerce business supply-chain function is not yet known or well established. What will the impact be when introducing Chatbot technology on South African e-commerce businesses supply-chain function?

4.7 CONCLUSION

The aim of this study was to develop a managerial framework to provide guidance for e-commerce businesses in South Africa who wish to implement Chatbot service technology. Throughout the study it was made evident that developing such a managerial framework is a complex task. E-commerce business models are complex, and they have different strategic management goals. When the South African context is also considered, the operational environment becomes even more complex.

South Africa's ITC infrastructure enables e-commerce, but there are also unique challenges that need to be considered. To overcome all these challenges, management needs to look intensively at IT management models and how to effectively implement Chatbot technology. In addition to the IT strategy, management also need to consider the unique market environment of South African e-commerce and its consumers. This research study sought to address these challenges.

A literature study was conducted, which identified the best managerial practices in local and international e-commerce businesses that have experience in successfully implementing Chatbot technologies in their or client operational processes.

The study found that opinions differ and there is no absolute consensus on which technology management models or implementation methods are best to adopt when implementing a Chatbot service. 80% of the respondents opt to use a combination of technology management models and their professional knowledge to implement a Chatbot service.

By studying the correlations between the various recommended implementation strategies and processes using categorisation matrixes, the conclusion was made on which will be the most preferred methods to manage the implementation process. These identified processes were incorporated in the structure of a proposed managerial framework. The managerial framework thus consists of a combination

of existing IT management models and the researchers' own conclusions drawn from the literature and empirical study.

4.8 CHAPTER SUMMARY

This chapter proposed a managerial framework for managing IT services projects based on the identified risks, challenges, and success factors. The purpose of the proposed managerial framework is that it may be used as a tool for Chatbot implementation by experts who are looking for support, guidance, or an indication of best practices derived from related project experience. The managerial framework consolidates the insights derived from the research and allocates them to the relevant managerial framework.

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APPENDDIX A: INTERVIEW QUESTIONS

A managerial framework for the implementation of Chatbots in e-commerce business

Dear Manager

The main objective of this study is to develop a managerial framework to provide guidance for e-commerce businesses in South Africa who wish to implement Chatbot service technology. The study will be conducted among local and international IT managers, product managers, project managers, and other managerial staff members involved in Chatbot development. This research forms part of a mini dissertation to be submitted in partial fulfilment of the requirements for the degree Master's in Business Administration at the Potchefstroom campus of the North-West University.

Due to your position and expertise you have been selected to assist with this investigation and you are kindly invited to take part in an interview. It will require about 30 to 35 minutes of your time.

Your involvement and time set aside to contribute to this study will be highly appreciated. All responses will be treated as strictly confidential and participation in the study is voluntary. All the demographic data provided will only be used for scientific analysis. The results of the study will be made available to you on request.

Ethical clearance has been obtained *NWU-01347-19-S4, Information and Technology Management*; Expiry date *31 December 2019*

Kind regards

Researcher:	**Supervisor:**
Mr Jacques van Heerden	Mr Johannes Coetzee

Email: Jacques.vanheerden@nwu.ac.za Telephone: 018 299 1599	Email: Johannes.Coetzee@nwu.ac.za Telephone: 018 299 4012

Research Interview Guidelines

Please note the following:

- Please answer questions as they relate to you and your organisation.
- Please ensure not to divulge sensitive or proprietary information from your organisation.
- Terminology and aberrations in the interview may differ from your those used in your organisation or background. Please feel free to ask for clarification or additional information.

Research Interview Questions

Contact Information

Name: _____

Contact e-mail: _____

Date of interview: _____

Method of interview: _____

Section A: Background Information

1.) Sector of organisation *e.g. e-commerce or banking*?
2.) Nature of organisation *e.g. software development or research entity*?
3.) Position held at the organisation *e.g. IT or Project manager*?
4.) Current status of your Chatbot service or project?
5.) Maturity level of Chatbot service project *(if operational)?*
6.) Intended capabilities of the Chatbots service?

7.) Is the Chatbot based commercial Bot framework? If yes which framework?

8.) If the Chatbot service is self-developed please provide details.

Based on your indicated profession:

Section B: Management Commitment and Involvement

9.) How involved was the top management with the initiating process?

10.) What is your opinion regarding the involvement of top management?

Section C: Tool Selection

11.) Did you or your organisation use business analytics tools? If yes, please provide further details.

12.) Do you or your organisation adhere to a formal managerial framework to assist with the implementation of a Chatbot service? If yes, please provide further details.

13.) Did you or your organisation use technology management tools? If yes, please provide further details.

14.) What criteria was used when selecting the software development tools?

Section D: Organisation Assessment

15.) Did you or your organisation perform an environmental or organisational assessment before the initiating process of the Chatbot service? If yes, please provide further details.

Section E: Planning

16.) What type of planning did you or your organisation do for the implementation of the Chatbot service? What did the planning entail? Please provide further details.

Section F: Staff Training

17.) Did you or your organisation perform or receive any training before or during the implementation of the Chatbot service? If yes, please provide further details.

18.) What is your opinion regarding training of staff members?

Section G: Implementation

19.) What factors do you perceive need to be considered for the successful implementation of a Chatbot service in a South African e-commerce business?

20.) What managerial processes / models(s) do you perceive need to be adhered to for the successful implementation of a Chatbot service for South African e-commerce businesses?

21.) Are you aware of current industry best practices and research advances in the implementation process of Chatbot projects?

- If yes, do you agree or disagree with these best practices?
- If no, do you perceive it is necessary to follow best practices?

Section H: Continuous Improvement

22.) Do you or your organisation adhere to a formal continuous improvement plan or process? If yes, please provide further details.

Section I: Additional Information *(if applicable)*

Other topics discussed: _____

Documents obtained: _____

Post interview comments or leads: _____