

## **CHAPTER I**

### **INTRODUCTION AND BACKGROUND**

#### **1.1 Introduction**

This chapter offers background information that is crucial to understanding the research issue and places the study in the larger academic context. The identification of the research problem emphasizes the need to fill the current gap in the literature. This therefore prepares the ground for defining this thesis's objectives and aim. The research model is used to generate the primary research questions, which will direct further analysis throughout the study.

#### **1.2 Background**

The nature of technology, which is always linked with change, ensures that teachers' use of technology is not inflexible. In recent years, the COVID-19 pandemic has fueled the digital transformation in education, culminating in the permanent acceptance of online learning (Bayaga and Plessis, 2023). This has resulted in the usage of a variety of digital tools and platforms to facilitate online learning, with AI being no exception.

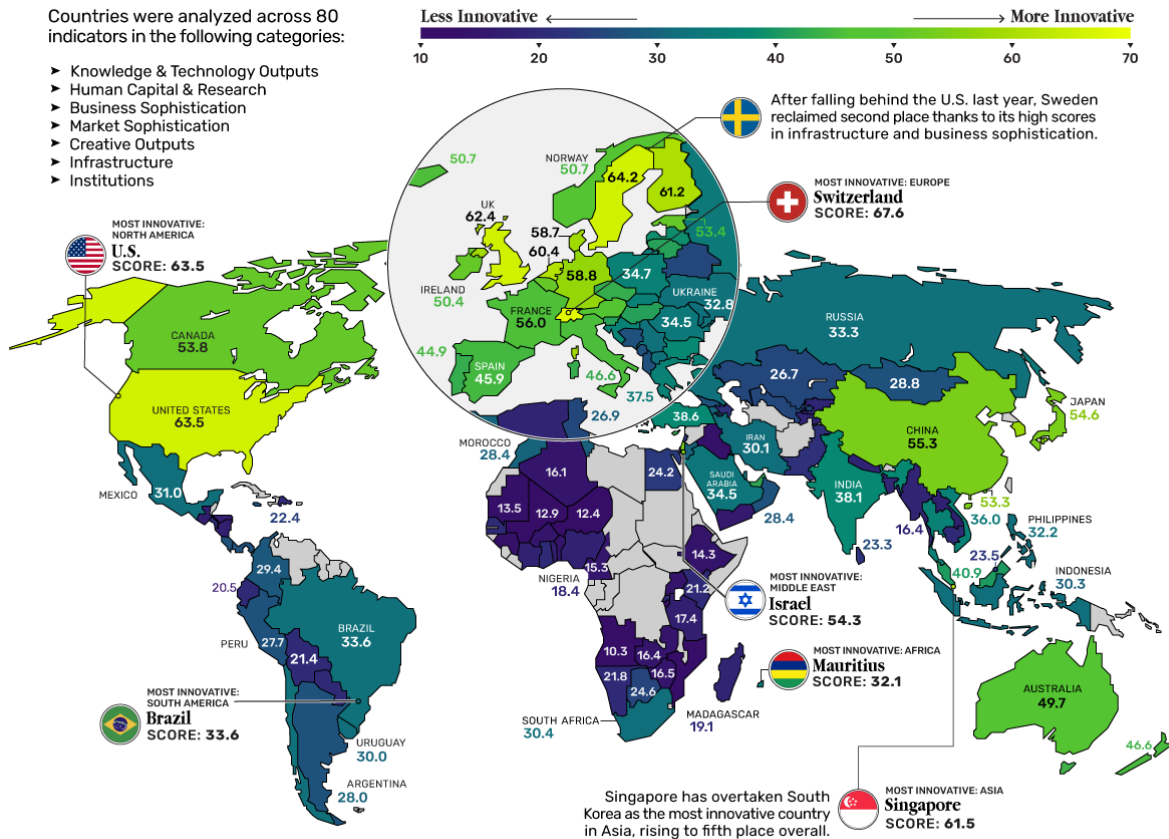
# Global Innovation Index

We show global innovation rankings across 132 countries at a time of rapid technological advancement.

2023

Countries were analyzed across 80 indicators in the following categories:

- Knowledge & Technology Outputs
- Human Capital & Research
- Business Sophistication
- Market Sophistication
- Creative Outputs
- Infrastructure
- Institutions



**VISUAL CAPITALIST**

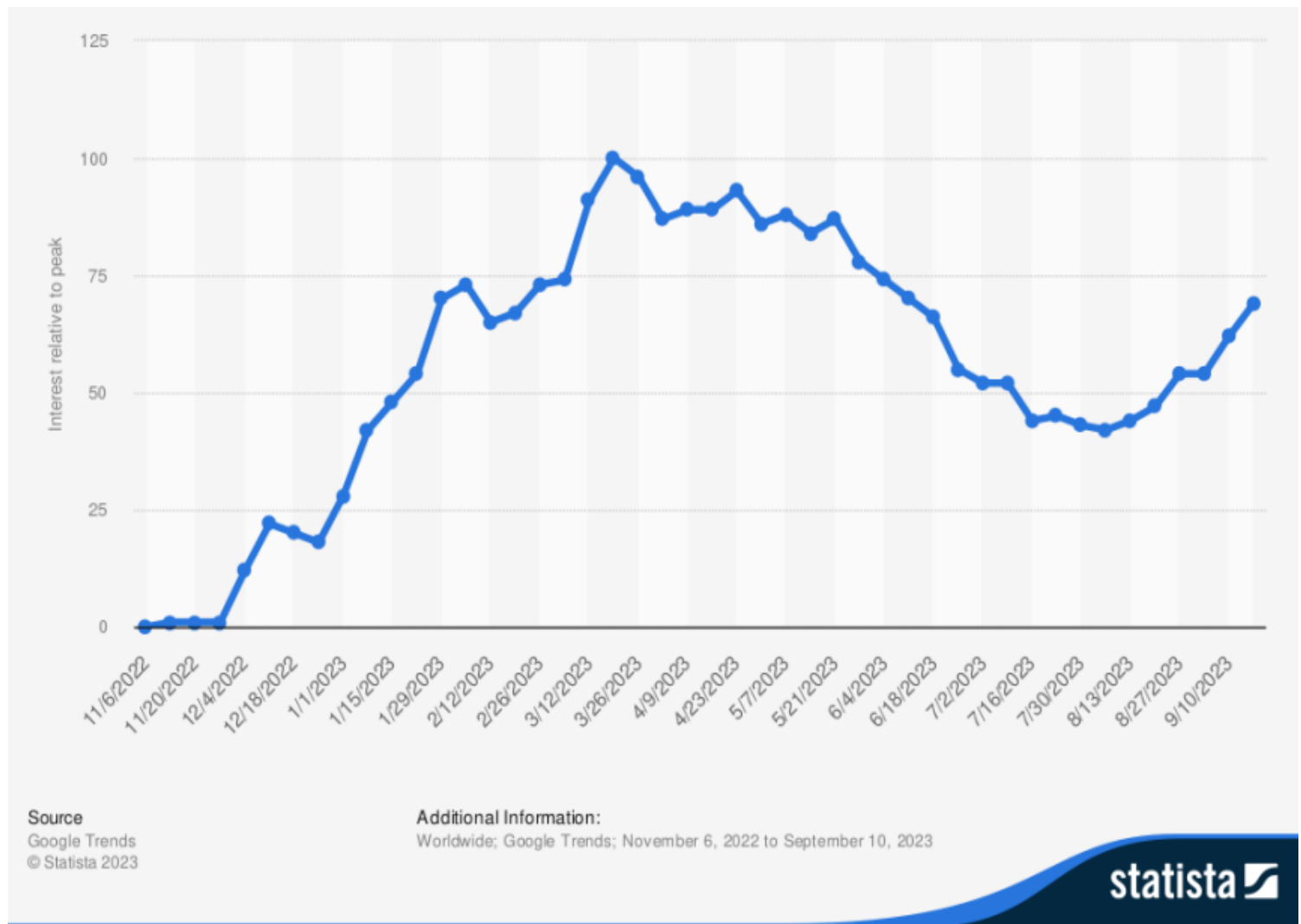
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**Figure 1: Global Innovation Index (Data source: WIPO Global Innovation Index, 2023).**

The above picture shows the global innovation index across 132 countries and in Africa, Botswana has a score of 24.6 based on its rapid technological advancement.

## Interest in ChatGPT on Google search from November 2022 to September 2023 worldwide, by week



**Figure 2:** Google searches of “ChatGPT” (Data source: Google Trends- Statista, 2023).

The graph above illustrates the temporal variation in search volume, indicating the highest level of popularity for the given term.

The swift progression of technology has significantly altered our current way of life, becoming an essential component of our daily existence and introducing a new era of advancement in automation, information processing and communication. AIEd has already had an impact on the academic sector, precisely in learning, administration and instruction, (Chen et al., 2020). Academies are currently investigating methods to utilize the capabilities of artificial intelligence (AI) in order to enhance the scholars' memorable experience and support faculty members in their research and teaching endeavors (Zawacki-Richter et al., 2019). ChatGPT, an AI-powered chatbot developed by OpenAI, leads the way in technical advancements. It

utilizes sophisticated natural language processing (NLP) techniques to understand, analyze, and generate content that resembles human language (Adiguzel et al., 2023). The potential of this innovation to transform teaching, learning, and research experiences has garnered considerable attention, as highlighted in the International Journal of Information Management. According to Sam Altman, the CEO of Open AI, ChatGPT gained over one million members within the first five days of its launch on 30 November 2022. This makes it the fastest-growing platform to date (Dwivedi et al., 2023).

### **1.2.1 About ChatGPT**

OpenAI created ChatGPT, an artificial intelligence (AI) system that can understand and produce language similar to that of a person. It is taught to identify linguistic patterns as a natural language processing (NLP) tool, enabling it to produce contextually relevant answers to text-based questions (UNESCO, 2023).

Hart-Davis (2023) emphasised that ChatGPT utilize data patterns and regularities to generate suitable phrases, , relevant images or words in response to user inquiries. ChatGPT is capable of performing various tasks, such as answering questions, summarizing text, translating languages, creating creative writing like fiction or poetry, producing well-written short or long form content like articles, engaging in conversational prompts, explaining intricate themes, concepts or subjects and rectifying errors in existing code or generating new code (Javaid et al., 2023). ChatGPT's inherent capabilities have been demonstrated in tests that reveal its proficiency in successfully completing a Law School examination (Choi et al., 2023) and a Master of Business Administration examination (Terwiesch, 2023).

ChatGPT's proficiency at comprehending natural language inquiries and producing responses that resemble human-like conversation has rendered it a widely sought-after tool for swiftly obtaining answers to a diverse range of concerns, spanning from ordinary to intricate subjects. For instance, it has the ability to promptly condense a lengthy scholarly paper into a solitary sentence, with the option of beginning the sentence with a specific letter such as 'q' exclusively. It not only identifies the issue but also offers precise remedies, even while programming autonomously. ChatGPT has rapidly become a valuable tool for scholars and professionals (Adiguzel et al., 2023).

### **1.2.2 AI in Education (AIEd)**

The inception of AI dates back to the 1950s when John McCarthy prepared a two-month conference at Dartmouth College in the United States. McCarthy introduced the term "artificial

intelligence" in 1956 in his workshop proposal (Russel and Norvig, 2010, p. 17). In their work, Baker et al., (2019) present a comprehensive characterization of artificial intelligence (AI) as the utilization of computers to carry out cognitive functions, often attributed to human intellect, with a particular emphasis on problem-solving and learning. They clarify that AI does not pertain to a singular technology. It is a broad word used to encompass various technologies and methodologies, including data mining, neural networks, machine learning, algorithms and natural language processing. Artificial intelligence and machine learning.

According to UNESCO (2023), ChatGPT can potentially function as an educational tool to assist in the learning process. It has been shown that ChatGPT-3 is capable of producing multiple-choice questions containing both correct and incorrect answers, outperforming rival software designed for generating quizzes. While ChatGPT-3 is mainly capable of producing accurate multiple-choice questions, human supervision is still required to address occasional mistakes.

Zawacki-Richter et al., (2019) suggests that ChatGPT has potential as a tool for open education, as it can improve self-directed learning and adaptability for self-taught students while preserving flexibility and efficiency. ChatGPT can enhance engagement and motivation for those involved in self-directed learning by offering tailored advice, mentorship, and assessment. This technique facilitates access to superior learning resources and materials, hence enhancing the affordability and accessibility of education.

Subramani et al., (2023) have shown that ChatGPT has the ability to serve as a helpful resource in medical education, namely in the field of medical physiology. The study emphasizes the model's capacity to deliver logical and thorough responses to intricate inquiries. The researchers assessed the effectiveness of ChatGPT by employing it to complete a Medical Physiology Examination designed for Phase I MBBS (Bachelor of Medicine, Bachelor of Surgery) students. The examination had both theoretical inquiries and multiple-choice inquiries. The responses produced by ChatGPT were evaluated by the faculty members of the Department of Physiology. Remarkably, ChatGPT achieved a high score (>75%) on the exam and its responses included comprehensive explanations. Nevertheless, the investigation revealed a constraint: ChatGPT lacked the ability to provide pertinent graphics alongside its responses in specific instances where they were required.

ChatGPT possesses extensive applications beyond the realm of education and can prove advantageous in diverse domains, such as climate change research. The study conducted by

Biswas (2023) emphasizes the potential influence it has on enhancing our comprehension of climate change and refining the accuracy of climate forecasts. ChatGPT can aid academics and policymakers in producing and examining climate scenarios, with an emphasis on data analysis and interpretation. Furthermore, it facilitates cooperation among various parties by consolidating information from a wide range of sources, encouraging multidisciplinary discussions, and aiding in making well-informed choices on climate change mitigation and adaptation. However, it is vital to recognize the constraints of ChatGPT, including possible shortcomings, prejudices, and mistakes in its responses.

Nevertheless, the implementation of AI tools such as ChatGPT in higher education has ignited intense debates. There is a divergence of perspectives regarding the role of ChatGPT in education. Although some critics contend that it encourages plagiarism, it has the potential to generate erroneous or fabricated factual citations. While certain individuals perceive the possibility of improved learning and less burden on teachers, others argue that it can greatly strengthen the relationship between faculty and students, making it easier to obtain crucial information for academic achievement (Zhang, 2023).

ChatGPT can also be used to promote collaborative learning. The system supports online discussions and group projects, allowing students to collaborate to solve problems and complete assignments. This can assist children develop a feeling of community while also improving critical thinking and problem-solving skills. Furthermore, ChatGPT can help teachers manage online discussions and moderate group activities, ensuring that all students have an equal opportunity to engage and contribute (Baidoo-Anu and Ansah, 2023).

Botswana has achieved substantial advancements in its education system since gaining independence in 1966. The government has made substantial investments in education, allocating a considerable amount of the national budget to public expenditure on education. Education is both costless and obligatory for all individuals aged 6 to 16, and it is structured into three tiers: elementary, secondary, and postsecondary. English is the primary medium of instruction in schools, with Setswana being taught as a secondary subject (Malejane and Diraditsile, 2019).

Botswana, similar to numerous underdeveloped countries, encounters difficulties in delivering high-quality education to its populace, especially in distant or underserved regions. Certain parts of Botswana face inadequate access to well-trained instructors and educational resources, resulting in unequal educational outcomes. AI-powered educational systems such as ChatGPT

have the ability to address these disparities and enable customized learning experiences (Suping, 2022).

One could argue that the current notions and theories of AI in education are predominantly derived from data collected in more advanced nations, which limits their relevance to Botswana's distinct educational environment. The educational system in Botswana faces distinct obstacles, such as constraints in infrastructure and a heterogeneous student population with various requirements. It is possible to interpret ChatGPT's adoption in Botswana's educational institutions as a reaction to these particular difficulties, and examining its adoption can shed light on the viability of AI solutions in this situation (Huang et al., 2021).

### **1.3 Research Problem Statement**

ChatGPT adoption in educational institutions has been slow, especially in Botswana. One of the primary reasons for this slow adoption is a lack of awareness about ChatGPT and its potential educational benefits. Many educators are unfamiliar with ChatGPT or how to use it in the classroom. Moreover, there is a lack of studies regarding the effectiveness of ChatGPT in educational environments (Bayaga and Plessis, 2023; Kasneci et al., 2023).

Diverse findings are seen in survey research that looks at ChatGPT use in educational settings. According to a research, 55% of college students use ChatGPT, and 22% of them use it especially for academic work (Welding and Lyss, 2023). However, according to a different survey, 89% of students had utilized ChatGPT in a classroom (Jo, 2023). It is evident from the conflicting results that more investigation is required to fully comprehend ChatGPT's adoption and usage in higher education. The purpose of this study is to collect data that will aid in the understanding of the factors influencing ChatGPT uptake and acceptance among educators, students. There isn't much study being done on this subject right now. Because it will provide light on how educators, students use and adopt ChatGPT in academic settings.

More research on this topic needs to be done in less developed and emerging countries such as Botswana. This research seeks to fill the existing gap in the literature regarding the adoption of ChatGPT in the context of the developing country Botswana. The study is among a few in emerging countries that used the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) as a theoretical framework with an extension of IT knowledge and Personal innovativeness to assess the Behavioral intention and Use behavior of ChatGPT by educators and students.

Botswana is making concerted efforts to enhance its education system, recognizing its pivotal role in fostering economic growth and societal advancement. The presence of inadequate access to high-quality education has been recognized as a significant obstacle, necessitating the implementation of inventive measures to tackle this problem. ChatGPT, an AI-powered educational tool, has the capacity to extend its reach to students residing in remote regions, offer tailored learning experiences, and aid teachers in delivering high-quality education (Suping, 2022).

Nevertheless, there are worries regarding the technology infrastructure, digital literacy, and the cultural significance of artificial intelligence in education. Therefore, it is crucial to thoroughly examine the practicality and consequences of using ChatGPT. It is crucial to inspect the extent to which scholars and educators comprehend the capacities and constraints of ChatGPT in terms of tailoring learning experiences, offering immediate support, and tackling the distinct educational difficulties specific to the region. Several studies have found a significant lack of research on the perception, usage, and consequences of ChatGPT in academic education (Kasneci et al., 2023; Dwivedi et al., 2023). There is a noteworthy dearth of research that specifically pertains to the situation of Botswana. The objective of this research is to investigate the utilization and evaluation of ChatGPT by students and educators in educational institutions in Botswana. This research aims to gain insights into the acceptance and usage of ChatGPT in Botswana, with the goal of optimizing the educational experience for students and informing the ethical and advantageous application of ChatGPT, in academic settings in Botswana. Moreover, gaining comprehension of the acceptance and utilization of ChatGPT could yield useful discernments for its creators, hence facilitating improvements that better correspond with the requisites of academic users.

## **1.4 Aims, Research Questions and Objectives**

### **1.4.1 Research Questions**

1. What is the impact of Performance Expectancy on the consumer behavioral intention to use ChatGPT?
2. Is there a significant correlation between the Effort Expectancy on the consumer's behavioral intention to use ChatGPT?
3. What is the effect of Social Influence on the consumer behavioral intention to use ChatGPT?



4. What extent does Facilitating Conditions impact the consumer behavioral intention to use ChatGPT ?
5. What is the correlation between Hedonic Motivation and the consumer behavioral intention to use ChatGPT?
6. Is there a significant correlation between the availability of IT Knowledge on the consumer's behavioral intention to use ChatGPT?
7. What is the impact of Personal Innovativeness on the consumer behavioral intention to use ChatGPT?
8. Is there a significant correlation between Habit on the consumer's behavioral intention to use ChatGPT?
9. What is the relationship between consumer behavioral intention to use ChatGPT?

#### **1.4.2 Aim**

To comprehensively understand and analyze the factors influencing customer adoption of ChatGPT within educational institutions in Botswana.

#### **1.4.3 Objectives**

1. To investigate the influence of performance expectancy on consumers' behavioral intention to use ChatGPT.
2. To assess the significant correlation between effort expectancy knowledge and consumers' behavioral intention to use ChatGPT.
3. To examine the effect of social influence on consumers' behavioral intention to use ChatGPT.
4. To determine the extent to which facilitating conditions impact consumers' behavioral intention to use ChatGPT.
5. To discover the correlation between hedonic motivation and consumers' behavioral intention to use ChatGPT.
6. To analyze the significant correlation between the availability of IT knowledge and consumers' behavioral intention to use ChatGPT.
7. To determine the influence of personal innovativeness on consumers' behavioral intention to use ChatGPT.
8. To assess the significant correlation between habit and consumers' behavioral intention to use ChatGPT.

9. To investigate the correlation between consumer behavioral intention and actual usage of ChatGPT.

### **1.5 Research Benefits**

This research subject seeks to fill the existing gap in the literature by examining how a developing country has implemented AI in education. This study will provide a significant contribution to the field. This study aims to augment the existing research in this field by addressing the deficiency in the literature regarding the adoption and perception of ChatGPT. The research findings can offer valuable perspectives on how ChatGPT can effectively influence educational outcomes by improving student engagement, comprehension, and achievement. By utilizing AI-powered solutions, educational institutions, educators, and students in Botswana can enhance their learning experience and derive significant advantages. To optimize resource allocation for the integration of ChatGPT into their curricula, educational institutions can enhance their understanding of the determinants that impact consumer uptake. This can result in enhanced resource allocation and increased cost-efficiency.

Academic establishments can utilize the research discoveries to synchronize ChatGPT's functionalities with precise educational goals, resulting in enhancements to the curriculum. This guarantees that the incorporation of ChatGPT into the educational system is not merely a novelty, but rather serves a distinct function in augmenting learning. The research can offer significant data for government entities to formulate rules and regulations on the incorporation of AI in education. This can facilitate the conscientious utilization of AI technologies and guarantee the safeguarding of students' privacy and rights.

By using ChatGPT, educational institutions can actively contribute to the enhancement of skills in Botswana, thereby aligning with the government's objectives of cultivating a more proficient workforce. This research can facilitate the identification of the domains in which AI-based learning can exert the most substantial influence on the enhancement of skills. This research can provide valuable insights for academic scholars to enhance their comprehension of the use of AI in educational environments. They can utilize this knowledge to examine analogous situations in different areas or institutions, so progressing the subject of educational technology and adoption research.

If the implementation of ChatGPT in education results in enhanced educational achievements, it has the potential to foster long-term economic expansion in Botswana by cultivating a

workforce that is more proficient and well-informed. This, in turn, can attract investment and stimulate innovation. The research can situate Botswana within a worldwide framework, enabling educational institutions and policymakers to compare their practices with international trends and optimal approaches in the integration of artificial intelligence.

## **1.6 Outline of Chapters**

**Chapter 2** of this study examines the framework and conceptual literature review derived from secondary sources. The review specifically explores the topic of consumer adoption towards ChatGPT in educational institutions, with a focus on Botswana as the study location. Exclusively verified materials are utilized.

**Chapter 3** focuses on the research philosophy and the reasons behind choosing the research topic. The philosophy encompasses the principles of pragmatism, as well as the research methodology, design, tactics, procedures, and data collection methods. The research onion is examined in relation to an appropriate methodological selection for the investigation. The chapter also addresses the ethical considerations and constraints of the study, as well as aspects related to the population, sampling, and sample size.

**Chapter 4** - This chapter presents the data and analyzes the findings. This is an analysis of data obtained from research questionnaires, which is presented using graphs and tables. The conclusions are derived from both desk research and fieldwork. Further discussion is provided on the analysis of both secondary and primary data.

**Chapter 5**- Presents the conclusions drawn from the study's findings. The study's suggestions, which were carefully planned. Next, a concise summary of the chapter is provided.