EXPLORING A COMMUNITY-BASED HEALTH MICRO-TAKAFUL FRAMEWORK: AN EMPIRICAL STUDY ON ADOPTION DETERMINANTS IN SUDAN

BY

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REEM ABBAS ABUBAKER

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ABSTRACT

Access to affordable healthcare remains a major challenge in Sudan, particularly for low-income populations. Health Micro-Takaful (HMT) offers a potential solution by providing financial protection against medical expenses. This study investigates the factors influencing HMT adoption in Sudan using the Theory of Planned Behaviour (TPB), with awareness and affordability as extended variables and behavioural intention as a mediator. It also explores policy-related challenges and opportunities for HMT implementation. A mixed-methods approach was applied. Quantitatively, data from 428 respondents were collected via an online questionnaire and analysed using Structural Equation Modelling (SEM) with SmartPLS 3.9. Qualitatively, in-depth interviews with key stakeholders and policymakers were thematically analysed to capture opportunities and challenges. Findings show that attitude, perceived behavioural control, and subjective norms significantly influence adoption when intention is included as a mediator, while awareness and affordability were insignificant. In the direct model, attitude and awareness were significant predictors, but affordability, perceived behavioural control, and subjective norms were not. Qualitative results reveal that lack of specific regulation, economic instability, and limited public awareness hinder adoption, while willingness for policy reforms, digital solutions, and support from Zakat funds and NGOs present key opportunities. This study contributes to the literature on HMT in developing economies by highlighting behavioural, economic, and policy dimensions of adoption. It provides practical insights for regulators, insurers, and development organizations. Strengthening regulatory frameworks, leveraging technology, and raising public awareness are critical for sustainable implementation. Future research should assess the long-term impact of HMT on healthcare access, explore hybrid funding through waqf and CSR, and conduct comparative studies across contexts.

ملخص البحث

لايزال الحصول على رعاية صحية ميسورة التكلفة يمثل تحديًا كبيرًا في السودان، خصوصًا للفئات ذات الدخل المحدود. ويُعَدّ التكافل الصحي الأصغر (HMT) أحد الحلول الممكنة لتوفير الحماية المالية من تكاليف العلاج. تهدف هذه الدراسة إلى بحث العوامل المؤثرة في تبني التكافل الصحي الأصغر بالاستناد إلى نظرية السلوك المخطط (TPB) مع إدماج متغيري الوعي والقدرة على تحمل التكلفة، واعتبار النية السلوكية وسيطًا. كما تستكشف التحديات والفرص المرتبطة بالسياسات الخاصة بتطبيق التكافل الصحي الأصغر. اعتمدت الدراسة منهجًا مختلطًا. في الجانب الكمي، جُمعت البيانات من 428 مشاركًا عبر استبيان إلكتروني وحُللت باستخدام نمذجة المعادلات الهيكلية (SEM) ببرنامج SmartPLS 3.9. أما في الجانب النوعي، فقد أُجريت مقابلات معمقة مع الجهات المعنية الرئيسية وخضعت للتحليل الموضوعي. أظهرت النتائج أن الموقف، والتحكم السلوكي المدرك، والمعايير الذاتية تؤثر في التبني عند إستخدام النية كوسيط، بينما لم يكن للوعي أو القدرة على تحمل التكلفة أثر كبير. وفي النموذج المباشر، برز الموقف والوعي كمؤثرين رئيسيين، فيما لم يظهر للقدرة على تحمل التكلفة أو التحكم السلوكي المدرك أو المعايير الذاتية دلالة إحصائية. وكشفت النتائج النوعية أن غياب تشريعات واضحة، وعدم الاستقرار الاقتصادي، وضعف الوعي والثقة بالتكافل تشكل عقبات أساسية، في حين أن الاستعداد لإصلاح السياسات، وتبني الحلول الرقمية، ودعم صناديق الزكاة والمنظمات غير الحكومية تمثل فرصًا واعدة. تُسهم هذه الدراسة في إثراء الأدبيات حول التكافل الصحي الأصغر في الاقتصادات النامية، مقدمةً رؤى عملية لصانعي السياسات وشركات التكافل والجهات التنموية. وتشدد على أهمية تعزيز الأطر التنظيمية، والاستفادة من التقنية لتبسيط الإجراءات، وتنفيذ حملات توعوية لبناء الثقة وزيادة المشاركة. كما توصي بأبحاث مستقبلية لدراسة الأثر طويل المدى للتكافل الصحي الأصغر على الوصول للرعاية الصحية والاستقرار المالي للأسر، واستكشاف نماذج تمويل بديلة مثل دمج الأوقاف ومساهمات المسؤولية الاجتماعية للشركات لتعزيز الاستدامة.

APPROVAL PAGE

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DECLARATION

I hereby declare that this thesis is the result of my own investigations, except where otherwise stated. I also declare that it has not been previously or concurrently submitted as a whole for any other degrees at IIUM or other institutions.

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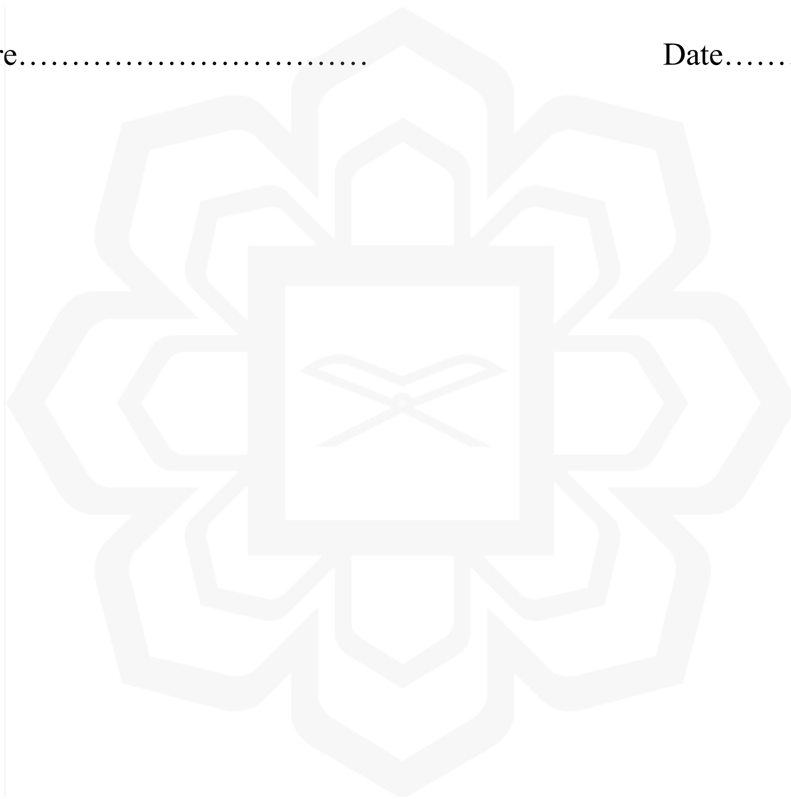

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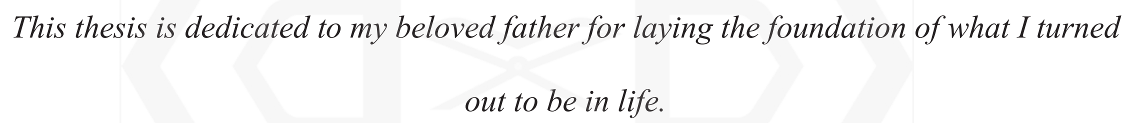

This thesis is dedicated to my beloved father for laying the foundation of what I turned out to be in life.

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LIST OF ABBREVIATION

AAOIFI	Accounting and Auditing Organization for Islamic Financial Institutions
CBHI	Community Based Health Insurance
CBoS	Central Bank of Sudan
IAIS	International Association of Insurance Supervisors
IFSB	Islamic Financial Services Board
ISA	Insurance Supervisory Authority
MFIs	Microfinance Institutions
MFU	Microfinance Unit
NHIF	National Health Insurance Fund
OOP	Out-Of-Pocket
SMEs	Small and Medium Enterprises
SMFIs	Sudanese Microfinance Institutions
ILO	International Labour Organization
IFS	International Financial Statistics
CIA	Central Intelligence Agency
TPB	Theory of Planned Behaviour
UNDP	United Nations Development Programme
WHO	World Health Organization

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF STUDY

Micro-Takaful is an emerging concept in the Takaful industry that aims to provide affordable and accessible Takaful products to underserved populations to mitigate the financial impacts of unexpected events, such as illness, death, or natural disasters. It is rooted in Islamic principles of mutual aid, such as Tabarru (donation), Taawun (cooperation), and avoiding Riba (interest) (Rosman, 2024).

The goal of Micro-Takaful is to assist low-income groups in protecting their future financial well-being (Rosman, 2024). Micro-Takaful is beneficial for low-income populations for several reasons, it offers Takaful coverage that is more accessible and affordable for low-income individuals, who may not have access to traditional Takaful products (Salleh, 2023; Rapi, 2023; Ghani et al., 2019). It helps low-income individuals and households manage risks and uncertainties, such as those related to health, property, or livelihood, which can impact their financial well-being (Salleh, 2023; Salleh, 2023). Micro-Takaful also acts as an indicator of financial inclusion, as it provides financial protection to the poor and low- income, who are often excluded from the formal financial system (Ghani et al., 2019; Abdullah et al., 2019).

This contributes to the broader goal of achieving financial inclusion in developing countries. Also, Micro-Takaful can be integrated with Islamic social finance instruments, such as Zakat (charitable giving) and Waqf (endowment), to further support the financial needs of low-income populations (Mohamad, 2019; Shahar et al., 2022). This integration enhances the reach and impact of Micro-Takaful schemes. Research has shown that factors such as attitude, subjective norms, price, and knowledge influence the intention of low-income individuals to participate in Micro-Takaful schemes (Razak et al., 2021; Rapi, 2023; Rapi & Kassim, 2023). Additionally, the distribution channels and awareness of Micro-Takaful among the targeted populations are crucial for the successful adoption and utilization of these products (Shari, 2024). Addressing these barriers and developing appropriate distribution

strategies can help increase the adoption and utilization of Micro-Takaful products among the targeted populations (Shari, 2024).

In Sudan, the need for effective risk management solutions is urgent (Mohamed & Yusoff, 2024). The country faces numerous socio-economic challenges, including high levels of poverty and low-income, high disease burden, lack of financial inclusion, limited access to healthcare, and frequent environmental shocks (World Bank, 2023; World Bank,2019). Sudan is classified as a low-income country, with poorer economic status compared to its neighbours (Mohamed & Ahmed, 2022; World Bank, 2022; Boutayeb et al., 2020). This makes access to Takaful products difficult for most of the population. Studies have shown that poor family income is a risk factor for malnutrition among children in Sudan "Risk Factors of Malnutrition among Children under Five Years of Age in Mohamed Alamin Paediatric Hospital", (2016). Sudan faces a growing burden of contagious diseases, such as malaria and Crimean Congo haemorrhagic fever, as well as noncontagious diseases, including diabetes, obesity, and cancer (Charani et al., 2019; Pengpid & Peltzer, 2022). Sudan has a shortage of healthcare infrastructure and resources, with fewer than seven hospital beds per 10,000 population, compared to the Lower Middle-Income Countries (LMIC)[1] average of 23 beds (Mohamedsharif, 2023 cited World Bank, 2019). The long history of civil war in Sudan has contributed to lower rates of vaccination and healthcare access among Sudanese (Mohamed & Ahmed, 2022). Sudan's agricultural sector and rural populations are vulnerable to climate-related risks, such as droughts and floods, which can have an impact on their livelihoods (Siddig et al., 2019).

The distribution channels and accessibility of Takaful products, especially in rural and underserved areas, are fundamental for the successful adoption and utilization of Takaful schemes in Sudan (Shari, 2024). Sudan faces challenges in terms of low Takaful penetration rate, only around 50% of the population is covered by the National Health Insurance Fund (NHIF), except for Khartoum state, which has a coverage of around 70% (Hussain et al., 2023). In addition to that, the out-of-pocket share in Sudan's healthcare system is reported to be around 70% (Hussain et al., 2023). Sudan has a long history of civil war, which has contributed to low rates of healthcare access and financial inclusion among the population (Mohamed & Ahmed, 2022; Ghani et al., 2019), this

[1] The World Bank uses this classification to group economies based on their gross national income (GNI) per capita

lack of financial inclusion makes it difficult for low-income individuals to access Takaful products. Improving awareness and addressing the perception challenges among the target population is essential for increasing Takaful penetration in Sudan. Studies have shown that factors such as attitude, subjective norms, price, and knowledge influence the intention of low-income individuals to participate in Takaful schemes, including Micro-Takaful (Razak et al., 2021; Rapi, 2023; Rapi & Kassim, 2023). Despite these challenges, the adoption of Micro-Takaful in Sudan remains low (Mohamed & Yusoff, 2024).

This research aims to explore the factors that influence the adoption of Health Micro-Takaful in Sudan, providing insights that can inform policy and practice. Sudan, a country in Northeast Africa, has a diverse economy including agriculture, mining, and oil production. However, it is also characterized by its economic inequalities and a large informal sector (World Bank, 2023). Many Sudanese households lack access to formal financial services, making them vulnerable to various risks (World Bank, 2023). In this context, Micro-Takaful has the potential to play a transformative role in improving financial security and the overall well-being of society. The concept of Micro-Takaful has been widely studied in various contexts, highlighting its potential benefits and challenges associated with its implementation. Existing literature has identified several key factors that influence the adoption of Micro-Takaful, including awareness and understanding of Takaful products (Nadzli & Yahaya, 2023), trust in Takaful providers (Beshir et al., 2023), affordability (Nadzli & Yahaya, 2024), and the perceived value of Takaful (Kassim & Mat, 2015; Nadzli & Yahaya, 2024). Studies have shown that low levels of financial literacy and awareness are significant barriers to the adoption of microinsurance in many developing countries (Eling & Yao, 2024). For instance, Hassan and Kassim (2023) found that a lack of understanding of Takaful concepts significantly reduced the likelihood of Takaful uptake in Malaysia. Similarly, Arifin and Bakar (2020) emphasized the importance of trust in Takaful providers, noting that mistrust can deter individuals from purchasing Takaful.

In the context of Sudan, there is limited research on the specific factors influencing Micro-Takaful adoption (Mohamed & Yusoff, 2024). However, insights can be drawn from studies conducted in similar environments. For example, the role of social networks and community-based approaches in promoting microinsurance adoption in African countries. Social networks, including family, friends, and

community relationships, serve as essential platforms for resource mobilization and information spreading, helping to build trust and awareness about microinsurance products (Kumdana, 2020). Community-based approaches, such as health insurance schemes, have also been effective in improving access to financial protection, particularly in rural and underserved areas, by fostering localized ownership and trust (Akwaowo et al., 2021). Additionally, the increasing use of social media and digital platforms in Africa has further strengthened the role of social networks in raising awareness and enhancing microinsurance adoption (Kajwang, 2022). Dror (2023) offers a detailed analysis of microinsurance, highlighting the potential of community-based approaches to reach populations not covered by government-operated social protection systems. Additionally, cultural factors, such as religious beliefs and traditional risk-sharing practices, can also play a significant role in shaping attitudes towards Takaful (Hassan & Kassim, 2023).

Despite the growing body of literature on Micro-Takaful, there remain gaps in understanding the challenges and opportunities in the Sudanese context, which limits the understanding of the factors influencing adoption rates and the effectiveness of Micro-Takaful products in the region (Mohamed & Yusoff, 2024; Haroun & Yusoff, 2024). Although Micro-Takaful has gained attention in various developing countries, Sudan still suffers from a noticeable shortage of empirical studies, particularly in Health Micro-Takaful. Most available publications focus on general Takaful operations or conceptual discussions rather than examining real adoption behaviour, consumer perceptions, or operational challenges within the Sudanese market. This limited body of evidence creates a gap in understanding how socio-economic conditions, behavioural factors, and regulatory constraints influence the adoption of Health Micro-Takaful specifically. While there are some studies on Micro-Takaful (Islamic microinsurance) in Sudan, there is a need for more studies on how regulatory requirements align with market needs and how these regulations impact adoption (Mohamed & Yusoff, 2024; Haroun & Yusoff, 2024). Also, there is a gap in understanding the level of public trust and awareness regarding Micro-Takaful in Sudan. Research is needed to explore how to build trust and increase awareness among potential customers (Afandi et al., 2023). There is limited research on the effectiveness of different distribution channels for Micro-Takaful in Sudan. Studies are needed to identify the most effective channels for reaching the target population (Mohamed & Yusoff, 2024; Haroun & Yusoff, 2024).

There is a lack of studies assessing the impact of Micro-Takaful on the financial stability and welfare of households in Sudan. More research is needed to evaluate the long-term benefits and challenges of Micro-Takaful adoption (Mohamed & Yusoff, 2024; Haroun & Yusoff, 2024). This study seeks to fill these gaps by providing some analysis of the factors that affect Health Micro-Takaful adoption in Sudan, based on both quantitative and qualitative data.

1.2 PROBLEM STATEMENT

Islamic finance has become an important mechanism for addressing financial vulnerability among low-income populations, offering Shari'ah-compliant solutions that support social welfare and risk protection. Yet in Sudan, the health sector continues to face severe financing constraints despite ongoing reforms. Out-of-pocket (OOP) payments represent 69.2% of total health expenditure (MoH, 2021), and more than 60% of the population cannot afford essential treatments. Health Takaful products remain beyond reach for most households due to high contribution costs. Although the National Health Insurance Fund (NHIF) is intended to provide financial protection, 60.8% of its members still report financial hardship linked to prescription and service costs (Elhadi et al., 2022). The Fund also faces challenges related to limited-service quality, inadequate coverage, and long-term sustainability risks (Babiker et al., 2021). These challenges are shaped by broader macroeconomic constraints. Sudan is categorized as a low-income economy with unemployment reaching 20.6% in 2022 and inflation rising to 87.3% by the end of that year (CBoS, 2022; World Bank, 2023). As a result, OOP spending continues to exceed 67% of health expenses (Bashir & Allen, 2023), and only around 9% of the labour force is covered by social Takaful—primarily male workers (ILO, 2021). While Micro-Takaful has been introduced successfully in countries such as Indonesia, Pakistan, and Malaysia, Micro-Takaful is currently unavailable in Sudan (Mohamed & Yusoff, 2024).

International experiences demonstrate that Micro-Takaful can enhance health access through community-based contributions, affordable premiums, and integration with Islamic social finance instruments such as zakat, waqf, and crowdfunding-waqf models (Mikail et al., 2017; Mohd Sabri, 2021; Mazlan et al., 2024). These models highlight the transformative potential of Micro-Takaful when supported by effective

regulation, product innovation, and community engagement. However, replicating these successes requires careful adaptation to Sudan's socio-economic realities, regulatory environment, distribution channels, and levels of public awareness.

Sudan's health financing framework remains centred on the NHIF, supported by various legislative instruments regulating medicines, pricing, and service delivery (Ievtushenko & Ahmed, 2016; Federal Ministry of Health, 2017). Although these policies aim to improve access and quality, they have not reduced the heavy reliance on OOP payments. Evidence on the integration of Takaful or Micro-Takaful with zakat or waqf within Sudan is limited, despite growing recognition of the potential role of Islamic social finance in improving affordability and outreach (Idris et al., 2021). The country's burden of communicable and non-communicable diseases, compounded by vulnerability to natural disasters and climate-related risks, further underscores the need for alternative, inclusive health protection mechanisms (Ahmed et al., 2017; Elamin et al., 2024; WHO, 2024).

A fundamental barrier to new health protection models is the lack of awareness and weak public understanding of Takaful and Micro-Takaful concepts (Razak et al., 2021). For Micro-Takaful to succeed, public perception, trust, and behavioural willingness to participate must be clearly understood.

Despite the global growth of Micro-Takaful, Sudan suffers from a noticeable shortage of empirical studies, especially in Health Micro-Takaful adoption. Existing publications focus largely on general Takaful operations or conceptual analyses, rather than examining real adoption behaviour, consumer perceptions, or operational challenges within Sudan. This gap limits understanding of how socio-economic hardship, behavioural factors, and regulatory constraints shape willingness to participate in Health Micro-Takaful.

In summary, Sudan faces an urgent need for an affordable, Shari'ah-compliant health protection mechanism capable of reducing OOP expenditures and expanding access for underserved households. However, the absence of empirical evidence on public perceptions, behavioural determinants, opportunities, and challenges related to Health Micro-Takaful has hindered policy development and product innovation. Addressing this gap is essential for designing a context-appropriate, economically viable, and socially aligned Health Micro-Takaful model for Sudan.

1.3 RESEARCH OBJECTIVES

The following objectives are developed for this research considering the problem statement and the study background:

1. To examine the Sudanese perception of Health Takaful.
2. To examine the Sudanese perception of Health Micro-Takaful.
3. To identify the factors determining the Sudanese adoption of Health Micro-Takaful.
4. To examine the mediating effects of Intention on the relationships between (Attitude, Subjective Norms, Perceived Behavioural Control, Awareness, and Affordability) and Health Micro-Takaful adoption.
5. To explore the potential challenges of offering Health Micro-Takaful in Sudan.
6. To explore the potential opportunities of offering Health Micro-Takaful in Sudan.

1.4 RESEARCH QUESTIONS

1. How do Sudanese perceive Health Takaful?
2. How do Sudanese perceive Health Micro-Takaful?
3. What are the factors that influence the adoption of Health Micro-Takaful in Sudan?
4. What are the mediating effects of Intention on the relationships between (Attitude, Subjective Norms, Perceived Behavioural Control, Awareness, and Affordability) and Health Micro-Takaful adoption?
5. What are the potential challenges to providing Health Micro-Takaful in Sudan?
6. What are the opportunities to provide Health Micro-Takaful in Sudan?

1.5 SIGNIFICANCE OF THE STUDY

The research on the adoption of Health Micro-Takaful in Sudan addresses a gap in the existing literature, offering valuable insights into adopting this innovative financial

service. This study contributes to the literature related to Micro-Takaful for low-income groups. It will provide data about Takaful in Sudan. The researcher's knowledge also is that the application of the study may have great benefits on communities, whether. It is financially or in terms of strengthening the bond between members of societies and empowering those in need.

By employing a framework that integrates variables from the Theory of Planned Behaviour, and including awareness and affordability, this study contributes to understanding product/service acceptance in Islamic Finance.

In terms of academic contributions, this research expands the current body of literature on adopting new products or services, offering a detailed exploration of factors influencing acceptance. The findings might benefit researchers' knowledge of these elements and contribute to formulating new theories and models within Islamic finance.

Also, the research provides data for Takaful providers and the Sudanese government. The insights gained can inform the development and execution of targeted awareness campaigns to foster Health Micro-Takaful adoption. This, in turn, assists stakeholders in formulating more effective strategies and utilizing suitable communication channels to reach the Sudanese population.

Furthermore, the study's outcomes will give the Sudanese government and policymakers valuable insights into the determinants of Health Micro-Takaful acceptability. This understanding enables the formulation of policies contributing to the adoption of innovative solutions, fostering the rise of a broader and surviving economy.

For Takaful providers, the research offers insights into the determinants impacting Health Micro-Takaful acceptance. This knowledge empowers providers to refine marketing strategies and enhance their products and services, ensuring a more effective fulfilment of customer requirements.

In conclusion, the research proposes a Health Micro-Takaful framework in Sudan and holds a considerable impact on various stakeholders, including researchers, policymakers, Takaful providers, and the government. The perceptions collected might pave the way for more efficient approaches to encourage the acceptance of innovative

financial products, contributing to developing a resilient and inclusive economy in Sudan.

1.6 SCOPE OF STUDY

This study explores the adoption of Health Micro-Takaful in Sudan, employing the Theory of Planned Behaviour (TPB) as a foundational framework. The scope involves several dimensions. First, it targets Sudanese citizens across various regions in Sudan. Second, the study focused on the 18 years and above Sudanese, it seeks to offer insights into the perception, challenges, and opportunities this group encounters concerning the implementation of Health Micro-Takaful. Third, the research considers the contemporary context, acknowledging the novelty of the Micro-Takaful concept in Sudan. Fourth, this study extends the TPB (Theory of Planned Behaviour) by incorporating additional factors like awareness and affordability, recognizing their crucial roles in shaping behavioural intentions towards adoption. Fifth, the study thoroughly explores factors influencing Health Micro-Takaful adoption using quantitative questionnaires and qualitative interviews. Finally, the findings aim to contribute insights for policymakers, financial institutions, and stakeholders promoting Health Micro-Takaful adoption.

By presenting these factors, the study seeks to provide an accurate understanding of Health Micro-Takaful adoption in Sudan, thereby contributing to the literature on Islamic finance and financial inclusion.

1.7 DEFINITION OF IMPORTANT TERMS

Takaful: Takaful is an Islamic insurance that operates on collaboration and solidarity among its participants. It is a mechanism for collectively managing and distributing risks, where individuals contribute to a shared fund to cover losses and spread the resulting gains among the members (Ali & Nisar, 2016). Takaful refers explicitly to life insurance in Sudan to separate it from general insurance. In the context of this study, Takaful refers to Islamic insurance as defined by IFSB. IFSB defined Takaful as: "A mutual assurance, based upon the pledge to contribute a particular sum to a collective

risk pool, wherein members mutually agree to provide coordinated assistance for losses incurred due to predetermined risks."

Micro-Takaful: is a specialized form of Takaful that explicitly caters to the Takaful needs of individuals or small businesses with limited income. It is meant to be more easily attainable and cost-effective for individuals needing access to conventional insurance offerings (Rapi et al.2022). As per the International Association of Insurance Supervisors (IAIS), it is "insurance that is accessed by low-income populations, offered by several diverse entities but operated in agreement with generally accepted insurance procedures." The context of this study uses the same definition as provided by IAIS.

Adoption: Intention to adopt Islamic Bank's services/products refers to the tendency and willingness of consumers to embrace, experiment with, and intend to utilize or support the service items provided by Islamic Banks (Mbawuni& Nimako,2017). Another definition for adoption was given by (Maryam et al.,2022), as adoption refers to the ongoing use or acceptance of a product or object. In general, adoption refers to integrating a novel concept, procedure, or technology into a system or organization. In the context of this study, adoption relates to implementing Health Micro-Takaful as an alternative to Health Takaful in Sudan.

Community - Based Health Insurance: is a system where people in a community come together to pool their resources and share the costs of healthcare. It is designed to make healthcare more affordable and accessible, especially for those in rural or low-income areas who may not have access to traditional health insurance. Members contribute a small, regular amount, and in return, they receive coverage for medical expenses when needed. CBHI relies on trust, solidarity, and community participation to ensure everyone has access to essential healthcare services (WHO,2020). In the context of this study, Community-Based Health Insurance (CBHI) refers to a localized approach to health coverage where individuals within a community collectively contribute to a shared fund. This fund is then used to cover medical expenses for members, ensuring access to healthcare while addressing affordability challenges. It emphasizes community solidarity and could be tailored to align with Islamic principles, such as risk-sharing and mutual assistance (Taawun), making it a potential solution for enhancing healthcare access in Sudan.

1.8 ORGANIZATION OF THESIS

Chapter One: This chapter provides an outline and rationale for conducting this research. The research aims to offer comprehensive explanations of the challenges encountered in the adoption of Health Micro-Takaful in Sudan to ensure that the proposed framework is both relevant and necessary. Hence, this chapter provides a primary overview of the research problem. Furthermore, it outlines the research objectives, questions, and the significance of the research.

Chapter Two: This chapter presents an overview of Sudan and explains the county's overall financial environment. This chapter also gives an insight into the financial environment including the level of financial inclusion in Sudan.

Chapter Three: This chapter provides background literature to highlight the Takaful industry in Sudan, organized as follows. After an introduction, the second section discusses the literature on Micro-Takaful, its models, and its applications. The third section discusses Health Takaful in Sudan and its challenges, while the fourth section highlights the Community-Based Health Insurance (CBHI) in some African countries. The fifth section is the chapter summary.

Chapter Four: This chapter presents the theoretical framework, and the hypotheses development based on the Theory of Planned Behaviour (TPB). The theory and related research are discussed in this chapter, besides the research framework. Furthermore, a comprehensive analysis was conducted based on previous studies to formulate the hypothesis.

Chapter Five: This chapter will present a comprehensive explanation of the methodology employed in the study, the research design, the study area, population and sampling techniques, and the data collection methods, it introduces the quantitative technique, which will exclusively focus on the first part of the study. In the section related to the quantitative approach, the researcher introduced the technique of questionnaires and demonstrated its significance in the study, data collection, and data analysis. Also, the researcher explained the qualitative research methodology employed in the subsequent phase of the study. In this section, the researcher examines the utilization of semi-structured interviews, the employed sampling approach for

participant selection, and the instrument used for data analysis. This chapter also presents the pilot study findings.

Chapter Six: This chapter provides findings from the questionnaire and the interviews. This chapter is divided into five sections; the first one is an introduction to the chapter. The second section focuses on the data screening and analysis, the results of the descriptive statistics as well as the statistical assumptions. In the third section is the findings of hypotheses testing, the fourth section provides the results of the hypotheses and will critically analyse them. In section five, the researcher will present the findings and discussion of the interviews. The chapter will end with a summary.

Chapter Seven: This chapter is the study's conclusion. The proposed framework is discussed, along with the study's theoretical and practical implications limits, and suggestions for further research.

1.9 SUMMARY OF CHAPTER ONE

This chapter provides an insightful introduction, exploring the essential elements of the research undertaking. Furthermore, it precisely formulates the problem statement, research objectives, and research questions, establishing a foundation for a systematic investigation. Finally, the chapter highlights the significant importance of the study, emphasizing its prospective contributions to academics and practical applications in the sector.

CHAPTER TWO

OVERVIEW OF SUDAN FINANCIAL ENVIRONMENT

2.1 INTRODUCTION

2.1.1 Sudan Overview

The Republic of the Sudan, commonly known as Sudan, is a country in north-eastern Africa. Seven Sudanese states have international borders with other African countries. The Red Sea coast of Sudan shares borders with; Egypt and Libya to the north, South Sudan to the south, Chad and the Central African Republic to the west, and Eritrea and Ethiopia to the east (United Nations Office for the Coordination of Humanitarian Affairs, 2023). Sudan is a bridge between Africa and the Middle East due to the Red Sea's roughly 550-mile stretch of the east coast and the Nile River's south-to-north passage through Sudan. The geography of Sudan is mainly flat, with a few mountain ranges scattered. Deserts and semi-deserts make up most of it. Until 2011, Sudan had the fifth-biggest population in Africa and the most significant surface area. Sudan has lost more than 64 million square kilometres of territory and almost 10 million of its population because of South Sudan's separation in July 2011.

Sudan is the third largest country in terms of land area in Africa the third largest country in Africa following Algeria and the Democratic Republic of Congo (World Bank, 2024). It extends over approximately 1.88 million square kilometres. The World Bank estimates that the population of Sudan was around 50.8 million in 2024 (World Bank, 2024). It is made up of both native African ethnic groups and descendants of Arabian Peninsula immigration. Seventy percent or thereabouts of Sudan's population is Arab. Arabic is now the primary language and the culture of most of the nation's tribes. Sudan has a Sunni Muslim majority of about 97 percent, with a small Christian minority (CIA, 2024). The United Nations classifies Sudan as one of the world's least developed nations (UNDP,2024). Three factors determine the classification: low per capita income, poor levels of human development, and severe economic vulnerability (UN,2024). Sudan is included in a category of nations with low levels of human development (United Nations Development Programme, 2024).

The country has endured protracted social unrest, civil war, and the loss of more than 80% of its oil fields because of South Sudan's separation in July 2011 (Central Intelligence Agency, 2024). Since 1999, the oil industry has contributed significantly to Sudan's GDP development (World Bank, 2022). The economy grew for nearly ten years because of increased oil production, high oil prices, and considerable foreign direct investment inflows (World Bank, 2022). The almost year-long suspension of South Sudan's oil output in 2012 and the resulting loss of oil transit fees worsened Sudan's economy (World Bank, 2022). Sudan is included in a category of nations with low levels of human development (United Nations Development Programme, 2024). The country has endured expanded social instability, civil war, and the loss of more than 80% of its oil fields because of South Sudan's separation in July 2011 (Central Intelligence Agency, 2024). Since 1999, the oil industry has contributed significantly to Sudan’s GDP development (World Bank, 2022).

The economy grew for nearly ten years because of increased oil production, high oil prices, and considerable foreign direct investment inflows (World Bank, 2022). The almost year-long suspension of South Sudan's oil output in 2012 and the resulting loss of oil transit fees worsened Sudan's economy (World Bank, 2022). Despite extensive US sanctions, Sudan has persevered and made significant efforts to diversify its funding sources, including commercial banks and private and public sector partnerships, to increase its income from other industries (United States Department of State, 2024). Sudan also faces growing inflation, which peaked at 47% annually in November 2012 before declining to 37% in 2013 (International Monetary Fund, 2014). According to the International Financial Statistics (IFS) published by the IMF, the average inflation rate rose from 13.25% in 2010 to 36.91% in 2014 (International Monetary Fund, 2014). In the first half of 2024, Sudan's inflation rate surged to 136.67%, driven by rising food and medicine prices, along with increases in housing rents (Sudan Tribune, 2024). In addition to the rise in the cost of most food, goods, and some imports. This was due to the partial devaluation of some government-related transactions and the elimination of oil price subsidies (World Bank,2024). From 2001 through 2010, the average yearly inflation rate was only 9.18 percent (International Monetary Fund, 2014). However, the average inflation rate from 2011 to 2014 was about 31.59 percent, with a noticeable rise in recent years (World Bank, 2024). Inflation decreased from 36.91 percent at the end of 2014 to 16.91 percent at the end of 2015, and it kept falling throughout 2016 (World

Bank, 2024). The Bank of Sudan's policy, which attempts to control liquidity and restrict the expansion of the money supply, is responsible for this trend (CBoS, 2024). Inflation surged to 146.60 percent in 2023, reflecting ongoing economic challenges (Trading Economics, 2023).

2.1.2 Islamic Finance in Sudan

The first Islamic bank in Sudan, Faisal Islamic Bank, was founded in May 1977, marking the beginning of a long history of Islamic finance in Sudan (Faisal Islamic Bank of Sudan, 2024). The Sudanese banking system is now mostly Islamic, with most banks operating under Islamic principles (Mohsin, 2005). The Central Bank of Sudan (CBoS) and the Shari'ah High Supervisory Board (SHSB) oversee the financial sector, which comprises a variety of market participants, including banks, microfinance organizations, and Takaful firms which are monitored also by the Insurance Supervisory Authority (ISA) (CBoS, 2024). Between 1980 and 1983, the government established five additional Islamic banks, following the lead of Faisal Islamic Bank (Al-Hashimi, 2013). The Faisal Islamic Bank established Sudan's first-ever Takaful company, the Islamic Insurance Company, in January 1979 due to the lack of Shari'ah-compliant insurance services (Al-Hashimi, 2013).

However, it took four years for legislation mentioning Islamic Insurance to be introduced (Yesuf, 2017). Three more Takaful companies were active in Sudan by 1985 (Yesuf, 2017). The government made its first attempt to fully Islamize the banking system in the middle of the 1980s under President Jaafar Nimeiry, along with initiatives of a similar nature in Pakistan and Iran (Shikhov, 2013). During Omar Al Bashir's regime in the 1990s, more effective amendments were introduced to execute the Shari'ah law in all financial institutions (Mustafa, 2021). This included a 1992 decree on the regulation and oversight of Takaful companies and the creation of the High Shari'ah Supervisory Board to monitor the reform's implementation and ensure that financial transactions comply with the Shari'ah law (CBoS, 2024). By 1997, 29 banks were operating in Sudan under the interest-free system due to these changes (Mustafa, 2021).

A modification to the CBoS Act of 2002 converted the fully Islamic financial system into a dual, one a year after the Comprehensive Peace Agreement (CPA) that ended the Sudanese Civil War in 2005 was signed (World Bank, 2024). This meant that South Sudan pressured banks to change to a conventional business model or discontinue operations, while the system in North Sudan continued to function under Shari'ah legislation (World Bank, 2024). However, with South Sudan's split in 2011, Sudan's financial system became entirely Islamic again (World Bank, 2024). All financial institutions must function by Shari'ah law because of the financial system's Islamization. The prohibition of usury (riba) is the fundamental Shari'ah concept that Islamic financial organizations follow (CBoS, 2024).

Before the country's independence in 1956, financial institutions in Sudan operated as branches or subsidiaries of foreign organizations and were governed by British law (Mustafa, 2021). The National Bank of Egypt became the first bank in the Sudanese territory in 1903. The following years saw the establishment of branches in Sudan by Barclays Bank in 1913, Ottoman Bank in 1949, and both Misr Bank and Credit Lyonnais in 1953 (Mustafa, 2021). At that time, the primary functions of these banks were to serve as depositories for foreign and domestic businesses operating in the country and to finance international trade operations (Mustafa, 2021). Sudan regained its independence from Britain in 1956. The National Bank of Egypt's Sudanese assets were transferred to the Bank of Sudan in 1959, which was founded to replace the Sudan Currency Board (Bank of Sudan, 2024).

The Bank of Sudan started serving as the country's central bank in February 1960, issuing money, assisting with bank expansion, making loans, preserving the financial system's stability, and offering advice to the government (Bank of Sudan, 2024). However, the country did not begin to see the emergence of the Islamic banking system until the late 1970s. The 1973 Sudan Constitution's clause that "Islamic law and custom should be the main basis of legislation" was the first step in Islamization. The Committee for the "Revision of Sudanese Laws to Bring Them into Conformity with Islamic Teachings" was established by Sudanese President Jaafar Nimeiri to put this statement into practice (Warde, 2000 cited by Yesuf,2017). Initially controlled by banks, the financial sector was a part of the Islamization process. It should be

emphasized that this process occurred while Islamic banks began to appear in other Muslim countries, primarily in the Middle East.

The tendencies within Muslim cultures and the rising prosperity of some Middle Eastern countries were factors in the establishment of such organizations throughout the Muslim world (Warde, 2000 cited by Yesuf,2017). The Muslim Brotherhood, founded in Al-Ismailia (Egypt) in 1928 by Hasan al-Banna, was one of the most major movements. The Muslim Brotherhood challenged Egypt's and other Muslim countries' interest-based financial systems, arguing that as Islam offers its adherents a thorough intellectual framework for all facets of life, economic matters should also be covered by that framework (Saeed, 1996 cited by Yesuf,2017). Because of this, no interest-based activity should be permitted in the public or private sectors (Saeed, 1996 cited by Yesuf,2017). Both market professionals and academics have agreed with the Muslim Brotherhood and other Muslim movements. However, if it were not for the wealth of the Gulf states, which came because of the oil crisis and the sharp spikes in oil prices, Islamic banking would have likely developed more slowly (Warde, 2000 cited by Yesuf,2017).

Nearly all the Islamic banks founded in the 1970s were partially or even entirely financed by riches associated with oil. This collection of financial organizations includes several Faisal Islamic banks, including the 1977-founded Faisal Islamic Bank of Sudan (Saeed, 1996 cited by Yesuf,2017). The bank was established based on a special Act of Parliament that granted it several advantageous rights, including total freedom to move and use its foreign currency deposits, tax exemptions on all assets and profits, and employee pay and pensions (Saeed, 1996 cited by Yesuf,2017). The bank's equity expanded by more than 350% in a fairly short period between 1979 and 1982, and during the same time, its net profit increased from 1 million to 21 million Sudanese pounds (Stiansen, 2004 cited by Yesuf,2017).

As a result, the bank rose to become Sudan's second largest bank. Other Islamic banks in Sudan, including Tadamoun Islamic Bank, Sudanese Islamic Bank, Islamic Cooperative Bank, Al-Barakah Islamic Bank of Sudan, and Islamic Bank of Western Sudan, were established in the years that followed Faisal Islamic Bank's success (Ahmed, 2008 cited by Yesuf,2017). The first attempt at converting the entire banking sector to an Islamic banking system was launched in 1983. Jaafar Nimeiri, the president

of Sudan at that time, issued an order requiring all commercial banks to negotiate the conversion of their then-existing interest-bearing deposits into Shari'ah-acceptable forms and to terminate interest-based operations with immediate effect. Only overseas transactions were permitted to operate temporarily on an interest-based basis (Warde, 2000 cited by Yesuf,2017).

However, the attempt was unsuccessful. First, banks primarily built their business operations on the Murabaha, which is seen as highly critical and occasionally non-compliant with Shari'ah items (El-Gamal, 2006). Second, banks only technically used Islamic products in their reports and financial statements submitted to the central bank. The central bank's policymakers also believed the reform process to be poorly planned and more like a government-imposed political choice (El-Gamal, 2006). When the administration was replaced in 1985, Islamization was stopped (Iqbal & Molyneux, 2005 cited by Yesuf,2017). Some traditional banks returned to their old ways in the following few years as Sudan's policymakers attempted to increase democracy there. However, after President Omar al-Bashir took office in 1989, the notion of converting the Sudanese financial system to an Islamic financial system reappeared (Iqbal & Molyneux, 2005 cited by Yesuf,2017).

Again, there were few legal and institutional infrastructure preparations before it was passed in December 1990. It also did not help that the country was dealing with several difficulties at this time of economic transition brought on by the civil war, the US embargo, and the massive entry of refugees from Ethiopia and Chad, all of which occurred at the same time as the continent of Africa was experiencing a drought (Chapra, 2000 cited by Yesuf,2017). However, since the early 1990s, Sudanese banks have only been able to issue Shari'ah-compliant securities. The High Shari'ah Supervisory Board, founded in 1992, oversees this process (Bekkin, 2009 cited by Yesuf,2017). Naturally, challenges to the Islamization of the entire nation arose in that area. The Central Bank of Sudan Act from 2002 was revised in 2006 to decrease disputes between the north and the south after the Comprehensive Peace Agreement (CPA)[2] was signed on January 9th, 2005 (CBoS, 2024). Under Section 5 of this Act, only conventional banking was permitted in the South. Thus, Sudan had a dual banking

[2] The Comprehensive Peace Agreement (CPA) was signed on January 9, 2005. It aimed to end the Second Sudanese Civil War, develop democratic governance throughout the country, and share oil revenues

system until June 2011, when South Sudan attained independence: an Islamic banking system in the north and a conventional one in the south. Following South Sudan's secession, the country's entire financial system was once again based on Islamic law (World Bank, 2024)[3].

Sudan has an Islamic banking and financial system at the national level. By the turn of the millennium, it was clear that Sudan was the only nation to have completed the task of converting its entire financial system to an Islamic one (Iqbal & Molyneux, 2005 cited by Yesuf,2017).

Since the country's independence in 1956, the banking system in Sudan has undergone a great transformation. The Sudanese banking system before independence was referred to as colonial banking. There was no native currency or central bank, and the commercial banks were a part of foreign institutions. In this setting, there was a banking and credit system primarily comprised of foreign banks (Mustafa, 2021). The primary goals of those banks were to meet the demands of export and import trades and function as deposit takers for foreign-owned and domestic businesses doing business in the country (Al-Harran, 2003 cited by Yesuf,2017). The Sudan Currency Board was founded in 1957 to issue the new Sudanese currency upon independence (Al-Harran, 2003 cited by Yesuf,2017).

The Bank of Sudan Act was approved in 1959, and the Central Bank was launched as one of Africa's first operating central banks the following year. The Bank of Sudan took on the administration of foreign exchange and related currency problems, such as controlling the supply of notes and coins and creating a strong credit and banking system. It also acted as the government's banking and financial adviser (Al-Harran, 2003 cited by Yesuf,2017).

Sudan's banking systems experienced a major renovation in May 1970. The government decided to nationalize the entire commercial banking industry and severely limit foreign capital's ability to apply direct influence over Sudan's banking, Takaful, and export-import industries. Additionally, by nationalizing the whole commercial banking industry, the government aimed to advance and enhance the banking services offered to various industries, particularly the traditional industry, and rural areas, which

[3] The CPA also set a timetable for a Southern Sudanese independence referendum (World Bank, 2024).

were in dire need of banking services (Al-Harran, 2003 cited by Yesuf,2017). Private foreign banks were again permitted to conduct business in Sudan alongside the nationalized banks by the middle of the 1970s.

These international institutions included the Bank of America, the Islamic Bank for Finance and Development, the Arab Emirates Bank, the Abu Dhabi National Bank, the International Bank of Credit and Commerce, Citibank, and the Pakistan-owned Habib Bank (Al-Harran, 2003 cited by Yesuf,2017). These banks were not permitted to work with Sudanese citizens but to create accounts for import-export traders and Sudanese citizens employed overseas (Magda, 2005). In Egypt at that time, Islamizing the current financial system first surfaced. Complying with Islam's ban on interest involved establishing profit-sharing-based interest-free banking (Abdul Gafoor, 1996 cited by Yesuf,2017). Professor Ahmad El-Najjar, sometimes known as "The Founder of Islamic Banks," was the first Muslim economist to propose the idea of "interest-free banking" (Magda, 2005). In 1963, his concept was implemented in a savings bank in Mit-Ghamr, Egypt. Nevertheless, for several political reasons, this bank was shut down (Izakça, 1996 cited by Yesuf,2017). Numerous conferences were conducted in various Muslim countries in the early 1970s (Izakça, 1996 cited by Yesuf,2017). Following 1973, various Islamic Banks started to appear in some Muslim nations because of the Middle East's oil boom and large buildup of petrodollar surpluses. The Dubai Islamic Bank, founded in 1975, was the first Islamic bank (Ariff, 1988 cited by Yesuf,2017). It was followed by the Islamic Commercial Bank of Abu Dhabi (1977) and the Faisal Islamic Bank of Sudan (1977). As a result, many Faisal Islamic Banks were soon established in several Muslim countries (Magda, 2005).

Islamic banking was first implemented in Sudan in 1966 at the Islamic University of Omdurman's Department of Economics. At the time, a key subject at the Department of Economics was an article on Islamic Economics, which helped spark the idea of founding an Islamic bank in Sudan. However, several barriers put a stop to this plan. As the political landscape in Sudan altered over time, Prince Mohammed Al Faisal Al Saud met with President Gaafar Nimeiri in February 1976 (Al-Harran, 2003 cited by Yesuf,2017). He urged him to permit the establishment of an Islamic bank there. The Faisal Islamic Bank was consequently given legal registration in 1977. Eighty-six founders from Sudan, Saudi Arabia, and other Muslim countries decided to form the

bank in May 1977. They all contributed the necessary capital, which was at the time known as Paid-up Capital, and amounted to 600 million Sudanese pounds (Al-Harran, 2003 cited by Yesuf,2017). As a result, on August 18, 1977, the Faisal Islamic Bank of Sudan (FIBS) was registered under the Companies Act of 1925 as a public shareholding limited. Effective operation of the FIBS began in May 1978.

The initial step toward subsequently Islamising all Sudanese banks was the formation of the Faisal Islamic Bank in Sudan (Al-Harran, 2003 cited by Yesuf,2017). Since most Sudanese hesitated to engage with the former commercial banks that ran on an interest basis, this Islamic bank attracted much support from both the government and the populace (Magda, 2005). This was fully demonstrated by the fact that, in less than four years, the real paid-up capital of this bank expanded from 0.6 to 2 million Sudanese Dinars. In terms of the total paid-up capital of 18 commercial banks, including private and national, this rise represented 17% and 30%, respectively (Magda, 2005). At that time, the shares were allocated in the following proportions: 4:4:2 to Saudis, Sudanese, and other Muslims (Shaaeldin & Brown, 1983 cited by Yesuf,2017). Due to the Faisal Islamic Bank's quick success, the government opened five additional Islamic banks. The Sudanese Islamic Bank and the Islamic Cooperative Development Bank were established in 1982 after the Al-Tadamun Islamic Bank, which was established in 1980 (Shaaeldin & Brown, 1983 cited by Yesuf,2017). Al-Baraka Bank and the Islamic Bank of Western Sudan were established in 1983 (Bashir & Malik, 1984 cited by Yesuf,2017).

The Islamic Bank for Western Sudan and the Al Baraka Sudanese Bank were established in 1984. These banks successfully attracted new depositors, which led to the opening of other branches across the Sudanese states. The Shamal Islamic Bank, founded in 1985, operated until 1990. The government decided to implement the same interest-free financial system as in Iran and Pakistan because of the success of the Islamic banking system (Haron, 1997 cited by Yesuf,2017). In 1989, the government decided to convert the whole banking sector to follow Islamic law, in keeping with the citizens’ overall Islamic orientation. The first step was to convert the Sudanese National Bank's rules to Islamic law. When the Bank of Sudan released the Banking Business (Organization) Act in 1991, which mandated that Shari'ah administer all banking

financial transactions for all banks in Sudan, the decision came into effect (Haron, 1997 cited by Yesuf,2017).

Consequently, all commercial and foreign banks were compelled to use Islamic financial practices. The number of banks functioning as interest-free banks expanded because of this conversion from 6 in the 1980s to 29 in 1997. These banks have all been successful in luring in more deposits. However, following the peace deal, which outlined the split of power and wealth, the southern Sudanese banks formally broke from the central bank's control and continued functioning as regular banks (Haron, 1997 cited by Yesuf,2017). The banks in Sudan have previously relied on Murabaha financing, like other Islamic banks worldwide. Regarding financing options, Murabaha was the most widely used in 2014, as it accounted for more than half of all funding and is regarded as the simplest to use due to its minimal administrative expenses and profit assurance. However, the percentage of other financing options, including mudarabah, musharakah, and other activities, is rising, accounting for over 40% of all bank financing (Haron, 1997 cited by Yesuf,2017).

Regarding industries, the construction and agricultural industries, which narrowly exceeded the industrial sector in 2014 and are also reflective of the Three-year Economic Program, received most of the financing. This program focuses on producing eight agricultural and mining goods. One of the main areas of attention for the Sudanese government is microfinance. Sudan aims to prosper economically and socially by increasing the percentage of microfinance initiatives in the country's GDP. The country has so far executed plans for growing and extending the microfinance sector and has made considerable strides in microfinance (Haron, 1997 cited by Yesuf,2017). When the Central Bank of Sudan (CBoS) formed a "Microfinance Unit" in 2007 to set microfinance rules and frameworks and improve socio-economic banking, it marked a turning point. In 2008, the CBoS and the Multi-Donors Trust Fund, which the World Bank runs, launched the Sudan Microfinance Development Facility. Intending to develop a workable system for the banking industry, private sector investors, and donors, the facility gives financing and financial contributions to banks and non-banking organizations engaged in microfinance (Haron, 1997 cited by Yesuf,2017).

Additionally, CBoS rules were created to encourage banks to allocate at least 12% of their financing portfolios to social dimension financing and microfinance

initiatives (Central Bank of Sudan Annual Report, 2014). With expanded government initiatives aimed at microfinance, banks should create strategic plans to meet the rising demands of this expanding market segment more actively. This purpose can be achieved by offering a wide range of products beyond traditional banking and encompassing a broader selection of goods and services, including financial and non-financial items. According to a World Bank survey, the need for microfinance is significant in urban areas throughout Khartoum. The survey, titled Building Businesses for Sudan's Poorest (April 2013), found that 1.5 million people, or 21% of the population, were interested in microloans (Kaynak, 2013 cited by Yesuf,2017). According to the survey, 72% of microentrepreneurs also needed access to formal or informal financial services.

The outcomes of Sudan's microfinance projects thus far have been positive. The Central Bank of Sudan (CBoS) estimates that bank-extended microfinance expanded by 33% from SDG 1,546 million in 2013 to 2,055 million in 2014. Additionally, from 614,000 in 2013 to 1,108,454 in 2014, the overall number of microfinance beneficiaries from banks and other microfinance providers rose (Central Bank of Sudan Annual Report, 2014). Widespread poverty (almost 50% of Sudan's population is below the poverty line) and a failing economic climate have forced many people to investigate microfinance options. Given the growing expansion of microfinance, Sudan has a great chance to pursue international microfinance companies that wish to build a presence in the nation and the region (Central Bank of Sudan Annual Report, 2014). These are acceptable options because the monthly commitments are as low as Sudan's, with an estimated population of 43,660,260 in 2020 and a healthcare system primarily funded through out-of-pocket payments. This situation, in which 46.5 percent of the population lives below the poverty line, delays universal access to health services for a large percentage of the population (mfu,2022).

2.1.3 Overview of Microfinance in Sudan and Its Impact on Financial Inclusion

Microfinance in Sudan has become a vital tool for poverty alleviation and economic development, offering financial services to low-income populations who lack access to traditional banking. Despite its promise, the sector is still in its early stages, with demand often overtaking supply, especially among the poorest segments of society (Ghandour, 2015; World Bank, 2024). Microfinance institutions (MFIs) have stepped

in to bridge this gap, providing services like small loans and savings accounts to underserved communities (Elsafi et al., 2019). The Central Bank of Sudan (CBoS) has implemented policies requiring commercial and specialized banks to allocate a percentage of their portfolios to small businesses. However, the actual financing for small and medium enterprises (SMEs) often falls short of these targets, revealing a gap between policy and practice (Arabi & Abdalla, 2020). Additionally, most financial products are based on the Murabaha financing model, which limits the diversity of offerings and reduces outreach effectiveness (Mustafa, 2023).

Despite these challenges, microfinance has positively impacted household livelihoods, contributing to poverty reduction and improved economic conditions (Bilal et al., 2020). Programs targeting women have been particularly transformative, enabling them to start or expand businesses and improve household incomes (Islam, 2020; Nepal, 2023). However, barriers like limited funding, high operational costs, and regulatory hurdles persist, hindering broader impact (Arabi & Abdalla, 2020). Given Sudan's predominantly Muslim population, Islamic microfinance models adhering to Shari'ah principles are gaining traction. These models provide interest-free financing options, enhancing financial inclusion for those excluded from conventional banking due to religious constraints (Ahmed & Ammar, 2015; Akram, 2023). Capacity-building programs for both borrowers and MFIs, including financial literacy initiatives, are crucial to maximizing microfinance's potential (Elneel, 2021).

Recent developments in Sudan's banking system highlight the challenges and opportunities faced by the sector (Central Bank of Sudan, 2023). The Sudanese banking system has undergone many changes, particularly post-war, to rebuild and renew the sector (World Bank, 2022). These changes include addressing damage caused by the conflict, restoring infrastructure, resolving non-performing loans, and ensuring stability and reliability (African Development Bank, 2023). The Central Bank of Sudan has implemented measures to enhance the supervisory framework, corporate governance practices, and financial intermediation (IMF, 2023). Despite these efforts, the sector still faces challenges such as low levels of financial intermediation, limited innovation in products and services, and inadequate adoption of technology (OECD, 2023).

2.2 CHAPTER SUMMARY

This chapter provides a comprehensive overview of Sudan, establishing the foundation for this study, which focuses on Health Micro-Takaful adoption. The chapter begins with an exploration of Sudan's geographical, demographic, and socio-economic landscape, highlighting the challenges faced by its population, including widespread poverty, high unemployment rates, and limited access to essential services. It then examines the historical development and current state of Islamic finance in Sudan, highlighting its development as a central component of the financial system. Particular attention is given to the role of Shari'ah-compliant financial instruments, such as Takaful, in promoting economic development and addressing financial inclusion. The chapter concludes with an analysis of microfinance in Sudan, highlighting its impact on expanding access to financial services for low-income communities. Despite its contributions, microfinance faces continuing challenges, including limited outreach and regulatory constraints. By integrating these elements, the chapter offers an understanding of Sudan's socio-economic and financial systems.

CHAPTER THREE

LITERATURE REVIEW

3.1 INTRODUCTION

This chapter provides background literature to highlight the Takaful industry in Sudan, organized as follows. After an introduction, the first section presents an overview of Micro-Takaful, its models, and its applications. The second section discusses Islamic insurance/ Takaful in Sudan, while the third section highlights Health Takaful in Sudan and its challenges. The fifth section sheds light on Community-Based Health Insurance (CBHI) in some African countries. The last section is the chapter summary.

3.2 MICRO-TAKAFUL OVERVIEW

Micro-Takaful or Islamic microinsurance refers to a modern term used for a type of Islamic Insurance (Takaful) service that is modified to suit low-income groups to get protection to lessen the risks associated with unforeseen circumstances. Takaful originated from the Arabic verb "kafala," which reflects the idea of a mutual bond or promise of cooperation or assistance and micro means extremely small. Combining Takaful with micro refers to a certain Takaful product customized to provide financial protection to low-income segments (Yusoff et al., 2020, cited by Rapi et al., 2022). There is a practice of group self-insurance in African and Muslim communities for social occasions like weddings, death, or other unpleasant events where each member in this group contributes any amount of money or food to the concerned person (Ahmed MH,2016). As per the International Association of Insurance Supervisors (IAIS), it is "insurance that is accessed by low-income populations, offered by several diverse entities but operated in conformity with generally accepted insurance procedures."

Micro-Takaful is a contract where the insurer/operator undertakes as an agent of the policy holders to pay the participant (insured) of the beneficiary a given amount of money or any other compensation when the risk insured against occurs (Ahmed MH,2016). The participants pay the contribution to the insurer on a donation basis. Micro-Takaful products are among the poverty alleviation tools to help low-income

groups protect their financial abilities and life maintenance in the future. Micro-Takaful is a unique product that cares about public needs rather than a profit-gaining product (Salleh & Padzim, 2018). Mikail et al. (2017) defined Micro-Takaful as an Islamic form of micro-insurance developed to provide insurance services to poor and low-income people. Bank Negara Malaysia defined it as "A microinsurance or Micro-Takaful product is an insurance or Takaful product created to respond to the financial protection needs of low-income households.

3.2.1 Concept and Principles

At its core, Micro-Takaful operates on the principle of shared responsibility, where participants contribute to a collective fund managed by a Takaful operator. In the event of predefined risks, such as illness, disability, or natural disasters, the fund provides financial compensation to those affected. This model fosters a sense of community solidarity and aligns with Islamic values of equity and social justice. All financial transactions within Micro-Takaful must comply with Shari'ah law, ensuring that no riba (interest) is charged or paid (Rosman, 2024). It serves as a safety net against various risks, such as health emergencies, natural disasters, and other unforeseen events (Salleh, 2023). Micro-Takaful operates on the principles of cooperation (ta'awun) and voluntary contribution (tabarru). Participants contribute to a common pool, which is then used to provide financial assistance to members facing losses.

IFSB defined Micro-Takaful ultimately:" Micro-Takaful is the Islamic counterpart of microinsurance and exists in family and general forms. The scheme in concern is a collaborative effort where a collective of individuals mutually agree to help each other in the event of losses resulting from specific dangers. Micro-Takaful is generally offered to the low-income and underprivileged segment of the population (which is usually excluded from the general Takaful terms and conditions) by various entities that are regulated and supervised by a regulatory and supervisory authority under the national laws of any jurisdiction." Pro-poor microfinance institutions existed in the semi-formal sector in the early seventies.

3.2.2 Relevance to Low-Income Communities

Modern Micro-Takaful was developed to complement the development of Microfinance institutions and Non-Government Organizations in developing countries, where their achievement has resulted in the acknowledgment that underprivileged individuals can and want to save. Remembering that Micro-Takaful is essential in providing funding; it fills the current gap in microfinance compared to the demand for available security or collateral needed for the poor segment, as well as presenting enough security to financing institutions to protect them against the risk of default. Micro-Takaful encourages financial institutions to finance this group. It, therefore, contributes to the lessening of poverty on the one hand and turning many of the unemployed, poor, and needy segments into a working and stable group on the other hand. This will make the dependency of this category on the state unlimited. By offering affordable and accessible coverage, Micro-Takaful aims to alleviate the financial burden on vulnerable populations.

Micro-Takaful seeks to enhance financial inclusion by providing Shari'ah-compliant financial products to underserved segments of the population. By addressing the specific needs of low-income households, Micro-Takaful can help integrate these individuals into the formal financial system (Shamsudheen & Muneeza, 2024; Rusydiana et al., 2019). By providing information about risk management, financial planning, and the benefits of Micro-Takaful, these programs empower individuals to make informed decisions regarding their financial futures (Jahya et al., 2023). This inclusion is vital for fostering economic stability and improving overall well-being. Micro-Takaful aims to contribute to community development by promoting social welfare and enhancing the overall quality of life for participants. By providing a safety net, Micro-Takaful encourages individuals to invest in their businesses and livelihoods, ultimately leading to economic growth within the community (Rosman et al., 2024; Salleh, 2023).

Another objective of Micro-Takaful is to raise awareness and educate potential participants about the benefits of risk management and the principles of Islamic finance. By raising a better understanding of Micro-Takaful, providers can encourage greater participation and build trust within the community (Jahya et al., 2023; Rusydiana et al., 2019). This collective approach allows members to support each other financially,

creating a safety net that enhances community resilience (Jaenudin et al., 2019). This way emphasizes community support and solidarity, aligning with Islamic values of cooperation and mutual aid (Shamsudheen & Muneeza, 2024; Rosman et al., 2024). In Micro-Takaful, the concept of risk sharing is central. Participants share the risks among themselves, knowing that their contributions will benefit the community, and any surplus funds can be redistributed or used for community welfare. This approach promotes a sense of community and collective responsibility (Rosman et al., 2024).

Micro-Takaful often involves greater community engagement and education efforts to ensure participants understand the principles and benefits of the product. This engagement is essential for building trust and encouraging a sense of ownership among participants (Shamsudheen & Muneeza, 2024). Micro-Takaful products are designed to meet the specific needs of low-income populations, often incorporating features that reflect local customs and practices. This flexibility allows for tailored solutions that suit the target segments (Ahmad et al., 2022). Overall, Micro-Takaful places a strong emphasis on social impact and community welfare. The goal is not only to provide financial protection but also to enhance the overall well-being of participants and their communities (Shamsudheen & Muneeza, 2024). Micro-Takaful will aid in guaranteeing loan financiers and ensure that the spread of social responsibility is wide while limiting economic risks and eradicating poverty. Micro-Takaful objectives are to reduce poverty and help the needy (Ahmed MH, 2016). According to Ahmed (2016), Micro-Takaful focuses on the poor segment of the community to reduce their insurance costs. The increased demand for Islamic products helps the growth of Takaful. In developing nations, many impoverished individuals need more awareness regarding Micro-Takaful. Hashim and Abd Halim (2017) highlighted that lack of awareness and misunderstanding of Takaful are some of the issues that affect the growth of the Takaful industry, especially among developing countries.

World Bank and Islamic Development Bank Group Report on Islamic Finance in 2016 defined Micro-Takaful as Takaful accessed by the low-income market; as a result, Micro-Takaful is more than just a smaller version of standard Takaful; the product and processes must be entirely reengineered to fit the features and preferences of the low-income market, which includes farmers, and small traders. This means that Micro-Takaful must have distinct product features that align with the target market's

income and other variables. It also requires creative and cost-effective techniques to reach many people who need to work or have a bank account formally. As a means of extending existing social security plans, Micro-Takaful provides various comparative benefits. Micro-Takaful can reach groups not covered by traditional social insurance, particularly workers in the rural and informal economy. Micro-Takaful benefit packages can be built in close collaboration with the target demographic to ensure a better participation rate. One cause of concern for Micro-Takaful is that people with low incomes prefer informal Takaful schemes to formal ones since they are easier to join and less expensive (IDGB report,2016). The transaction costs required to reach these populations can be reduced because Micro-Takaful schemes can be run by local governments, social organizations, or nongovernmental organizations that are usually close to their target population; their staffs include social workers who are used to working with and are closer to targeted groups.

3.2.3 Models and Distribution Channels

To reach people experiencing poverty, Micro-Takaful can be implemented through new innovative distribution channels, such as a community-based model, a cooperative-based model, a Wakalah partner approach, or even a provider-driven model, and it covers family and health benefits as well as crop, livestock, and property damages (IDGB report,2016). These innovative distribution channels explained by the World Bank and Islamic Development Bank Group Report on Islamic Finance in 2016. First, the full-service model where regulated Takaful operators reduce the scope of their Takaful services and charge a premium that people experiencing poverty can pay. Islamic microfinance organizations might act as insurers to preserve their loan portfolios by providing basic credit life Takaful. Second, the partnership model involves Takaful operators collaborate with Islamic microfinance institutions and others to provide Micro-Takaful products to low-income consumers. Third, the provider model in which prepaid, or risk pooling coverage is created by providers, such as hospitals, clinics, or dairy cooperatives, for those who utilize their facilities or services. Fourth, the social protection models where national governments ensure coverage for specific risks, such as health care, agriculture, and livestock, as well as covariant risks, through social Takaful schemes. Finally, the community-based model builds on local

communities organizing groups that capitalize and manage a risk pool for their members.

Micro-Takaful can play a significant role in promoting financial inclusion. Financial institutions are increasingly advocating the usage of Insurance or Takaful as a credit guarantee. This is especially essential in developing nations since the poor have limited liquidity and the ability to commit various sorts of assurances that may be acceptable under formal banking rules ("Global Report on Islamic Finance 2016: A Catalyst for Shared Prosperity", 2016). Micro-Takaful is a socially responsible tool that attempts to decrease poverty, assist the disadvantaged, and assist the underserved people by promoting financial inclusion and behaviours such as risk and asset pooling within villages or communities. Micro-Takaful can be implemented using a community-based model, a cooperative-based approach, a wakalah partner model, or even a provider-driven one (IDGB report,2016). Participants in a micro-level Health Takaful scheme can minimize their out-of-pocket expenses while increasing their utilization of health care services (Panda et al., 2016).

As a means of extending existing social security plans, Micro-Takaful provides various comparative benefits. Micro-Takaful can reach groups not covered by statutory social Takaful, particularly workers in the rural and informal economy. Because Micro-Takaful schemes can be operated by local governmental or social organizations or nongovernmental organizations that are usually in the vicinity of their target population, their staffs include social workers who are used to working with and are closer to targeted groups, the transaction costs required to reach these populations can be reduced. Micro-Takaful benefit packages can be built in close collaboration with the target demographic to ensure a better participation rate. One source of worry for Micro-Takaful is that people with low incomes prefer informal Takaful schemes to formal ones since they are easier to join and less expensive. Furthermore, while membership can be boosted through choices such as subsidies and coupons, given the cost, comprehensive inclusion will not be achievable for all ("Global Report on Islamic Finance 2016: A Catalyst for Shared Prosperity", 2016).

The Lebanon Agricultural Mutual Fund developed the first Micro-Takaful plan in 1997. It provides Health Takaful and pays costs not covered by the Government Social Security Fund, which typically covers 85 percent of hospital fees. More than

5,000 households are covered by the fund (23,000 beneficiaries). Each family pays a monthly fee of $10. Local villagers or other policyholders sponsor those who cannot afford the premiums (Brugnoni, 2013 cited by Global Report on Islamic Finance 2016: A Catalyst for Shared Prosperity, 2016). Micro-Takaful can be an effective tool for mitigating financial risk for people with low incomes by preserving and assuring the productive use of their savings and credit facilities, as well as minimizing their vulnerability to the impact of disease, theft, disability, and other risks ("Global Report on Islamic Finance 2016: A Catalyst for Shared Prosperity", 2016).

The impoverished require the ability to adapt to the outcomes of a shock in the absence of significant resources and other risk-reduction components. The anticipated risk occasions make it more difficult for people with low incomes to grow savings and the means to adjust to such occasions. Low-income people are powerless against numerous hazards because they live in dangerous environments. Low-income people are more defenceless against risks than the rest since they are the least prepared to adjust when an emergency occurs. Because of their apprehension about the possible effects of risk, low-income people have a low take-up rate on income-generating opportunities that could alleviate poverty. Low-income family units struggle to generate an average and meaningful income and are utterly powerless in the face of financial, political, and physical downturns. Low-income family units with no financial assets or resources are likely to slip into extreme poverty if they are caught up in numerous risks. Low-income people should be protected from such a possibility and must have access to appropriate Takaful. Because premiums are prohibitively expensive, low-income people are typically overlooked or inadequately overhauled by the Takaful market and social Takaful systems. In this way, providing help as Takaful is considerably superior to providing social Takaful to people experiencing poverty. That is to ensure that expanding access to the Takaful market encourages people living in poverty to better their jobs and rise out of poverty.

Ahmed MH (2016) argued that Micro-Takaful should be the stepping-stone for development in developing countries because it provides the ability to finance and support victims and micro enterprises, mainly in the agricultural industry. Also, it plays an essential role in fighting poverty in developing countries. In developing countries, there is a need for more awareness among many poor people about the nature of Micro-Takaful or even its existence. Ahmed MH (2016) also argued that two factors affect the

growth of Micro-Takaful in developing countries: insufficient awareness of its importance and nature and the absence of accurate data. Ahmed MH (2016) argued that in developing countries, there is a strong positive correlation between Micro-Takaful and microfinance on the one hand and economic growth on the other.

3.3 DIFFERENCE BETWEEN MICRO-TAKAFUL AND TAKAFUL

Table (1.1) below shows some differences between Takaful and Micro-Takaful (Ahmed MH, 2016; Haroun & Yusoff, 2019).

Table 3.1. Difference Between Micro -Takaful and Takaful

Criteria	Micro-Takaful	Takaful
Target Market	Poor People Limited Takaful awareness or knowledge	Members are from middle and high-income households and business entities. The market is mainly aware of Takaful benefits.
Risk covered	Not for specific risk	Usually, high-risk is excluded.
Distribution	Microfinance institutions, rural banks, mosques; no brokers	Sold through convenient and well-trusted delivery channels
Product Design	Simple product design with easy-to-understand features. Community of group pricing and limited actuarial data	Multiple coverage and features Risk-based pricing driven by multiple considerations and good data quality
Affordability	In most cases, they need subsidies from the government, charity organizations, or Takaful companies (Corporate Social Responsibility) and can benefit from Zakat.	Contributions are paid by participants (individual or business entity)

3.4 MICRO-TAKAFUL MODELS

Micro-Takaful operates through various models that align with Islamic principles while addressing the unique needs of underserved populations. IFSB and IAIS (2015) defined the Micro-Takaful models: the Wakalah Model, the Wakalah-Mudarabah Model, the Wakalah-Waqf Model, and the cooperative model.

3.4.1 Wakalah Model

Under a Wakalah model, The Micro-Takaful provider and the participants create a principal-agent relationship in the Wakalah paradigm, in which the Micro-Takaful provider works solely as a Wakil (agent) on behalf of the participants to manage the risks and investments of the contributions. The Micro-Takaful provider gets a management charge, known as a Wakalah fee, in exchange for the service provided as Wakil. Generally, the Wakalah fee is a proportion of the contributions received. The Wakalah charge must be agreed upon in advance and specified explicitly in the Micro-Takaful contract. The Wakalah charge is designed to cover the whole amount of management expenditures and a margin of operating profit for the Micro-Takaful provider. In this regard, a Micro-Takaful provider will be profitable if the Wakalah charge exceeds its administration expenditures. It is not directly participating in the Micro-Takaful Risk Fund's or any of its investment profits or deficits. Furthermore, the Wakalah model may allow the Micro-Takaful supplier to receive Wakalah in the form of a performance-related charge as part of its payment. A performance-related fee is generally linked to the Micro-Takaful Risk Fund's underwriting outcome, as the Micro-Takaful contract stipulates. After the amount of the Wakalah charge, including any performance-related element, and after crediting any investment income, the underwriting result in the Micro-Takaful Risk Fund is accountable to the members jointly.

3.4.2 Wakalah-Mudarabah Model

In a Wakalah–Mudarabah model, the Micro-Takaful provider serves as both a Wakil and a Mudarib (entrepreneur) to the participants, generally as a Wakil to manage the Micro-Takaful Risk Fund's underwriting operations and as a Mudarib to handle the

Micro-Takaful Risk Fund's investment activities, however, the Micro-Takaful contract will specify the specific connection and basis of compensation for these services. The Micro-Takaful provider is paid a Wakalah fee, which is generally a proportion of the contributions paid, as mentioned above. A performance fee may also be paid based on the underwriting outcome (if the contract allows it). A set percentage portion of the investment earnings is also paid to the Micro-Takaful supplier. Some regulatory and supervisory authorities allow the Mudarabah part of the concept to be extended to include the underwriting outcomes of Micro-Takaful activities. The residual in the Micro-Takaful Risk Fund after payment of all contractual obligations, including profit shares owed to the Micro-Takaful provider, is attributable to the participants collectively, much like the Wakalah model.

3.4.3 Wakalah-Waqf Model

In a Wakalah–Waqf model, the Micro-Takaful provider's owners and perhaps Micro-Takaful participants contribute start money to the Waqf Micro-Takaful Risk Fund's formation. In addition to serving as a Waqif (trustee) for the Waqf Micro-Takaful Risk Fund, the Micro-Takaful provider also serves as a Wakil, overseeing the underwriting process. Wakalah fees must be agreed upon in advance and specified explicitly in the Micro-Takaful contract. The Waqf fund is responsible for the surplus in the Micro-Takaful Risk Fund once all contractual commitments have been met, including profit shares payable to the Micro-Takaful Risk Fund.

3.4.4 Cooperative Model

In a cooperative model, the Micro-Takaful provider's owners and participants form a cooperative Micro-Takaful Risk Fund, which pays for all administration and acquisition costs. However, there is a distinction between the Saudi and Sudanese cooperative models. The Micro-Takaful provider in the Saudi model implements the Wakalah contract to its Takaful system, entitling it to a Wakalah charge. It also receives a portion of the underwriting excess from the Micro-Takaful Risk Fund, a cooperative. The Sudan cooperative model, on the other hand, does not enable any excess to be shared between the Micro-Takaful supplier and the participants; instead, the surplus belongs entirely to

the participants. Furthermore, the Sudan model uses the Mudarabah contract for its Takaful operation; as a result, being a Mudarib is compensated by a set portion of investment revenue. Another distinguishing characteristic of this approach is that the participants designate their representatives to the board of directors.

Although the three Micro-Takaful models wakalah, mudarabah, and the cooperative model provide useful conceptual foundations, their relevance varies depending on the institutional, economic, and cultural characteristics of each country. In the case of Sudan, the cooperative model is particularly significant because it aligns closely with existing community-based support systems and the long-standing tradition of mutual financial assistance. Given the country's limited institutional capacity, high informality in employment, and strong reliance on social solidarity networks, a cooperative structure offers a practical and culturally acceptable entry point for expanding Health Micro-Takaful. By grounding the discussion in Sudan's context, this study highlights the importance of selecting an operational model that can realistically function under prevailing regulatory, economic, and social conditions.

3.5 MICRO-TAKAFUL AROUND THE WORLD

Micro-Takaful focuses on both the needy side and the business side. On one hand, it aims to provide financial protection to low-income individuals and families, helping them cope with risks such as illness, disability, or natural disasters, and relies on money and accomplishment on aides like gifts, Zakat, and interacted through non-profit organizations (Haroun & Yusoff, 2019). On the other hand, it also represents a business opportunity for Takaful operators to tap into underserved markets and promote financial inclusion (M. H. Ahmed, 2016; cited by Haroun & Yusoff, 2019).

Haroun and Yusoff (2019) reviewed some of the global establishments of Micro-Takaful applications. In Malaysia, Bank Rakyat collaborated with Etiqa Takaful to offer three Takaful products; Takaful Murni, which provides financial rewards in the event of a mishap; Takaful Didik, which ensures children's education in the future; and Takaful Amanah, which offers family protection. In Bangladesh, Prime Islamic Life provides group Micro-Takaful, combining memorial service fees with a monthly income of $7–$14 for a one-year term, a shift from its earlier individual products. In

Sudan, Shiekan Insurance and Reinsurance offer a range of Micro-Takaful products, including household credit insurance, family Takaful, material harm, domesticated animals, fire and theft, and agriculture. In Indonesia, PT Ansuransi Allianz introduced the "AlliSya Credit Life" program, which ensures indebted persons who pawned gold from partner banks receive a guarantee for four months based on their residency. Additionally, Ansuransi Takaful Keluarga launched Takaful Micro Sakinah in collaboration with the Takmin Working Group and Shari'ah micro-fund groups, offering Shari'ah-compliant credit insurance to relieve consumers of their financial obligations in the event of death. PT Ansuransi Takaful Keluarga also partnered with the National Alm Board to create a Micro-Takaful plan for Alm beneficiaries, providing members with an income of $5 to $530 in case of natural death.

3.6 MICRO-TAKAFUL SUCCESSFUL APPLICATIONS

Micro-Takaful has seen various implementations across the globe, each tailored to meet local needs and contexts. While there have been notable success stories, challenges persist in its implementation. Examples of these successful stories are Malaysia, Indonesia, and Bangladesh. For instance, Malaysia stands out for its well-established regulatory framework and leadership in Islamic finance, providing a model for how Takaful can be effectively structured and scaled (BNM, 2016). Indonesia, with its strong community-based Micro-Takaful initiatives, demonstrates how public involvement can enhance accessibility and trust among low-income populations (Rapi & Kassim, 2023), an approach that could be highly relevant to Sudan's economic landscape Meanwhile, Bangladesh has successfully integrated Islamic microfinance with Takaful, particularly through institutions like BRAC and Grameen, showing how Micro-Takaful can be linked to financial inclusion efforts (Muhammad et al., 2023). These countries also share cultural and religious contexts like Sudan's. By learning from their experiences, Sudan can explore practical ways to navigate regulatory challenges, increase awareness, and design an inclusive Micro-Takaful framework that aligns with local needs. This section will explore these key success stories, challenges, and lessons learned from global Micro-Takaful practices, along with how different countries have adapted Micro-Takaful to their local environments.

3.6.1 Micro-Takaful in Malaysia

Malaysia has been a pioneer in developing Micro-Takaful products tailored for low-income groups. The government, through Bank Negara Malaysia, has encouraged Takaful operators to offer affordable Micro-Takaful schemes that provide coverage for health, life, and property. Programs like the "Takaful for the Poor" initiative have successfully increased awareness and participation among low-income households, demonstrating the effectiveness of government support in promoting Micro-Takaful (Ghani et al., 2021).

The Department of Statistics in Malaysia (DOSM,2019) classified the Malaysian population based on income into three main groups: the Top 20% (T20) group, the Middle 40% (M40) group, and the Bottom 40% (B40) group. The B40 group of individuals is significantly affected by the persistent consequences of economic instability in the country's economy, leading to many unpredictable outcomes. As a result, these low-income individuals are compelled to mitigate and safeguard themselves against these risks actively. The B40 category comprises households whose yearly family income in 2019 was below RM3,855 (Ishak, 2020 cited by Ravi & Redzuan, 2022). B40 is alternatively called B1, B2, B3, and B4. This categorization facilitates more focused strategizing, monitoring, and provision of services to mitigate inequities in household income (DOSM, 2021). Furthermore, the B40 population exhibits low levels of wealth and nonfinancial asset ownership, rendering them vulnerable to economic shocks and heavily dependent on government assistance to enhance their circumstances (UNDP, 2020). Given the vulnerability of the B40 group to several dangers, it is imperative to have financial instruments to support this population.

Several Micro-Takaful products, such as MySalam and Tenang Protection, have been introduced in Malaysia to provide support to low-income citizens (Rapi et al., 2022; Mukshar et al.,2023). For instance, MySalam program is offered by the Malaysian government and is intended for eligible persons to receive the government's provisions with a fee between RM50 and RM700 Charged to cover the cost. Similarly, the Tenang Protection Program offered by Bank Negara Malaysia. On November 24, 2017, Bank Negara Malaysia introduced the Tenang Protection product to expand the role of insurance or Takaful in supporting the B40 group (Sabri et al. ,2021). The

monthly contributions or payments are reasonably priced and set by the bank as a monthly premium rate limit ranging from RM15 to RM50, determined by the customer's desired contribution or financial capacity when obtaining insurance or Takaful coverage. This would significantly reduce the cost of owning a protection plan for the customer. Nevertheless, determining the premium rate requires a comprehensive assessment of multiple parameters, such as income, job status, household size, emergency savings, and social security. In addition, the Asnaf Takaful program is offered by the Federal Territory Islamic Religious Council. This program is aimed at people from the entitled zakat groups (asnaf) who get monetary aid monthly from the Federal Territory Islamic Religious Council. The purpose of the program is to lift the monetary troubles of the asnaf group who face difficulty, because of accidents or deaths and the fees paid to join this program are as little as RM100. Furthermore, the Micro-Takaful (FWD Kasih) program is offered by FWD Takaful Limited Company (Syarikat FWD Takaful Berhad) for low-income households. This plan offers a reasonably priced and suitable protection plan, with a monthly fee as low as RM 2.03 for women and RM 2.54 for males. The benefits offered include death benefits, disability, burial cost, Pilgrimage (Hajj)expenses for Muslims, charity contributions for non-Muslims, and accidental death. Finally, Takaful Etiqa Keluarga Berhad offers the Prisma Etiqa program. This package provides family Takaful coverage with monthly payments starting from RM50. The benefits include coverage for death and total or permanent disability (Takaful Prisma, 2021; Mustafa et al., 2019 cited by Rapi et al.,2022).

3.6.2 Indonesia's Community-Based Micro-Takaful

In Indonesia, community-based Micro-Takaful schemes have been implemented to provide coverage for agricultural risks. These schemes are designed to be affordable and accessible, allowing farmers to protect their livelihoods against crop failures due to natural disasters. The integration of local community leaders in promoting these products has led to increased trust and participation among rural populations (Maf'ula & Mi'raj, 2022).

3.6.3 Bangladesh's Health Micro-Takaful

Bangladesh has introduced Health Micro-Takaful products that cater specifically to low-income families. These products provide coverage for medical expenses, which is crucial in a country where healthcare costs can be prohibitively high for the poor. The success of these schemes has been attributed to their affordability and the emphasis on community engagement in their design and implementation (Maf'ula & Mi'raj, 2022).

A comparison of international Micro-Takaful experiences also reveals that different countries succeed through varied pathways. For example, Malaysia's expansion of Micro-Takaful has been driven largely by strong regulatory support and strategic public–private partnerships, which facilitated innovation in product design and distribution. In contrast, Indonesia's progress has been more community-driven, relying on local cooperatives and grassroots organizations to build participation. These variations suggest that Micro-Takaful performance is shaped not only by product features but also by the broader socio-political environment. Understanding such distinctions is essential for Sudan, where issues of institutional capacity, political instability, and financial distrust must be considered when adapting external models.

3.7 MICRO-TAKAFUL: CHALLENGES IN IMPLEMENTATION

3.7.1 Regulatory Barriers

One of the significant challenges faced by Micro-Takaful providers globally is the lack of a supportive regulatory framework. In many countries, existing insurance regulations do not accommodate the unique features of Micro-Takaful, such as risk-sharing and community-based models. This regulatory gap can hinder the growth and sustainability of Micro-Takaful (Maf'ula & Mi'raj, 2022). The establishment of supportive regulatory frameworks is essential for the growth of Micro-Takaful. Policymakers should consider the unique characteristics of Micro-Takaful when developing regulations to facilitate its implementation (Maf'ula & Mi'raj, 2022).

3.7.2 Limited Awareness and Understanding

One of the primary challenges facing Micro-Takaful globally is the lack of awareness and understanding among potential beneficiaries (Haroun & Yusoff, 2024; Abd Aziz & Zainal, 2013). Research indicates that low-income individuals often have limited knowledge about Takaful products, which hinders their participation in Micro-Takaful schemes (Jahya et al., 2023). For instance, in Malaysia, despite the growth of the Takaful sector, only 25% of adult employees in the low-income group have some form of life Takaful or family Takaful cover, highlighting a significant gap in awareness and accessibility (Jahya et al., 2023). This gap is not only in Malaysia, but similar trends can also be observed in other countries where Micro-Takaful is being introduced, indicating a need for targeted educational initiatives to enhance understanding and acceptance of these products (Fauzi & Laldin, 2022).

Despite the success stories, there remains a widespread lack of awareness and understanding of Micro-Takaful among potential participants. Many individuals are unfamiliar with the concept of Takaful and how it differs from conventional insurance. This lack of knowledge can lead to doubts and reluctance to engage with Micro-Takaful products (Qazi, 2024). One of the key lessons learned from previous studies is the necessity of education and awareness campaigns to enhance understanding and acceptance of Micro-Takaful. Informative initiatives that explain the benefits and workings of Micro-Takaful can significantly increase participation rates (Qazi, 2024). Understanding public perceptions is critical for promoting Micro-Takaful as it directly influences the willingness of individuals to participate in these financial products (Nasir et al., 2023).

3.7.3 Financial Literacy

Low levels of financial literacy among target populations can pose significant barriers to the uptake of Micro-Takaful. Many potential clients may struggle to understand the terms and conditions of Micro-Takaful policies, making it difficult for them to make informed decisions (Ghani et al., 2021). Educational initiatives are essential to enhance understanding and encourage participation. Micro-Takaful products must be flexible and adaptable to meet the changing needs of participants. Continuous feedback from

clients and stakeholders can help providers refine their offerings and ensure they remain relevant (Maf'ula & Mi'raj, 2022).

3.7.4 Sustainability Concerns

The sustainability of Micro-Takaful funds is another critical challenge. There is a risk that the funds collected from participants may not be sufficient to cover claims, particularly if the risk pool is small or if there are unexpected large-scale claims. Providers must carefully assess the risks involved and implement sound financial management practices to ensure sustainability (Maf'ula & Mi'raj, 2022). Community engagement and involvement are critical for the success of Micro-Takaful initiatives. Providers should prioritize building relationships with local communities and leveraging existing social structures to enhance trust and participation (Maf'ula & Mi'raj, 2022).

Furthermore, Micro-Takaful products must be flexible and adaptable to meet the changing needs of participants. Continuous feedback from clients and stakeholders can help providers refine their offerings and ensure they remain relevant (Maf'ula & Mi'raj, 2022). In some countries, Micro-Takaful has been integrated with other social programs, such as zakat (charitable giving) and waqf (endowments). This integration can enhance the overall impact of Micro-Takaful by providing additional resources and support for participants, thereby addressing broader social welfare objectives (Maf'ula & Mi'raj, 2022).

3.8 TRAITS OF MICRO-TAKAFUL

The table below illustrates Micro-Takaful main features:

Table 3.2. Micro-Takaful main features

Elements	Features
Simplicity	The products are presented and provided with clarity that is readily comprehensible to the intended demographic. The product's characteristics are inherently clear and understandable, requiring minimum guidance or assistance from intermediaries. The benefits, terms, and conditions are presented clearly and concisely, with limited exclusions and restrictions. The level of financial literacy within the target demographic is considered when developing disclosures, marketing materials, and language usage.
Accessibility and Affordability	The distribution channel exhibits accessibility and approachability towards the target demographic. The product's features and procedures are tailored to align with the specific circumstances of the target group. The policy owner/Takaful participant can carry out various activities, such as Takaful /premium contribution income, Takaful/ policy certificate renewal, inquiries, and claims.
Efficiency	All procedures are efficient and punctual, specifically emphasizing reducing the time required to process income claims. The simplification, streamlining, and automation of back-office administration processes are prioritized to the greatest extent feasible.

Source: (Haroun &Yusoff,2019; Rapi et al., 2022)

This study builds on these concepts to explore the adoption of Health Micro-Takaful in Sudan, focusing on perceptions, opportunities, and challenges within the socio-cultural and economic context of the country.

3.9 TAKAFUL SECTOR IN SUDAN

Sudan's Takaful system was established in 1979. When Faisal Islamic Bank founded the first Takaful Company in the world in 1979, Sudan officially began practicing Takaful. The system was born when the Faisal Islamic Bank in Sudan struggled to ensure its operations and assets. The bank was not allowed to use the commercial insurance companies available on the Sudanese market at the time by the Shari'ah Supervisory Board. This was due to the commercial insurance companies' insurance systems needing to adhere to Shari'ah principles and regulations. The first Takaful company in the world was founded in 1978 by Faisal Islamic Bank (Sudan) and began operating in January 1979 (Abdalla, 2013; Khan et al., 2016; Yesuf,2017). The National Cooperative Islamic Insurance Company (now known as Taawuniya) was founded by the Islamic Cooperative Development Bank, followed by Al Baraka Insurance Company, founded by Al Baraka Bank in 1985, and El Salama Insurance Company, founded by the Sudanese Islamic Bank in 1992, were the ones that came next.

As is evident, Islamic banks play a significant role in the growth and promotion of the Takaful industry by funding the establishment of each of these businesses. The 1983-founded Shiekan Insurance and Re-insurance Company voluntarily changed its status to an Islamic insurance provider in 1990. According to Ministerial Decree No. 219 of 1992 issued by the Minister of Finance, all conventional insurance companies were mandated to convert into Islamic organizations. Similarly, in 1992, all other firms were legally obligated to transform.

In Sudan, the financial industry uses various financing methods, including Takaful. The Shari'ah-compliant insurance option with the longest track record remains Sudanese Takaful. There are currently 15 businesses in the Takaful industry, comprising nine general Takaful providers, four merged providers, and two re-Takaful providers. Despite the restrictions imposed on Sudan, the Takaful industry has performed successfully over the previous few years, from 2010 to 2013. High contributions and a profitable surplus are indicators of the Takaful industry's ongoing expansion. From an institutional standpoint, the Central Bank of Sudan (CBoS) and the Insurance Supervisory Authority (ISA) oversee the Takaful industry. The Takaful industry in Sudan expanded rapidly between 2011 and 2013, with contributions increasing by 21.7% CAGR to SDG 1,007 million by that year (Yesuf,2017).

By the end of 2013, the composite Takaful company comprising just four insurers accounted for 62% of Sudan's Takaful contributions. It still makes up a small percentage of the Takaful sector. By establishing the "Microfinance Unit" to enhance socio-economic banking, the CBOS pushed microfinance as part of the financial inclusion agenda (Yesuf,2017). The division has successfully given people from low-income backgrounds easier access to financial options. Since the CBoS launched the Islamic Microinsurance Pilot Project from 2008 to 2011 to protect against the risk of microcredit operations, Micro-Takaful has seen a steady expansion in Sudan since 2008, Takaful premiums from the project brought in a total of SDG 6.3 million (Yesuf,2017). The Insurance Supervisory Authority (ISA), which is directly under the Minister of Finance and National Economy, is responsible for overseeing and controlling the Takaful industry in Sudan (Yesuf,2017). The Controller of Insurance Act of 1960, which is still in effect and applies to all traditional and Takaful businesses, governed the Takaful sector in Sudan up until 1992. The 1992 Supervision and Control Statute, later repealed in 2001 after introducing the Insurance Control Act, replaced this act (Yesuf,2017).

All these adjustments were made to consider the changes affecting Sudan's overall economy, including the Islamic insurance sector, which has been subject to Islamic Shari'ah's rules and regulations since 1992. The Takaful and life Takaful Act of 2003 was introduced to define the scope, topic, and parties of Takaful and life Takaful contracts and provide a court reference (Yesuf,2017). It is important to note that in Sudan, life insurance is referred to by the term Takaful, which contrasts general insurance (Yesuf,2017; Sulieman, 2013).

In this study, the word Takaful is used to refer to Islamic insurance as defined by AAOIFI. According to AAOIFI (2018), Takaful is defined as a contractual arrangement among a collective of individuals to collectively manage the financial consequences of specific risks that may affect all of them. Once initiated, the process involves making donations, which subsequently leads to establishing a Takaful fund that is legally distinct and has its financial obligations. The funds from this fund are utilized to compensate any participant who experiences harm, contingent upon a specific set of regulations and a prescribed documentation procedure. The fund is overseen by either a designated cohort of policyholders or a corporate entity that

oversees the Takaful activities and strategically allocates the fund's assets in exchange for a specified fee.

3.9.1 Health Takaful in Sudan

Sudan established social health insurance in 1995 with the passage of the National Insurance Corporation Act of 1994 (Public Health Institute 2016) (Yesuf,2017). Initially under the jurisdiction of the Ministry of Health, then it was transferred to the Ministry of Welfare and Social Security following a change in the law in 2001. The statute was changed again in 2004 (Yesuf,2017). The government began to include impoverished and vulnerable families in 2008 as a component of the Social Initiative Program, which was funded by Zakat and targeted impoverished households, but it was not until 2016 that the Health Insurance Act mandated that every Sudanese be covered by Health Takaful or have access to health care services (Bilo et al.,2020).

With the passage of the National Insurance Corporation Act, many new Takaful programs were introduced, including national health insurance, police services, health Takaful, and armed forces Health Takaful. The National Health Insurance Fund (NHIF) is based in Khartoum. Each state has a state Health Takaful fund and a local office. The NHIF is Sudan's primary Health Takaful provider, with non-contributory and contributory branches. Membership became mandatory for both government and private-sector employees in 1996. Membership in the fund is mandatory for the formal sector but voluntary for the informal sector and small businesses (fewer than ten employees) (Yesuf,2017). On the other hand, the latter is free to leave and enrol in private Health Takaful plans after negotiating and paying a lower contribution as a punishment.

The National Health Insurance Fund covers many population segments, including the formal sector and students. The Takaful family is the scheme's coverage unit, including the subscriber, his parents, his wife, and any children under 18 who are designated NHIF strengthens. One of the NHIF's weaknesses is a need for more coverage for medical services in rural areas and areas with precarious security and health conditions. Also, one of the NHIF concerns is the existence of a health delivery system that could be more efficiently distributed to support the growth in coverage

(Yesuf,2017). Finally, the scheme's uptake remains low, which is viewed as a danger, and therefore, the attainment of universal access to health care is viewed with doubt (Babiker et al.,2021). The NHIF's shortcomings include a need for more coverage of the informal and private sectors. The lack of clear restrictions for immigrants, nomads, and refugees is viewed as an adverse element affecting the NHIF (Yesuf,2017). Being a member incentivizes the insured to use services. However, the fund's financial situation is serious due to the tiny pool, low premium level, and big non-costed benefit package.

The development of private Health Takaful started when Sheikan for Insurance and Re-insurance was founded in 2002 as Sudan's first private Health Takaful firm (Yesuf,2017). Private Takaful providers' services are governed by a set of rules that include group Takaful and family Takaful. Group Takaful covers affiliates of public and private institutions, professional associations, companies, unions, and organizations. In contrast, family Takaful covers the husband, wife, and their children and parents, with the condition that the husband or wife's age on the contract date does not exceed 65 years. Clients with this type of Takaful receive both a basic and a selective package. However, the coverage does not include cold/elective surgical operations and medicines for inpatients due to chronic diseases during the first ten months (waiting time) (FMOH report,2014).

However, one of the difficulties that the NHIF has is the provision of the pharmaceuticals on the list. The Joint Committee identified the following as the primary reasons for the poor provision rate in direct pharmacies: the failure of Sudanese industry to supply the agreed-upon quantities; the implementation of measures that prohibited imports of manufactured products like those produced domestically; and the slow response of some pharmaceutical companies to the Committee's request for direct offers and prices it deems appropriate (FMOH report,2014). Some of the significant challenges identified by the NHIF (2019a, 52) include the need to maintain financial stability in light of the continuous rise in medical service and drug prices, as well as the stability of the value of contributions for different categories, accelerating coverage in densely populated states; completing coverage of farmers, the private sector, and self-financing government institutions; identifying low-income families; and covering foreigners, and organizations that receive direct NHIF funding for health care services;

the provision of pharmaceuticals by the Health Takaful list in all states and health institutions; and the implementation of a single plan for complete health care coverage in all states, as well as the monitoring of implementation (Bilo et al.,2020).

The National Pension and Social Insurance Fund (NPSIF) was established by the Social Insurance and Pensions Law of 2016 to provide pensions and social insurance to the government, and private and public sectors. The former includes all government personnel paid by the Ministry of Finance and National Economy, while the latter includes all private and public firms. Previously, these two sectors were served by two independent funds: the National Pension Fund for the government sector and the Social Insurance Fund for both the public and private sectors. The Government Pension Law established the National Pension Fund in 1904 during the colonial period. The pension plans of the army, police, and security forces are separate from those of civil servants (World Bank and Ministry of Finance and Economic Planning, 2016).

The government enacted the Social Insurance Law in 1975 to balance the public and private sectors. Since the establishment of the two funds, several legislations have been performed. The 2016 law, on the other hand, repealed all earlier legislation and established a single fund. The two funds were formally united in September 2019, although the financial merger continues. The National Pension and Insurance Fund's (NPSIF) strategic goal is to develop an effective social security system and provide comprehensive social protection. In addition to cash for pensions, it provides Takaful coverage in cases of old age, job accident, and death, and social support to retirees to combat poverty through microfinance, loans, and other support projects in the fields of trade, agriculture, and livestock, among others (NPSIF 2019a). These benefits are in addition to the Takaful coverage introduced by the 2016 legislation. According to the Pensions and Social Insurance Law of 2016, Takaful is required for all employees in the public and private sectors, as well as in the government sector. Professionals and craftspeople are also protected.

Sudanese nationals working abroad may be covered voluntarily, whereas foreign workers are subject to the provisions of international, regional, and bilateral agreements. Foreigners employed on diplomatic or international missions, agricultural labourers (excluding those engaged in agricultural machine maintenance and agriculture-related manufacturing plants), household workers, family labourers, and

traineeships (except for more than three months) are not eligible for the program. According to the Pensions and Social Insurance Law of 2016, insured persons who are subject to a permanent disability of 15% or more because of a work-related injury, old age pensions who are 65 years of age (or the retirement age stated in the person's contract) or 50 years of age in case of early retirement, or at least 20 years of contributions are eligible for the Takaful (Bilo et al.,2020).

Health insurance (HI) is a social solidarity system that allows various sectors of society to receive health treatments without financial obstacles. It is a technique of health financing in which an organization provides the necessary funds to cover the entire or a portion of a person's health expenses and thereby replaces the user fees imposed. Sudan's present healthcare system was launched in 1995, and by the end of June 2017, it had reached a coverage rate of 53.8 percent of the total population (Habbani et al.,2020). Community awareness of HI and understanding how to enrol, the service package, and the HI premium are critical characteristics that promote HI coverage expansion in each community. As a result, perceptions of the need for and value of HI may influence HI coverage (Habbani et al.,2020).

With an estimated population of 43,660,260 in 2020, Sudan has a healthcare system primarily funded through out-of-pocket payments (OOP). This situation, in which 46.5 percent of the population lives below the poverty line, as reported by WHO in 2020, impedes the overall accessibility of a significant percentage of the population to health services and impoverishes others.

3.9.2 Challenges Facing Health Takaful in Sudan

Islamic insurance sector (Takaful) in Sudan faces challenges, particularly in the scope of Health Takaful. Despite the existence of both social and private Health Takaful schemes, the country struggles to achieve universal coverage (Haroun & Yusoff,2024), this is due to many obstacles including the high cost of healthcare, economic inflation, and the low affordability of premiums for many individuals, particularly those in the informal sector and among low-income populations (World Bank, 2024; Salim & Hamed, 2018; Yesuf,2017).

3.9.2.1 Accessibility

Sudan implemented Social Health Insurance (SHI) in 1997 to overcome the issue of accessibility. SHI achieved 71.5 percent coverage in Khartoum State (966,728 families out of 1,351,514 families) and 50.7 percent overall coverage in the remaining states (16,012,805 out of 31,583 869 individuals) in 2017 (Salim & Hamed,2018). Other Health Takaful plans, such as police, military, and para-statal organizations, cover approximately 5.5 percent of the population. Zakat and the Ministry of Finance pay premiums for low-income people (about 350,000 households) yearly. However, a significant gap exists because an estimated 2,300,000 poor people still need to be covered (Salim & Hamed,2018).

3.9.2.2 Sustainability

The most significant difficulty for governmental Social Health Insurance is financing because the contribution made by the beneficiaries is low, and most of the funding comes from the Ministry of Finance or the Ministry of Health, which may influence sustainability (Salim & Hamed,2018).

3.9.2.3 Economy and Inflation

The execution of the Comprehensive Peace Agreement in 2011 made the formation of The Republic of South Sudan possible. This agreement led to the change of the states previously known as Southern Sudan states. Sudan lost 75 percent of its oil resources and nearly half of its revenue because of the separation. As a result of the removal of oil earnings, the Sudanese economy incurred losses, and the annual percentage of GDP growth rate fell from 7.8 percent in 2008 to 3.1 percent in 2014. Sudan possesses abundant natural and human resources, although its economic and social progress has yet to meet anticipated levels.

Similarly, health financing and spending data could be better and more complete. It makes it difficult for decision-makers to plan, distribute, and correctly see weaknesses. Regardless of external challenges such as brain drain, extended economic sanctions, and independence from South Sudan, which reduced economic support to

meet the goals, internal deficiencies in the healthcare system need to be improved (Ebrahim et al., 2017). According to the United Nations, Sudan is one of the world's least developed countries. The classification is based on three criteria: low per capita income, low human development, and high economic vulnerability. Sudan is likewise part of a group of countries with low human development. The country has seen protracted social unrest, civil war, and the loss of more than 80% of its oil fields because of South Sudan's separation in July 2011(Yesuf, A.J. 2017).

Other challenges that all types of Health Takaful face in Sudan include economic inflation, which raises the cost of services, resulting in financial losses for insurers, recruitment of the self-employed and informal sector, and the recent problem of medicines stock-outs in the country due to a lack of foreign currency required for medicine importation include the availability of medicines and the impact of inflation on insurers' resources. The enrolment contribution has stayed the same in the last five years despite a significant increase in cost due to inflation. The fundamental issue is economic insecurity (inflation). Typically, Takaful companies forecast a 10–20 percent increase in medicine prices each year and set their premiums accordingly. The past two years have seen a massive increase in medicine prices, significantly impacting Takaful providers' expenses and resulting in losses (Salim & Hamed, 2018).

Despite its historical role as a pioneer of Takaful, the Sudanese Takaful market continues to confront low penetration ratios and economic issues. Sudanese low-income levels, high inflation, and a lack of competent underwriting, among other issues, continue to plague the industry (African Development Bank, 2023). Sudan's fundamental infrastructure has deteriorated dramatically because of years of sanctions and government underinvestment. Sudan has experienced prolonged economic instability, including hyperinflation and currency devaluation, which negatively impact the affordability and attractiveness of Takaful products (African Development Bank, 2023). The economic environment makes it difficult for individuals and businesses to prioritize Takaful purchases. Sudan's economy is predominantly cash-based as inflation remains a significant challenge in 2020 (International Trade Administration, 2021).

3.9.2.4 Cost of Medical Services and Medicines Prices

Sudan's Takaful sector is small, and its primary challenge is financing. The Takaful concept has yet to be embedded in the Sudanese mentality. The primary concern is the high expense of medical services. The failure to accommodate a large section of the population under Health Takaful coverage happened because most of the people were unable to maintain the flat fee demanded for Takaful subscriptions due to the prevalence of high poverty, particularly in rural areas, where most people live in poverty, lack healthcare facilities, and do not have regular work (Ebaidalla & Ali, 2019). Sudan's population density is very low, with most communities dispersed far apart. The low population density discourages public and private providers from establishing healthcare centres in less populated areas, causing people to spend more on transportation to these centres.

Furthermore, the low population density prevents public and private providers from establishing healthcare centres in less populous areas, possibly contributing to rising medical care prices due to high transportation costs. Regions lacking adequate infrastructure are presently geographically cut off, leading to elevated prices of commodities and services, as well as restricted investment from prudent financiers (Yesuf, 2017; Ebaidalla & Ali, 2019; Salim & Hamed, 2018; Ali & Abdalla,2021). Slow progress in expanding Health Takaful coverage has many negative consequences for the population, including exposure to high health spending, limited access to health care services, and living with illnesses for an extended period (Ebaidalla & Ali, 2019).

The next section explores Community-Based Health Insurance (CBHI) in some African countries that share socio-economic similarities with Sudan. Looking at their experiences can offer valuable lessons on what might work and what challenges to expect when considering Health Micro-Takaful adoption in Sudan.

3.10 COMMUNITY-BASED HEALTH INSURANCE (CBHI)

Community-Based Health Insurance (CBHI) is a microinsurance scheme that serves as a financial mechanism, allowing households with limited income to effectively handle the economic uncertainties related to their healthcare needs and mitigate potential crises. Its foundations include open enrolment, a non-profit goal, a focus on local

leadership and administration, and the principles of joint solidarity (WHO,2020). CBHI programs refer to non-profit health insurance plans established and operated by volunteers within a local community. CBHI programs have three things in common: voluntary membership, community control, and not-for-profit prepayment plans (Umeh & Feeley, 2017).

Establishing a healthcare financing system that ensures universal health coverage (UHC) through justice in access to healthcare services and the protection of people's financial risk is the main objective of many nations (Hsiao & Yip,2023). While some countries have made modest progress in areas like maternity and child healthcare and service coverage for infectious diseases, further efforts are required to provide cost-effective and efficient essential healthcare services (World Health Organization and World Bank, 2021, cited by Hsiao and Yip,2023). More readily available funds are needed for prompt treatment in most developing nations (Roy & Sarkar,2018).

There are five main ways to pay for healthcare worldwide: general tax money, required social insurance, optional private insurance, out-of-pocket spending, and donor funding. There is much proof that private insurance and paying out-of-pocket cannot result in UHC (Hsiao & Yip,2023). In developing countries, Community-Based Health Insurance (CBHI) has become an achievable way to lessen the burden of out-of-pocket (OOP) expenses and enhance financial risk mitigation. Houses with catastrophic health expenditure defined as spending more than 40% of household consumption expenditures, excluding food, more than 25% of non-food consumption expenditures of households, or more than 10% of total household consumption expenditures on health are more likely to reside in countries with a high portion of out-of-pocket payments (Elmi et al.,2021).

According to the World Health Organization (WHO), the preservation of optimum health for all individuals is regarded as an essential human right and is considered a fundamental human right. With universal health coverage (UHC), everyone is protected against experiencing financial difficulties or the negative impacts related to the financial burden of getting essential healthcare services.

The World Health Report (2010) and the World Health Assembly convened in Geneva in 2005 emphasized the need for all nations to move more quickly toward

"Universal Health Coverage." Due to low-income levels, inaccurate identification of the target population, and a sizable informal sector, the tax-based finance system and Social Health Insurance schemes (SHIs) have proven insufficient in developing nations (Roy & Sarkar,2018). In recent years, about 10% of the people in these nations had health protection against an unexpected health catastrophe. High levels of poverty were caused by catastrophic medical expenses (Xu et al., 2003, cited by Roy and Sarkar,2018).

Community-Based Health Insurance plans (CBHIs) could give the poor access to medical protection. Many health-related costs are out-of-pocket and the main factor in poverty. Health insurance helps lower the barriers that prevent people experiencing poverty from accessing inexpensive care. Insurance payments can be easily collected through payroll deductions or taxation in nations with sizable formal economies. Large segments of the workforce in many developing nations are employed in the informal economy, which restricts the capacity to raise money through payroll deductions or taxes (Roy & Sarkar,2018). People who voluntarily enrol in Community-Based Health Insurance (CBHI) and frequently engage in the informal sector contribute resources. Thus, CBHI provides a substitute for health insurance in countries where only a tiny percentage of national income is taxed. In CBHIs, community members who are frequently connected by proximity to one another or by connections based on their employment, such as local trade unions, pool resources to share the financial risk of ill health (Roy & Sarkar,2018). Enrolling in CBHI creates a financial buffer between service prices and seasonal economic swings in communities, making it easier to separate payment from the time of health care usage.

One of the Sustainable Development Goals (SDGs) that all UN member nations have committed to achieving by 2030 is universal health coverage (UHC).

WHO estimates that 400 million people globally lack access to essential healthcare services and that every year, out-of-pocket (OOP) payments for healthcare cause 100 million people to fall into poverty and 150 million to experience financial hardship. It is imperative to undertake collaborative efforts to attain the objectives outlined in the Sustainable Development Goals (SDGs) for Universal Health Coverage (UHC) by 2030.

It has been projected that an additional 18 million health professionals will be required. However, efficient funding, management, and service delivery in the healthcare industry promote equity in access to care (WHO, 2016). Establishing a healthcare financing system that ensures universal health coverage (UHC) through equity in approach to healthcare services and financial risk protection for the populace is the main objective of many nations. In developing countries, Community-Based Health Insurance (CBHI) has become a viable solution to lower out-of-pocket (OOP) costs and enhance financial risk protections (Subedi L et al.,2018). Community-based Health Insurance (CBHI) programs are potential alternatives to a cost-sharing healthcare system that may improve the use of healthcare services, lessen the income shocks caused by illness, and finally result in fully functional and sustainable universal health coverage (Subedi L et al.,2018; Khuwaja et al.,2021). In low- and middle-income nations, (LMICs), particularly in areas with limited employer- or government-based health insurance options CBHI has become an economical alternative for out-of-pocket expenses (Fadlallah et al., 2018). The act of personally financing healthcare expenses leads to reduced frequency of service consumption and the potential for incurring overwhelming medical expenditures. Certain countries have adopted Community-Based Health Insurance (CBHI) initiatives, specifically targeting persons residing in rural regions or engaged in informal employment, to reduce direct payments and enhance healthcare accessibility.

Nevertheless, the issue of equitable access to healthcare services has yet to receive much attention within the context of Community-Based Health Insurance (CBHI) programs.

3.10.1 Challenges Facing Community-Based Health Insurance

Community-Based Health Insurance (CBHI) has attracted significant attention as a practical healthcare financing mechanism and a potential alternative to user charges in numerous low and middle-income nations. CBHI is a health insurance system created to solve the healthcare financial issues that the rural poor face (WHO,2020). It is based on voluntary participation, a non-profit goal, a link to a local hospital, risk sharing, and a mutual aid/solidarity ethic. As with conventional health insurance, the CBHI system covers preventive and curative treatment such as pre-and post-natal care, normal

delivery, child welfare services (immunization, nutritional care), family planning, health education services, and more (WHO,2020; Demeke, 2021). CBHI is intended to satisfy the health needs of people in the community, particularly those in the informal sector, by giving them the option of getting healthcare without paying at the time of service (Jude et al., 2018). Globally, Healthcare financing has become increasingly complex, especially in underdeveloped nations like Africa, where healthcare expenditures are rising (Mango, 2020).

For more than three decades, people in developing countries have been urged to plan, finance, organize, and administer healthcare services. Increasing African populations' access to health care is one of the most pressing concerns confronting Africa and the global community (Jude et al., 2018). Shaltynov et al. (2024), claim that empirical evidence shows that out-of-pocket health payment is the least efficient and inequitable method of funding health care, preventing individuals from getting medical care and potentially exacerbating poverty (Shaltynov et al., 2024).

According to a large amount of research, the most challenges with the CBHI scheme's implementation are trust issues, moral hazard, and administration costs (Muchabaiwa et al., 2019; Bifato,2020; Demeke,2021), the attractiveness of the benefits package, quality of care that is offered by the providers (referral services), the attractiveness benefit packages, provision of partial payment, reduced premiums, and home visits by the representative (Subedi L et al., 2018), low awareness and knowledge (Abdulganiyu et al., 2018; Yusuf et al., 2019; Bifato, 2020; Do et al., 2021), low enrolment rates (Bifato, 2020), difficult selection (Demeke, 2021; Muchabaiwa et al., 2019), poor quality of healthcare (Demeke, 2021; Bifato, 2020), and high drop-out rates (Sydavong & Goto, 2018), lack of government support or unclear policies (Shah et al., 2023), and cultural acceptance (Conde et al., 2022).

3.10.2 Community-Based Health Insurance Models

CBHI programs have gradually improved throughout the world. Different additions were made to the CBHIs' original working mode as time and demand changed (Demeke, 2021). According to the Basic Model, households in the program pay premiums to the CBHI fund. Healthcare providers receive payment from the plan for their services, and

in exchange, they provide healthcare to plan participants. The model underwent its first expansion (Extension 1) when non-members were permitted to utilize the services of the scheme's suppliers in exchange for user fees. This model suggested that the providers would have a better possibility of recovering costs through insurance payments and user fees from non-members. Following this, the government significantly entered the CBHI arena.

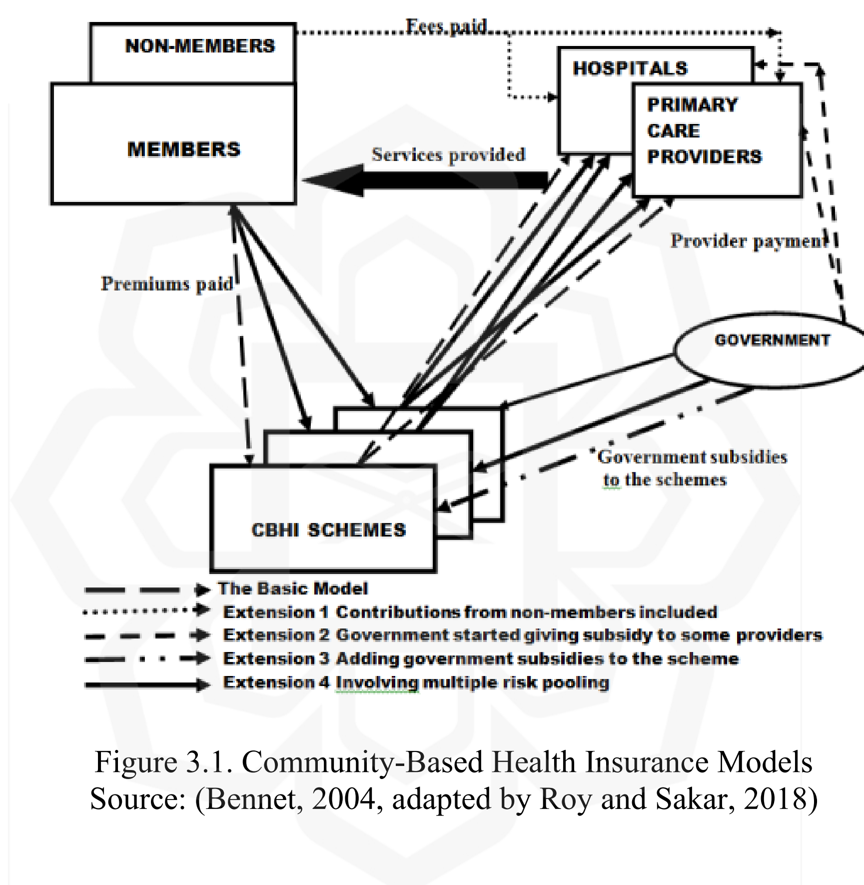

Figure 3.1. Community-Based Health Insurance Models
Source: (Bennet, 2004, adapted by Roy and Sakar, 2018)

To preserve the viability of the CBHI program, the government provided subsidies to numerous commercial manufacturers in many sub-Saharan countries and most developing nations' public facilities (Extension 2). Extension 3 of the model is the third extension. The government matched the household premium payments made to the CBHI program in this arrangement. CBHI funds are occasionally increased by outside donor help. This award is not depicted in the graphics because it was mostly a one-time gift. The basic model's fourth and final extension (Extension 4) demonstrates the case in which several risk pooling programs exist in the same nation. Multiple risk pools are depicted in the diagram by various CBHI schemes, but these risk pools may

also include government-financed or social health insurance (SHI) programs offered by employers. These models are illustrated in Figure 3.1.

3.11 MAIN MODELS OF COMMUNITY-BASED HEALTH INSURANCE (CBHI) IN AFRICA

Community-Based Health Insurance (CBHI) has emerged as a viable solution for improving access to healthcare in many African countries, particularly for low-income populations. The main models of CBHI in Africa include first, the Mutual Health Organizations (MHOs), these are community-based groups that pool resources to provide health coverage for their members. Members contribute to a common fund, which is used to cover healthcare costs. This model emphasizes solidarity and mutual support within the community (Conde et al., 2022). In rural settings, CBHI models often rely on community engagement and local leadership to promote participation. The mutual health organization model is particularly effective in these areas, as it fosters a sense of community solidarity. However, challenges such as low literacy levels and limited access to healthcare facilities can hinder the effectiveness of these schemes (Fadlallah et al., 2018; Eze et al., 2023; Touré et al., 2023). Second, the Social Health Insurance (SHI) model, which some countries have integrated CBHI into broader social health insurance schemes. In this model, CBHI acts as a supplementary insurance option for informal sector workers, providing additional coverage alongside government-sponsored health insurance programs (International Labour Organization, 2024). In urban contexts, CBHI may be integrated with existing social health insurance schemes, providing a more comprehensive coverage option for informal sector workers. Urban populations may have higher levels of awareness and access to information, which can facilitate the uptake of CBHI products.

However, competition from private health insurance can pose challenges (Eze et al., 2023). Third, the Hybrid Models. Hybrid models combine elements of CBHI with other financing mechanisms, such as government subsidies or private insurance. This approach aims to enhance the sustainability and reach of CBHI by leveraging multiple funding sources (Roy & Sarkar, 2018). In countries with mixed economies, CBHI can serve as a bridge between public health systems and private insurance markets. Hybrid models that incorporate government support can enhance the sustainability of CBHI

schemes, making them more attractive to potential participants (Rouyard et al., 2022). Finally, the Public-Private Partnerships (PPPs), in some contexts, CBHI schemes are developed through partnerships between government entities and private organizations. These partnerships can help improve the management and efficiency of CBHI programs, ensuring better service delivery (World Health Organization, 2020).

3.11.1 Lessons Learned from Successful CBHI Models

Lessons Learned from Successful CBHI Models highlight several key factors. First, community engagement is essential; successful CBHI programs highlight the importance of community involvement. Building trust through partnerships with local leaders and organizations helps encourage participation and a sense of ownership (Conde et al., 2022). Second, education and awareness campaigns; increasing awareness and understanding of CBHI products is essential for promoting acceptance. Clear and accessible campaigns that highlight the benefits and explain how CBHI works can make a big difference in encouraging people to join (Conde et al., 2022; Fadlallah et al., 2018). Third, customizing products to local needs; CBHI products must be tailored to meet the specific needs and risks faced by local populations. Customization enhances the importance and attraction of CBHI, encouraging greater participation (Baine et al., 2018). Fourth, regulatory support is critical; establishing supportive regulatory frameworks is essential for the growth of CBHI. Policymakers should craft regulations that align with the unique nature of CBHI to help it grow and succeed (Shah et al.,2023; Niang et al., 2023). Finally, sustainability through smart management; ensuring the long-term viability of CBHI requires careful financial planning. Providers should manage risks wisely and maintain sufficient resources to cover claims, ensuring the program's future (Nyandekwe et al., 2020).

To summarise, CBHI models in Africa show diverse features and operational mechanisms designed for local contexts. While challenges such as limited awareness, financial sustainability, and regulatory barriers continue, successful CBHI programs provide valuable lessons in community engagement, education, and product customization. By learning from these experiences, countries like Sudan can enhance their CBHI offerings and improve access to healthcare for underserved populations.

3.12 THEORETICAL FRAMEWORK (THEORY OF PLANNED BEHAVIOUR)

The Theory of Planned Behaviour (TPB), developed by Ajzen (1991), is a widely used psychological framework for understanding and predicting human behaviour in various contexts. TPB suggests that an individual's behaviour is determined by three key constructs: attitude toward the behaviour, subjective norms, and perceived behavioural control. These constructs collectively influence behavioural intention, which in turn expects actual behaviour. First, attitude toward the behaviour refers to an individual’s positive or negative evaluation of performing the behaviour. In the context of Micro-Takaful, this could involve assessing whether individuals perceive Micro-Takaful as beneficial or relevant to their needs. Second, subjective norms, these are the perceived social pressures to perform or not perform a behaviour. For instance, if family, friends, or community leaders approve of Micro-Takaful, individuals may feel encouraged to adopt it. Third, perceived behavioural control (PBC) reflects an individual’s perception of their ability to perform the behaviour, considering internal and external constraints. In Micro-Takaful adoption, PBC could include factors like affordability, accessibility, or understanding of the product.

TPB has been widely applied in studies exploring consumer behaviour, including Health Takaful adoption, financial decision-making, and pro-social behaviours to predict and influence behaviours (Azizam et al., 2020). Studies have utilized TPB to explore the intentions of individuals and households to adopt Micro-Takaful products. For instance, Rapi, (2023) research in Indonesia found that attitudes, subjective norms, and perceived behavioural control significantly influenced the intention to purchase Micro-Takaful among low-income households (Rapi, 2023). Its flexibility in including additional variables makes it particularly relevant for complex behaviours like Micro-Takaful adoption, which are influenced by contextual factors such as cultural norms, economic conditions, and awareness levels.

According to Rapi, (2023), affordability is a critical factor influencing the adoption of Micro-Takaful, particularly among low-income populations. The cost of premiums is often a significant barrier for low-income households. If Micro-Takaful

products are perceived as too expensive, potential participants may prioritize immediate needs over long-term financial protection, leading to low uptake rates (Rapi, 2023). When Micro-Takaful products are affordable, they are more likely to be perceived as valuable by potential clients. If individuals believe that the benefits of coverage balance the costs, they are more leaning to enrol (Rapi, 2023). Offering flexible payment options, such as monthly or seasonal payments, can enhance affordability. This flexibility allows low-income households to manage their finances better and make Takaful payments without struggling with their budgets (Rapi, 2023).

Furthermore, many individuals in low-income areas have limited access to information about Micro-Takaful products. This lack of information is due to insufficient marketing efforts or the absence of educational campaigns that explain the benefits and workings of Micro-Takaful (Rapi, 2023). Rapi, (2023) argued that cultural beliefs and misconceptions about Takaful can create barriers to awareness. In some communities, Takaful may be viewed as unnecessary or incompatible with traditional practices, leading to resistance against Micro-Takaful (Rapi, 2023).

In some cases, there may be a general distrust of financial institutions, including Takaful providers. This distrust can stem from past experiences or perceptions of corruption, further complicating efforts to raise awareness about Micro-Takaful (Rapi, 2023). To enhance both affordability and awareness of Micro-Takaful, Rapi, (2023) suggested several strategies that have proven effective in similar contexts, engaging local leaders and community organizations can help raise awareness and build trust. Community-based initiatives that involve local stakeholders in promoting Micro-Takaful can enhance integrity and encourage participation (Rapi, 2023). Also, implementing educational campaigns that explain the benefits and workings of Micro-Takaful can significantly improve awareness. These campaigns should be tailored to the local context, using culturally relevant messaging and channels to reach target audiences (Rapi, 2023).

In addition to that, providing subsidies or financial assistance to cover premiums can improve affordability for low-income households. Government or NGO support can help reduce the financial burden on participants, making Micro-Takaful more accessible (Rapi, 2023). Offering flexible payment plans can enhance affordability. Allowing participants to pay premiums in instalments or providing options for seasonal payments

can make Micro-Takaful more manageable for low-income households (Rapi, 2023). Finally, utilizing mobile technology to disseminate information and facilitate enrolment can improve access to Micro-Takaful products. Mobile platforms can provide educational resources, simplify the enrolment process, and enable easier premium payments (Rapi, 2023).

In this study, TPB serves as the theoretical foundation to understand the factors influencing Health Micro-Takaful adoption among Sudanese adults. The framework is extended by incorporating awareness and affordability as additional variables to address the unique challenges of the Sudanese context. Furthermore, the behavioural intention is used as a mediating variable to capture the link between perceptions and actual adoption behaviour. A detailed discussion of TPB, its constructs, and its application in hypothesis development is provided in the following chapter.

3.13 LITERATURE GAP

Sudan is rich in natural resources, including fertile land, oil, minerals, and diverse livestock. Yet, despite these advantages, poverty remains a harsh reality for most Sudanese people. As of 2014, approximately 46.5% of the population lives below the poverty line-on less than $2.15 per day -(World Bank, 2014). Unemployment is widespread, the unemployment rate has risen to 20.8%, up from 17.6% in 2022 (Trading Economics, 2023) and many families struggle to afford even the necessities. This situation has been worsened by years of civil conflict and the loss of oil revenues following South Sudan's secession in 2011. Inflation and the removal of fuel subsidies have further compounded these challenges. While the inflation rate dropped slightly from 422.8% in July 2021 to 387.6% in August 2021, and to 146.60 % in 2023 (Trading Economics, 2023), it remains alarmingly high, making life even harder for low-income families.

During these struggles, Sudan has been a leader in introducing Takaful, under the supervision of the Central Bank of Sudan. Takaful was introduced in Sudan by Faisal Islamic Bank in 1978, and the operations of the Takaful company began in January 1979. This event marked the establishment of the first Takaful company in the world (Yesuf, 2017). Takaful services have grown in Sudan, with 13 Takaful companies

and two re-takaful companies (Haroun & Yusoff, 2024). However, despite Sudan's pioneering role in Islamic finance, there is a noticeable lack of research on the Takaful industry and its related subsectors. While Micro-Takaful holds great promise for addressing the needs of low-income communities, existing studies have not explored how these services can be tailored to fit the economic challenges faced by Sudanese families.

This research aims to fill that gap by exploring the factors that influence the adoption of Health Micro-Takaful, it's opportunities and challenges and proposing a framework that considers the realities of poverty, unemployment, and affordability in Sudan. By focusing on the perceptions, opportunities, and challenges of Health Micro-Takaful adoption, this study seeks to provide practical solutions that can make a real difference in the lives of those who need it most.

3.14 CHAPTER SUMMARY

The researcher reviewed previous studies on Takaful, Micro-Takaful, and its various models and applications in this chapter. Also reviewed Islamic finance in Sudan in general and Health Takaful in particular. Furthermore, the researcher also explained the obstacles facing the Takaful industry in Sudan. The researcher also presented previous studies on CBHI in some African countries, the applicable models, and their challenges.

CHAPTER FOUR

THEORETICAL FRAMEWORK AND HYPOTHESES DEVELOPMENT

4.1 INTRODUCTION

This chapter focuses on the theoretical framework used in this research; and provides a detailed discussion of the TPB and its constructs, along with an explanation of why it is suited to this study. It will also explore how the inclusion of awareness and affordability enhances its applicability to the Sudanese context. This chapter also provides the stage for developing the hypotheses of this study.

4.2 THEORETICAL FRAMEWORK

A strong theoretical foundation is the basis of any research, providing clarity and structure to explore a phenomenon. For this study, which examines the factors that influence the adoption of Health Micro-Takaful among Sudanese adults, behavioural theories are helpful in uncovering the motivations and barriers influencing individual decisions. Among these theories, the Theory of Planned Behaviour (TPB), introduced by Ajzen (1991), stands out as the most relevant and adaptable framework for understanding the relationship between individual intentions and actions in this context. The TPB explains behaviour through three constructs: attitudes, which capture an individual's positive or negative evaluation of a behaviour; subjective norms, reflecting perceived social pressures; and perceived behavioural control, which measures the ease or difficulty of performing a behaviour based on internal and external factors. These constructs are especially useful in the context of Health Micro-Takaful adoption, where personal beliefs, societal influences, and important barriers such as affordability and awareness shape decision making processes.

In choosing the TPB, other behavioural theories were carefully considered. The Theory of Reasoned Action (TRA) by (Fishbein & Ajzen, 1975), a foundation of the TPB, focuses on attitudes and subjective norms but does not account for perceived behavioural control, a critical factor when external constraints like economic challenges

are important. The Health Belief Model (HBM) by Rosenstock (1974), commonly used in health-related research, emphasizes perceived risks and benefits but does not fully address the socio-economic and cultural factors that influence Micro-Takaful adoption. The Social Cognitive Theory (SCT) by Bandura (1986) was also reviewed. SCT highlights the dynamic relationship between personal, behavioural, and environmental factors, highlighting observational learning, self-efficiency, and reinforcement. While this theory is valuable for understanding how individuals learn and adapt behaviours, its focus on modelling and reinforcement is less aligned with the intentional driven decision-making process that is central to this study.

In contrast, the TPB, with its focus on the formation of intentions and their translation into action, provides a more targeted and practical framework for exploring Health Micro-Takaful adoption in Sudan. Recognizing the socio-economic and cultural context of Sudan, this study extends the TPB by incorporating two additional variables/constructs: awareness and affordability. Awareness is critical because Micro-Takaful is a relatively new concept in Sudan, and without sufficient knowledge, individuals are unlikely to shape intentions to adopt Health Micro-Takaful. Affordability, on the other hand, addresses the economic realities faced by many Sudanese households, where cost remains a barrier to adopting new services. These extensions ensure that the framework captures the broader factors influencing adoption decisions, providing a better understanding of the perceptions, opportunities, and challenges surrounding Health Micro-Takaful in Sudan.

4.2.1 Theory of Planned Behaviour (TPB)

This study’s theoretical framework was based on the Theory of Planned Behaviour (TPB), which is a hypothetical framework that expands upon TRA (the Theory of Reasoned Action), developed by Fishbein and Ajzen in 1975 and further developed by Ajzen and Fishbein in 1980 which provided a foundation for the subsequent Theory of Planned Behaviour (TPB) that Ajzen introduced in 1985. Both theories operate under the assumption that individuals make rational choices to participate in certain behaviours by assessing the information at hand. The execution of behaviour depends upon the individual's deliberate purpose to participate in it (which is influenced by the individual's valuation of the action, the ease of its execution, and the opinions of

influential individuals) and the perception that the activity is under their control. The Theory of Planned Behaviour (TPB) forecasts an individual's intention to participate in an activity at a particular time and location. According to the theory, behaviours are governed by behavioural intentions, which are determined by three elements: an individual's attitude towards the behaviour, subjective norms, and perceived behavioural control (Ajzen, 1991).

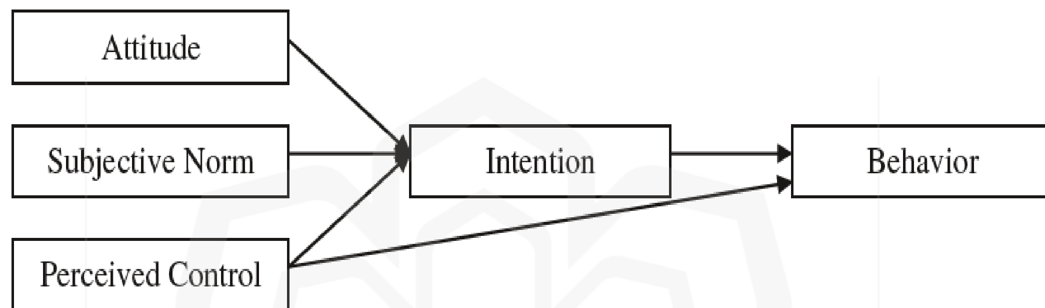

Figure 4.1. Theory of Planned Behaviour (Ajzen, 1991)

4.2.2 Theory of Planned Behaviour's Applications in Islamic Finance

Jaffar and Musa (2016) applied the Theory of Planned Behaviour (TPB) to ascertain the factors influencing individuals' attitudes and intentions toward adopting Islamic financing. The structural equation modelling (SEM) analysis results demonstrated that all five prominent beliefs or determinants of attitude examined have statistical significance. The study revealed that religious obligation exerted the most significant influence on attitude. The findings also indicate that the perceived behavioural control and subjective norms substantially impacted entrepreneurs' propensity to adopt. The study results provide valuable insights for industry practitioners in developing successful methods to bridge the gap between Islamic finance and Halal businesses. Aziz and Afaq (2018) examined the variables influencing individuals' willingness to adopt Islamic banking in Pakistan. The paper uses the deconstructed theory of planned behaviour (DTPB) to develop a comprehensive framework for adopting Islamic banking. This study examines the elements contributing to adopting Islamic banking by considering the influences of attitude, subjective norms, and perceived behavioural

control. Raza et al. (2019) used a modified model of the theory of planned behaviour to study the factors that influence the adoption of Takaful in Pakistan. Ghaouri (2022) used the theory of planned behaviour to examine the factors influencing household debt and provided a comprehensive system for addressing over-indebtedness in the Klang Valley region of Malaysia.

Maryam et al. (2021) used TPB to analyse the factors influencing the mindset and intention to adopt Islamic banking among potential customers in Pakistan. The study aimed to examine the impact of salient beliefs, including personal and external factors. The intention to adopt Islamic banking is influenced by two critical elements of the theory of planned behaviour (TPB): attitude and social influence. Rifas et al. (2023) utilized the Theory of Planned Behaviour to investigate the determinants that impact the behavioural tendency of micro, small, and medium-sized company (MSME) entrepreneurs to engage in Takaful in Sri Lanka. The study "Adoption of Islamic Banking in Pakistan: An Empirical Investigation" by Shahab Aziz and Zahra Afaq (Aziz & Afaq,2018) identified attitude, subjective norms, and perceived behavioural control as the key elements influencing individuals' intent to adopt Islamic banking. The study revealed that attitude is affected by awareness, uncertainty, relative advantage, and compatibility. Normative beliefs influence subjective norms, while perceived behavioural control is influenced by self-efficacy and resource facilitation. The results indicate that these elements exhibit a notable and favourable correlation with the inclination to embrace Islamic banking, and they have significance for Islamic banks to overhaul their marketing tactics.

4.3 HYPOTHESES DEVELOPMENT

Behavioural intention refers to a measure that substitutes for actual behaviour. It denotes an individual's motivation regarding their deliberate intention or choice to engage in specific activities (Conner & Armitage, 1998). Generally, the stronger the intention is, the more likely the behaviour to be performed. In the context of this research, the TPB was applied to understand and analyse the factors influencing individuals' adoption of Health Micro-Takaful in Sudan.

Attitude towards behaviour concerns the extent to which an individual possesses favourable or unfavourable emotions towards the behaviour. It involves evaluating the results of acting. Maryam et al. (2021) investigated the factors influencing the attitude and desire to adopt Islamic banking among prospective clients in Pakistan. Maryam et al. (2021) defined attitude as a mental state that encourages the intention to act. The study examined the impact of prominent beliefs (including individual and external factors) and the Theory of Planned Behaviour (TPB) construct, notably attitude and social influence, on the intentions to adopt Islamic banking. The findings indicated that attitude has a significant role in determining the intention of potential consumers to adopt Islamic banking. Furthermore, attitude fully mediates the relationship between cost benefits, reputation, support for business, and the intention to adopt Islamic banking.

Shabiq and Hassan, (2016) studied the factors affecting the adoption of Takaful in the Maldives, their study showed that there is a significant positive impact of attitude on the adoption of Takaful. Many previous studies supported that attitude has a strong relationship with adoption behaviour (Ibrahim et al., 2021; Lajuni et al., 2020; Bhatti & Husin, 2019; Kazaure, 2019; Ismail et al., 2022; Razak et al., 2021; Chusmita et al., 2019 cited by Nadzli et al., 2024). For instance, attitude refers to an individual's positive or negative evaluation of adopting Health Micro-Takaful. To assess attitudes, the study will examine individuals' perceptions of the benefits and drawbacks of Health Micro-Takaful, such as financial stability, protection against risks and uncertainties, and access to healthcare services. The study will explore how these attitudes influence individuals' intentions to adopt Health Micro-Takaful in Sudan.

Subjective Norm in the context of the Theory of Planned Behaviour refers to an individual's perception of social pressure from influential people, such as family members, friends, or colleagues, to engage in or avoid doing a particular action. This perceived social pressure can impact an individual's behavioural intentions and actions (Ajzen, 1991). It relates to an individual's interpretation of the societal context surrounding their actions. This construct includes two components: normative beliefs and motivation to comply. Normative beliefs are an individual's beliefs about the expectations of others regarding their behaviour. It reflects the perceived social pressure to conform to certain behaviours (Ajzen, 1991). Motivation to comply refers to the

individual's motivation to comply with the expectations and opinions of others. It reflects the importance an individual places on conforming to social norms (Ajzen, 1991).

In the context of Health Micro-Takaful adoption, subjective norms can be assessed by examining individuals' perceptions of social pressure from family, friends, and community members regarding the importance and value of having Micro-Takaful. Studies supported that subjective norms have a strong relationship with adoption behaviour (Ibrahim et al., 2021; Husin et al., 2016; Bhatti & Husin, 2019; Ismail et al., 2022; Razak et al., 2021 cited by Nadzli et al., 2024). The study will explore how subjective norms influence individuals' intentions and behaviour regarding Health Micro-Takaful adoption.

Perceived Behavioural Control: This concept pertains to an individual's subjective assessment of ease or difficulty associated with a specific behaviour (Ajzen, 1991). It increases when individuals perceive they have more resources and confidence (Ajzen, 1985; Hartwick & Barki, 1994; Lee & Kozar, 2005). It incorporates two components: perceived control beliefs and perceived power. Perceived control beliefs refer to an individual's beliefs regarding the existence of elements that can either help or hinder the execution of a particular behaviour. It includes internal factors (such as skills and resources) and external factors (such as environmental constraints and social support) (Ajzen, 1991). Perceived power reflects the individual's perception of their control over the behaviour and their confidence in their ability to overcome obstacles (Ajzen, 1991).

In the context of the study, perceived behavioural control pertains to an individual's sense of their capacity to act by adopting Health Micro-Takaful. This includes their beliefs about the ease of accessing Micro-Takaful products, understanding the terms and conditions, and affording the premiums.

Many previous studies supported that perceived behavioural control has a strong relationship with adoption behaviour (Husin & Ab Rahman, 2016; Bhatti & Husin, 2019; Raza et al., 2019; Ismail et al., 2022; Razak et al., 2021 cited by Nadzli et al., 2024). The study will investigate how perceived behavioural control influences individuals' intentions and actual behaviour regarding Health Micro-Takaful adoption.

The TPB posits that intentions mediate the relationship between the three primary constructs and actual behaviour. Therefore, the thesis will also examine the link between individuals' intentions to adopt Health Micro-Takaful and their actual adoption behaviour.

The study framework will also incorporate other factors influencing Health Micro-Takaful adoption, such as demographic variables (e.g., income and education level) and related factors (e.g., affordability of Health Micro-Takaful products and awareness). These factors were integrated into the TPB framework to provide a comprehensive understanding of the determinants of Health Micro-Takaful adoption in Sudan. Applying TPB as the underlying theoretical framework, this thesis will contribute to understanding the factors influencing individuals' intentions and behaviour regarding Health Micro-Takaful adoption in Sudan. The findings provide valuable insights for creating efficient strategies and interventions to encourage the adoption of Health Micro-Takaful and enhance financial and healthcare inclusion.

4.4 EXTENDED VARIABLES

The researcher included factors of awareness and affordability to the Theory of Planned Behaviour's factors and used behavioural intention- also referred to as intention sometimes in this study, both behavioural intention and intention have the same meaning- as a mediator.

4.4.1 Intention to Adopt as a Mediator

Intention refers to the degree of effort and determination an individual will put forth to carry out a specific behaviour (Bananuka et al.,2019). Also, intention, as defined by Ajzen (1991) in the Theory of Planned Behaviour (TPB), refers to an individual's motivation or willingness to perform a specific behaviour, reflecting their readiness to act. In the context of Health Micro-Takaful, intention captures the likelihood that individuals plan to adopt or purchase Health Micro-Takaful services. Its role as a mediator is supported in the literature, particularly in a study related to adoption by Nassar et al. (2019), the study examined the mediating role of behavioural intention as a mediator and ICT adoption. The results indicated that behavioural intention positively

mediates between social influence on ICT adoption. This is relevant in the Sudanese context, where Health Micro-Takaful is a new concept, and understanding individuals' readiness to adopt it. Intention helps to explain how perceptions, shaped by attitudes, social norms, and perceived ease of adoption, influence the decision-making process. By including intention as a mediator, the study aligns with the TPB framework, which suggests that intentions mediate the relationship between the three primary constructs and actual behaviour. Also provides a strong mechanism to understand how perception translates into behaviour, offering valuable insights for the adoption. Therefore, this study also examines the link between individuals' intentions to adopt Health Micro-Takaful and their actual adoption behaviour.

4.4.2 Awareness

Awareness refers to an individual's knowledge and understanding of a particular concept, product, or service. Jaffar and Musa (2014) defined awareness as possessing or demonstrating comprehension, perception, or understanding of a specific circumstance or truth. In the context of Health Micro-Takaful, awareness relates to individuals' knowledge and understanding of the concept of Micro-Takaful, its benefits, and how it differs from Takaful. Individuals need to be aware of Micro-Takaful as an alternative Takaful option that aligns with their religious beliefs and values. Enhancing awareness can be achieved through educational campaigns, marketing endeavours, and community outreach initiatives that seek to educate people about the accessibility and benefits of Health Micro-Takaful.

Various research studies in diverse contexts have emphasized the significance of consumer knowledge in accepting Islamic banking (Haron et al., 1994; Metawa and Almossawi, 1998; Naser et al., 1999; Rammal and Zurbrugg, 2007; Khattak and Rehman, 2010; Daud et al., 2011; Lateh et al., 2009; Keong et al., 2012; Thambiah et al., 2011, 2012 cited by Kaabachi & Obeid,2016). Many researchers have conducted their research on the awareness of Takaful including Maysami and Williams (2006), Ayinde and Echchabi (2012), Akhter and Hussain (2012), Htay and Salman (2013) and Shabiq and Hassan (2016). Past studies (Ayinde & Echchabi, 2012), (Obeid and Kaabachi, 2016; Warsame, 2016; Ali and Raza, 2019; Jamshidi and Kazemi, 2020; Junaidi, 2021; Shaikh et al. 2020 cited by Haron & Barre, 2023; Mukhtar and

Barre,2023) also indicated that a significant and positive relationship between customer awareness and the product acceptance on Takaful.

4.4.3 Affordability

Affordability refers to the affordability of Micro-Takaful premiums for individuals with limited financial resources (Mazlan et al., 2024). Many previous studies proved that price has a strong relationship with adoption behaviour (Akbar et al., 2020; Devi & Harjatno, 2019; Hermiyenti & Wardi, 2019; Guan et al., 2020; Putri, 2018; Anjani et al., 2018; Yoyada & Kodrat, 2017; Sukotjo & Radix, 2010 cited by Nadzli et al., 2024). In the context of the study, affordability refers to the ability of individuals to pay for a product or service without experiencing financial burden. Affordability is a key factor influencing the adoption of financial products and services, particularly among low-income populations. Research has consistently highlighted affordability as a significant determinant of adoption.

Dror and Jacquier (1999) emphasized that affordability is essential for encouraging low-income populations to participate in microinsurance schemes. Their study revealed that when premiums are set within the financial reach of individuals, adoption rates improve significantly. Similarly, Schneider (2005) found that in Rwanda, reducing the cost of micro-health insurance led to increased enrolment, highlighting affordability's role in expanding access to essential services. Baqutaya et al. (2015) found that housing affordability significantly affects societal well-being among middle-income groups in Malaysia. In the financial services sector, Tobbin and Kuwornu (2011) explored mobile banking adoption in rural Ghana and found that affordability was a critical factor. They concluded that cost-effective financial products are more likely to succeed in resource-constrained environments. This insight aligns with findings from Komendantova and Patt (2014) who examined renewable energy adoption in developing regions and identified affordability as a recurring barrier to adoption. Reddick et al. (2020), explored how affordability influences broadband adoption in San Antonio, highlighting that affordability is a key factor in bridging the digital divide.

Affordability is equally relevant in the realm of Micro-Takaful. Churchill and Matul (2012) noted that affordable pricing structures are crucial for ensuring the inclusion of economically disadvantaged populations in risk-sharing mechanisms. By designing affordable products, service providers can not only overcome barriers but also create opportunities for financial inclusion. Jin et al. (2019) found that perceived cost plays a crucial role in influencing consumer acceptance and adoption of Fintech products and services in Malaysia. Consumers are more likely to adopt these services when they perceive them to be cost-effective compared to traditional financial services. The study highlighted that reducing perceived costs could significantly enhance consumer willingness to adopt Fintech solutions, making affordability a key determinant in the acceptance and adoption process. Sukereman et al. (2021) examined the factors influencing housing affordability and found that affordability significantly impacts the adoption of housing among economically disadvantaged populations in Malaysia.

Awareness and affordability play a critical role in shaping the intention to adopt Health Micro-Takaful, particularly in environments where financial literacy is low and healthcare financing options are limited. Awareness may itself be multi-dimensional, involving general knowledge of Micro-Takaful, familiarity with operational principles, and levels of trust in service providers. Affordability is equally complex, as it encompasses the absolute cost of contributions, perceptions of value-for-money, and expectations regarding financial stability. These dimensions may also interact with core TPB constructs. For instance, affordability can strengthen or weaken the effect of perceived behavioural control on intention, especially when individuals feel that economic pressures limit their ability to participate. Acknowledging these restraints supports a more realistic understanding of adoption dynamics in low-income contexts.

4.5 HYPOTHESES OF THE STUDY

Based on the Theory of Planned Behaviour and some prior studies that have utilized it and the previous discussion, the current study develops the following hypotheses:

H1: *Affordability significantly influences the adoption of Health Micro –Takaful in Sudan.*

H2: *Attitude significantly influences the adoption of Health Micro-Takaful in Sudan.*

H3: *Perceived Behavioural Control significantly influences the adoption of Health Micro-Takaful in Sudan.*

H4: *Awareness significantly influences the adoption of Health Micro –Takaful in Sudan.*

H5: *Subjective norms significantly influence the adoption of Health Micro –Takaful in Sudan.*

H6: *Intention mediates the relationship between affordability, attitude, awareness, perceived behavioural control, subjective norms, and Health Micro –Takaful adoption in Sudan.*

H6a: *Intention mediates the relationship between affordability and Health Micro –Takaful adoption*

H6b: *Intention mediates the relationship between attitude and Health Micro –Takaful adoption*

H6c: *Intention mediates the relationship between awareness and Health Micro –Takaful adoption*

H6d: *Intention mediates the relationship between perceived behavioural control and Health Micro –Takaful adoption*

H6e: *Intention mediates the relationship between subjective norms and Health Micro –Takaful adoption*

4.6 CHAPTER SUMMARY

This chapter outlined the theoretical foundation that underpins the study and the development of its research hypotheses. It began by presenting the Theory of Planned Behaviour (TPB) as the main framework used to explain the intention to adopt Health Micro-Takaful (HMT) in Sudan. The discussion highlighted how the three key constructs of TPB—attitude, subjective norms, and perceived behavioural control—interact to influence behavioural intention and actual adoption. The chapter also

reviewed earlier studies that applied TPB within Islamic finance, showing its flexibility and relevance in explaining Shari'ah-compliant financial behaviours. Based on this understanding, the model was extended by adding two important variables: awareness and affordability. These extensions were introduced to reflect the social and economic realities of Sudanese communities, where both understanding and financial capacity strongly affect participation in HMT schemes. Furthermore, behavioural intention was examined as a mediating variable, capturing the pathway between individuals' perceptions and their actual willingness to adopt HMT. Each hypothesis was developed through logical reasoning and supported by previous empirical findings.

CHAPTER FIVE

METHODOLOGY

5.1 INTRODUCTION

This chapter provides an in-depth discussion of the research methodology used to achieve the research objectives. It covers the study's research design, research frameworks, hypotheses, approaches, and research instruments. In addition, the development of the questionnaire is also discussed, followed by sampling methods and the data collection process. The design of interview questions and the choice of interviewees are also presented. Finally, the methods of data analysis are discussed from the beginning until the completion of the data analysis.

5.2 RESEARCH PHILOSOPHY

Research philosophy refers to the set of beliefs and assumptions about the development of knowledge. These assumptions guide how research should be conducted, including the methodology and methods used, and influence how data is interpreted and analysed. Research philosophy is typically categorized into several paradigms or frameworks, including positivism, interpretivism, realism, and pragmatism, among others (Bryman & Bell, 2015; Creswell & Creswell, 2018).

Different research philosophies offer distinct ways of understanding reality and generating knowledge, and their relevance depends on the nature of the research questions being explored. Positivism emphasises objectivity, measurement, and the search for generalizable patterns, making it suitable for studies that test theoretical relationships using structured instruments. Interpretivism, in contrast, focuses on the subjective meanings individuals assign to their experiences and is therefore more aligned with exploring complex social or behavioural phenomena that cannot be fully captured through numerical data alone. Realism bridges these two perspectives by recognising that while an external reality exists, researchers' interpretations are shaped by social and contextual influences. Pragmatism extends this discussion by emphasizing the practical value of knowledge and the use of methods that best address the research

problem, regardless of their philosophical origins. In the context of this study, which seeks both to test behavioural constructs from the Theory of Planned Behaviour and to interpret the socio-economic and institutional realities shaping Health Micro-Takaful adoption in Sudan, pragmatism provides the most coherent philosophical foundation. It enables the integration of quantitative and qualitative evidence to produce findings that are both theoretically informed and practically relevant.

5.2.1 Key Components of Research Philosophy

1. **Ontology:** Concerns the nature of reality (Bryman & Bell, 2015). This study views reality as having both objective and subjective dimensions. By using a mixed-methods approach, it explores the objective views of reality through quantitative methods while also capturing the subjective experiences and perceptions of participants through qualitative methods. This viewpoint recognizes that reality is complex and can be better understood by combining different viewpoints.
2. **Epistemology:** Deals with the nature and scope of knowledge. It explores how researchers know what they know (Saunders et al., 2016). From an epistemological standpoint, this study is based on the idea that knowledge comes from both observable facts and personal experiences. The mixed-methods approach takes advantage of quantitative data, which offers measurable and generalizable insights and qualitative data, which provide deeper and more related understanding. By combining these methods, the study aims to reach a more balanced understanding of the research problem.
3. **Axiology:** Examines the role of values and ethics in research. Researchers consider whether their values should influence the research process or outcomes (Bryman & Bell, 2015). Throughout this study, principles like honesty, respect for participants, and a focus on creating meaningful and useful insights are prioritized. Ethical considerations, such as obtaining informed consent and maintaining confidentiality, are carefully followed at every stage.

In conclusion, the philosophical orientation helps researchers to explain their choice of research approaches as quantitative, qualitative or mixed method approach.

Research philosophy impacts every stage of the research process, from the construction of the research question to the method chosen for data collection and analysis (Saunders et al., 2016). Many researchers have emphasized the potential of pragmatism to serve as a philosophical basis for using mixed research methods. Denscombe (2008), Mitchell (2018), and Gillespie et al. (2024) highlighted that pragmatism is viewed as the ideal paradigm for mixed research, given that its fundamental assumptions form the basis for integrating research methods. Furthermore, Creswell (2014) noted that pragmatism is the philosophy that enables the blending of paradigms, assumptions, approaches, and data collection and analysis methods.

The most suitable research philosophy for this study is pragmatism, as it aligns with the mixed-method approach of the study. Pragmatism focuses on addressing research problems by integrating both quantitative and qualitative methods, making it ideal for exploring the perceptions, opportunities, and challenges of Health Micro-Takaful adoption in Sudan. By using the Theory of Planned Behaviour (TPB) as a framework and combining questionnaires with interviews, this research requires a philosophy that values both measurable data and related insights. Moreover, the goal of proposing a practical framework for Health Micro-Takaful in Sudan further supports the use of pragmatism, as it emphasizes finding actionable solutions to real-world issues. In selecting pragmatism, this study also considered other philosophical paradigms such as positivism, interpretivism, and realism. However, these alternatives were less aligned with the study's aims. Positivism was insufficient because the research requires more than measurable patterns; it also seeks to understand perceptions shaped by Sudan's economic pressures and trust-related challenges. Interpretivism alone could not support the use of TPB, which depends on quantifiable constructs such as attitude, subjective norms, and perceived behavioural control. Realism provided a balanced perspective but did not offer the methodological flexibility required for integrating quantitative surveys with qualitative interviews. Pragmatism therefore represents the most fitting foundation, as it accommodates multiple forms of evidence and supports context-driven decision-making—essential for examining Micro-Takaful adoption in a complex environment such as Sudan.

5.3 RESEARCH DESIGN

Research design refers to the structured approach, overall strategy or framework employed to integrate the different components of the study in a consistent and logical way, that guides the researcher in planning, executing, and analysing their study ensuring that the research problem is effectively addressed. It provides a roadmap for the collection, measurement, and analysis of data. The main purpose of a research design is to ensure that the evidence obtained enables the researcher to achieve the research objectives effectively and efficiently and answer the research questions as clearly as possible. According to Creswell and Creswell (2018), research design is essential for integrating various components of a study to address the research problem effectively. Kumar (2019) emphasizes the importance of selecting an appropriate design to ensure the validity and reliability of the findings. Yin (2018) highlights that different research designs, such as exploratory, descriptive, and explanatory, serve different purposes and are chosen based on the research objectives.

5.4 INTRODUCTION TO MIXED METHOD

Mixed methods research is an approach that combines both qualitative and quantitative research techniques, theories, and concepts within a single study. This methodology is designed to provide a more comprehensive understanding of research problems by drawing on the strengths of both qualitative and quantitative data collection and analysis.

The primary reason for employing mixed methods is to benefit from the complementary strengths of qualitative and quantitative research. Quantitative methods are used for measuring the extent of phenomena and identifying patterns, while qualitative methods are suited for exploring the underlying reasons, experiences, and motivations behind these patterns. By integrating these two approaches, researchers can achieve more robust and nuanced insights. Greene et al. (1989) listed five specific reasons why researchers should consider using mixed methods:

i. **Triangulation:** This principle involves using multiple data sources or methods to cross-verify results and improve the accuracy and credibility of the findings.

ii. **Complementarity:** Mixed methods allow researchers to use one type of data to extend and clarify findings obtained through another type. This can help explain how and why certain results occur.

iii. **Development:** The results from one method can help inform the design and implementation of subsequent methods. For example, qualitative findings can shape the development of a quantitative survey.

iv. **Initiation:** Researchers can identify contradictions and new perspectives by examining different types of data. This can lead to new research questions and deeper investigation.

v. **Expansion:** Mixed methods research broadens the scope of a study by using different methods to explore various components of the research question.

The study where the paradigm and its methods are dominant, with a minor portion of the overall study derived from an alternative design, is referred to as a "dominant-less-dominant" mixed methods design (Creswell, 1994). According to Greene and Caracelli (1997), if the research is planned in a way that the less dominant approach enhances the dominant one, the results from one dominating method are improved or elaborated by the findings from another method. According to Tashakkori and Teddlie (2010), dominant/less dominant design has one primary methodological focus and one secondary methodological approach. For example, the qualitative technique may provide a supporting role to the main quantitative method (QUAN qual), or vice versa (QUAL quan).

In the data gathering phase for this study, a mixed-methods strategy was adopted to provide both breadth and depth in understanding Health Micro-Takaful adoption in Sudan. Although the quantitative component forms the core of the study, a complementary qualitative phase was included to enrich the interpretation of findings and to address aspects that cannot be fully captured through numerical analysis alone. This design aligns with a dominant–less dominant QUAN-qual structure, where the qualitative insights play a supportive yet meaningful role.

The quantitative phase is grounded in a deductive approach that draws directly from the Theory of Planned Behaviour (TPB). Based on this framework, a series of hypotheses were formulated to examine the relationships among the core TPB constructs, together with the extended variables of awareness and affordability, with

intention positioned as a mediating factor. These hypotheses were tested using survey data analysed through SmartPLS 3.9, allowing for a systematic assessment of the proposed model and enabling the study to explore both the direct and indirect influences shaping individuals' behavioural intentions toward Health Micro-Takaful.

The qualitative phase was included to address the institutional and practical dimensions of the issue areas that often require contextual understanding. Semi-structured interviews were carried out with representatives from the Central Bank of Sudan, the Family Bank, and the Insurance Supervisory Authority. These participants provided regulatory, operational, and supervisory perspectives that offer a clearer picture of the opportunities and constraints surrounding Health Micro-Takaful adoption in Sudan. Their insights help illuminate issues that may not surface through quantitative responses, such as policy gaps, and institutional experiences with similar financial inclusion initiatives.

By integrating both quantitative testing and qualitative exploration, this study brings together theoretical analysis and real-world perspectives. This combination strengthens the overall inquiry, ensuring that the findings reflect not only statistical relationships but also the lived realities and institutional challenges that shape the adoption of Health Micro-Takaful in Sudan.

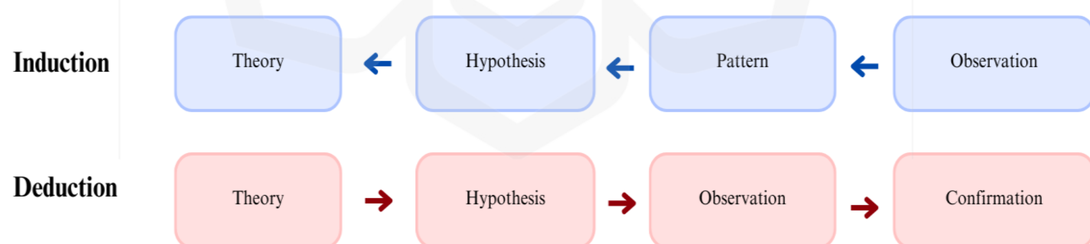

Figure 5.1. Inductive and Deductive Approach
Source: (Ragab & Arisha, 2017; Easterby-Smith et al. (1992); Douglas,2003)

5.4.2 Mixed Methods Designs

Mixed methods design commonly used in research is classified as follows:

i. **In convergent parallel design,** qualitative and quantitative data are collected simultaneously but analysed separately. The results are then compared and combined during the interpretation phase to provide a comprehensive understanding of the research problem (Creswell & Plano Clark, 2018). This design is useful when the researcher needs to corroborate findings from both types of data and understand different aspects of the same phenomenon.

ii. **Explanatory sequential design,** this approach involves collecting and analysing quantitative data first, followed by qualitative data to help explain or elaborate on the quantitative results. This sequential process allows for a deeper understanding of the quantitative findings through qualitative insights (Ivankova et al., 2005). It is suitable when the researcher needs to understand the mechanisms or reasons behind the quantitative findings.

iii. **Exploratory sequential Design,** qualitative data is collected and analysed first to explore a phenomenon. This is followed by the collection and analysis of quantitative data to test or build upon the initial qualitative findings (Creswell & Plano Clark, 2011). It is used when the researcher needs to develop a quantitative tool or test hypotheses based on initial qualitative insights.

iv. **Embedded design**, this design integrates one type of data (qualitative or quantitative) within a larger design involving the other type of data. For example, a primarily quantitative study could include a qualitative component for deeper insight (Creswell & Plano Clark, 2007). It is suitable when a single data type cannot fully address the research question, and a supplemental component is needed.

v. **Transformative design** uses theoretical support to guide the research. Both qualitative and quantitative data are collected and integrated throughout the study to address the research problem. This design emphasizes the importance of addressing issues of social justice and inequality (Mertens, 2009). It is appropriate when the research is aimed at addressing issues of social justice and inequality.

vi. **Multiphase design** involves multiple phases of data collection and analysis, with each phase building on the previous one. It often includes a series of studies that may use different designs and methods to address complex research questions iteratively (Creswell & Plano Clark, 2011). It is suitable for complex research questions that require a long-term study with iterative data collection and analysis.

5.4.3 Mixed Methods Approach

The use of a mixed-method explanatory sequential design is particularly suitable for this study because it reflects both the theoretical structure of the research and the contextual complexity of Health Micro-Takaful in Sudan. The quantitative phase provides measurable evidence on how the constructs of the Theory of Planned Behaviour influence individuals' intention to adopt Health Micro-Takaful. The qualitative phase then follows to clarify and expand on the quantitative findings by engaging directly with regulators and practitioners who understand the operational realities of the sector. This sequencing ensures that quantitative patterns are interpreted through real-world insights, producing a balanced and contextually grounded understanding. Given the scarcity of literature on Micro-Takaful in Sudan, integrating both forms of evidence are essential to formulate recommendations and propose a practical framework tailored to local needs. A research approach is the plan and procedure for conducting research that spans the steps from broad assumptions to detailed methods of data collection, analysis, and interpretation. It provides a framework for addressing the research question or problem and ensures the coherence and alignment of the research process. Research approaches can be broadly categorized into three types: Quantitative approach, Qualitative approach, and Mixed Methods approach.

In summary this study employs a Mixed Method approach - Explanatory sequential design. Both quantitative and qualitative research approaches are used to achieve its objectives and address the research questions. The quantitative approach seeks to investigate the factors influencing the adoption of Health Micro-Takaful in Sudan guided by the Theory of Planned Behaviour (Ajzen, 1991), this phase employs a quantitative online questionnaire, focuses on identifying the relationships between

variables and testing hypotheses to explain specific phenomena (Creswell & Creswell, 2018). The data collected is analysed to test the relationships between the key constructs: awareness, affordability, attitudes, subjective norms, and perceived behavioural control using behavioural intention as a mediator, and their impact on Health Micro-Takaful adoption. This approach provides empirical evidence to explain the behavioural drivers, perceptions and barriers to adoption. While the qualitative approach aims to uncover the opportunities and challenges associated with Health Micro-Takaful adoption in Sudan, using semi-structured, interviews with representatives from the Central Bank of Sudan, Family Bank-Sudan and the Insurance Supervisory Authority in Sudan. This method allows for an open-ended explanation of perceptions, obstacles, opportunities, and prospects related to Health Micro-Takaful adoption in Sudan.

5.5 QUANTITATIVE RESEARCH METHOD

5.5.1 Conceptual Framework

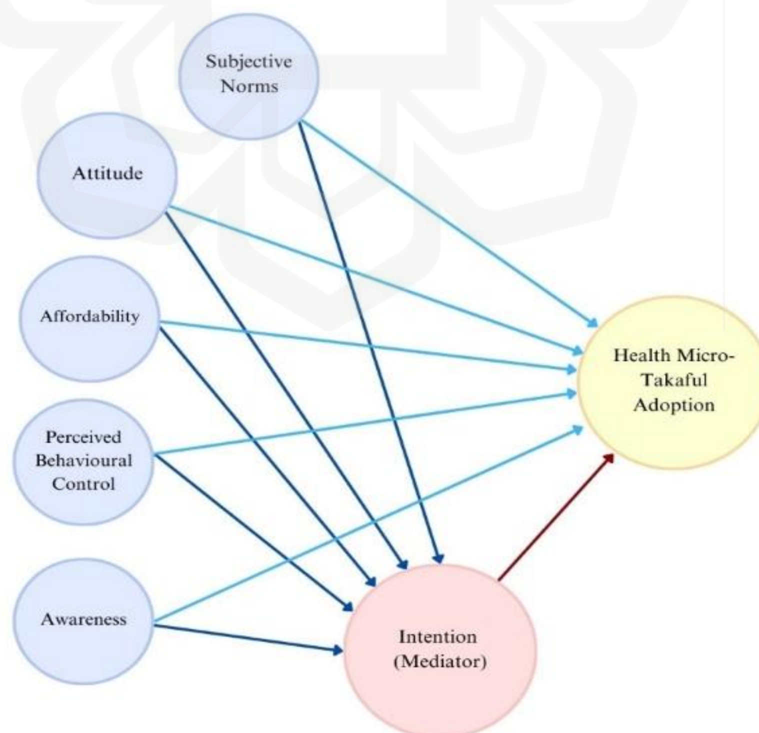

Figure 5.2. Conceptual Framework

In research, the conceptual framework describes the interrelated factors necessary for a correct comprehension of a phenomenon. The goal of the framework used in this study is to determine the pertinent factors for the Sudanese's adoption of Health Micro-Takaful. This study uses, a theoretical model based on the literature discussed in the previous chapters. Using the Theory of Planned Behaviour as the supporting theory of this research, the framework includes five independent variables as shown in figure 5.2. These variables are: Subjective Norms, Perceived Behavioural Control, Attitude, Awareness, and Affordability. In this structure awareness, and affordability are the extended variables. Intention acts as a mediator and Health Micro-Takaful Adoption is the dependant variable.

5.5.2 Data Collection

This study used a mixed-method approach to examine the perceptions, opportunities, challenges, and behavioural factors influencing the adoption of Health Micro-Takaful in Sudan. Quantitative data were collected through a structured questionnaire designed around the Theory of Planned Behaviour (Ajzen, 1991), focusing on awareness, affordability, attitudes, subjective norms, perceived behavioural control, and intention to adopt. The questionnaire was administered over six months using online platforms such as WhatsApp and social media groups commonly used by Sudanese adults. Participants were approached through invitation messages that briefly explained the purpose of the study, assured confidentiality, and included the survey link. This approach enabled access to respondents across different regions, particularly given the challenges of physical data collection in the Sudanese context during data collection period. Although the target population is all Sudanese adults aged 18 and above, the accessible population comprised individuals with internet access who could be reached through digital communication. This included participants from both urban and rural areas, with varying educational and employment backgrounds. Reaching a diverse demographic was essential, as perceptions of Health Micro-Takaful are shaped by geographic location, socioeconomic conditions, and exposure to financial services.

5.5.3 Study Area and Population

The study area for this study is Sudan, a Northeast African country with significant geographic and cultural diversity. Sudan is the third-largest nation on the continent, spanning roughly 1.89 million square kilometres. Its physical landscape ranges from expansive deserts to savannas and fertile zones along the Nile, where most agricultural activity is concentrated. The capital, Khartoum, lies at the convergence of the Blue and White Nile and serves as the administrative and economic hub of the country. Sudan's social structure is shaped by its rich cultural and linguistic variety, comprising hundreds of ethnic groups and more than a hundred spoken languages. The population is estimated at about 50.76 million, with a demographic distribution that is largely rural around two-thirds of Sudanese live outside urban centres. Rural communities often contend with limited access to healthcare, financial services, transportation, and other essential infrastructure, which contributes to ongoing socioeconomic vulnerability. The national economy relies heavily on agriculture and a substantial informal sector, both of which play a major role in household income generation.

Despite recurring political instability and economic constraints, Sudan continues to pursue structural reforms aimed at improving public welfare and financial inclusion. In determining the study population, the research considers the age of legal maturity in Sudan, which begins at 18 years[4]. Individuals at this age are granted full civil responsibilities and the legal capacity to enter contracts, vote, and engage in financial agreements (Dean et al., 2019). For this reason, the study includes Sudanese adults aged 18 and above, encompassing both urban and rural residents. This age group represents the primary audience for Health Micro-Takaful products and is central to understanding differences in awareness levels, perceptions of affordability, and overall acceptance of such schemes. Including respondents from both urban and rural settings allows the research to capture a wide spectrum of experiences. Urban areas typically benefit from more developed infrastructure and easier access to financial institutions, whereas rural communities face greater barriers due to distance, limited-service availability, and lower exposure to formal insurance mechanisms. This demographic variation is essential for examining how geographical, economic, and social factors

[4] www.worldpopulationreview.com

shape public perceptions of Health Micro-Takaful and, ultimately, influence its adoption across different segments of the Sudanese population.

5.5.4 Sampling Method and Sample Size

5.5.4.1 Sampling Method

According to Creswell, (2014), there are two ways of sample selection, it can be probability sampling (random) or nonprobability sampling (calculated). Probability sampling includes simple random sampling, systematic random sampling, stratified sampling and cluster sampling.

i. **Simple random sampling:** Every individual in the population of concern has an equal chance of being selected in the sample. Potential respondents are selected at random using various techniques, for example, a researcher wants to study the habits of undergraduate students in a particular university.

ii. **Systematic random sampling:** The researcher randomly selects a starting point on a list and then selects individuals systematically at a prespecified sampling period (e.g., every 50th individual). In systematic random sampling, both the starting point and the sampling time are determined by the required sample size.

iii. **Stratified random sampling:** Stratified random sampling is a method of sampling that involves dividing the population into distinct subgroups or "strata" based on a specific characteristic, and then randomly sampling from each stratum. This approach ensures that each subgroup is adequately represented in the sample (a researcher wants to study the academic performance of high school students based on their grade levels).

iv. **Cluster sampling:** Cluster sampling is a method where the population is divided into clusters, often based on geographical regions or other natural groupings. From these clusters, a random sample of clusters is selected, and then all or a random sample of elements within the chosen clusters are studied (a researcher wants to study teaching methods in high schools across a state).

Nonprobability sampling is a method of sampling where the samples are selected based on subjective judgment rather than random selection. This type of sampling is often used in exploratory research where the aim is to gain insights and understand phenomena rather than to generalize results to the entire population. Such designs enable researchers to study groups that may be challenging to identify. Nonprobability sampling includes purposive sampling, quota sampling, chunk sampling and snowball sampling.

i. **Purposive sampling:** Individuals are selected because they meet specific criteria (they are dentists).
ii. **Quota sampling:** The researcher targets a specific number of respondents with qualities (female teachers between the ages of 25 and 35 who are being promoted).
iii. **Chunk sampling:** Individuals are selected based on their availability (experts in cybersecurity).
iv. **Snowball sampling:** Researchers identify individuals meeting specific criteria, who in turn identify other potential respondents meeting the same criteria (a researcher studying a rare medical condition may start with a few known cases and ask those participants to refer others with the same condition).

Hence, the population is unknown the study employed non-probability purposive sampling for the quantitative component to ensure the representation of diverse demographic groups across Sudan (Bryman, 2012). The sample is randomly selected from the identified population, and all items have an equal chance of being selected based on key demographic characteristics, including age, gender, and employment status, to ensure proportional representation of different population subgroups.

5.5.4.2 Sample Size

In social science research, sample size refers to the number of observations or participants included in a study (Creswell & Creswell, 2018). The appropriate sample size depends on several factors, including the research design, the population size, the desired level of precision, and the statistical power required for the study. Sample size

is crucial because it affects the reliability and validity of the research findings. A sample that is too small may lead to inaccurate or unreliable results, while a sample that is too large may be unnecessarily costly and time-consuming. Researchers often use statistical techniques to determine the minimum sample size needed to achieve their research objectives while ensuring the results are generalizable to the larger population (Creswell & Creswell, 2018).

A well-determined sample size ensures that the study has sufficient power to detect meaningful effects or differences and reduces the risk of Type I (false positive) and Type II (false negative) errors. Type I errors are made when the data result in a rejection of the null hypothesis, but the null hypothesis is true, Type II errors (represented by β) are made when the data do not support a rejection of the null hypothesis, but the null hypothesis is false (Neyman,1928; Pearson;1967 cited by Voorhis & Morgan,2007). The choice of sample size should also consider practical constraints, such as the availability of participants and resources (Creswell & Creswell, 2018).

Many scholars recommended a suitable sample size for research, Kline (1979) and Gorsuch (1983) recommended that there should be at least 100 respondents. Some researchers used a rule of thumb to determine the research sample size. A rule of thumb is a general principle derived from practice or experience, rather than theory or scientific evidence, that guides behaviour or decision-making in various situations. These informal guidelines are often based on common sense and practical experience, providing quick and simple advice that can be easily applied in everyday life or professional contexts (McCarthy & Reilly, 2015).

In the context of determining research sample size, rules of thumb offer practical guidelines to help researchers estimate an appropriate number of participants for their studies. These rules are derived from experience and common practices rather than strict scientific principles, and they provide a quick way to make initial decisions about sample size. For example, a common rule of thumb for sample size in social science research is to have at least 30 participants per group or category being studied. This is based on the Central Limit Theorem, which states that the distribution of the sample mean will be approximately normal if the sample size is sufficiently large (usually $n \geq 30$) (Field, 2018).

A rule of thumb for factor analysis is 300 respondents (Van Voorhis & Morgan, 2007 cited Tabachnick & Fidell, 1996), another rule of thumb suggests that a minimum sample size of 100-200 participants is necessary to achieve reliable and valid results in quantitative studies (Cohen, 1992). Sekaran & Bougie (2010) stated that a rule of thumb for the sample size is 384 respondents, Pedhazur & Schmelkin (1991) advised that 50 participants per factor is sufficient (Pedhazur & Schmelkin, 1991 cited by Van Voorhis & Morgan, 2007). Hence, the questionnaire of this study has 50 items therefore, 250 respondents are sufficient. The sample used for this study is the Sudanese adults aged 18 years and above, in which about 400 questionnaires were distributed to the consumers in Sudan.

5.5.5 Research Instruments

Quantitative research data collection techniques are not limited to questionnaires; they encompass a variety of other techniques designed to gather numerical data. Here are some common methods used in quantitative research:

i. **Surveys and Questionnaires:** Structured forms with predefined questions designed to collect data from many respondents.
ii. **Experiments:** Controlled studies where variables are manipulated to observe their effects on other variables, allowing for cause-and-effect analysis.
iii. **Observational Studies:** Systematic observation and recording of behaviours or phenomena in their natural settings, often using checklists or coding systems.
iv. **Secondary Data Analysis:** Analysis of existing data collected by other researchers or organizations, such as census data, financial records, or health statistics.
v. **Content Analysis:** Quantitative analysis of the content of communication, such as media articles, books, or social media posts, often involving coding and statistical analysis.

These methods provide diverse approaches to collecting and analysing quantitative data, enabling researchers to address a wide range of research questions and hypotheses (Creswell & Creswell, 2018). This study uses questionnaire as the

research instrument. The questionnaire used in this study was developed directly from the constructs of the Theory of Planned Behaviour (TPB), which requires capturing respondents' evaluations, beliefs, and perceived abilities using structured and measurable items. For this reason, a Likert-scale format was adopted, as it allows respondents to express degrees of agreement in a clear and consistent manner. This format is widely applied in TPB-based studies because it enables the measurement of latent behavioural constructs that cannot be observed directly but can be inferred through patterned responses. In the context of this study, the scale provided a practical way to assess attitudes, subjective norms, perceived behavioural control, awareness, affordability, and intention among Sudanese adults.

5.5.5.2 Questionnaire Method

Here are brief explanations of various questionnaire methods commonly used in social science research:

i. **Likert Scale:** This method asks respondents to indicate their level of agreement or disagreement with a series of statements on a symmetric agree-disagree scale, typically ranging from "Strongly Disagree" to "Strongly Agree" (Likert, 1932).

ii. **Semantic Differential Scale:** Respondents rate a concept on a scale between bipolar adjectives (e.g., happy-sad, strong-weak). This technique measures the connotative meaning of objects, events, or concepts (Osgood et al., 1957).

iii. **Guttman Scale:** Also known as cumulative scaling, this method presents items in a specific order so that agreeing with an item implies agreement with all previous items, measuring a single underlying trait (Guttman, 1950).

iv. **Thurstone Scale:** This involves a series of statements representing different levels of agreement with a concept. Respondents indicate which statements they agree with, and responses are weighted to produce a score (Thurstone, 1928).

v. **Rating Scales:** Simple rating scales ask respondents to rate an item on a numerical scale, such as 1 to 10, based on their opinion or experience, and are widely applicable in various research settings (Allen & Seaman, 2007).

In this study, a Likert scale questionnaire was used, the Likert scale is a psychometric scale commonly used in questionnaires to measure attitudes, opinions, or behaviours. Named after its inventor, Rensis Likert, this scale typically presents a statement and asks respondents to indicate their level of agreement or disagreement on a symmetric agree-disagree scale for a series of statements. The most common form is the five-point Likert scale, which includes the following responses: Strongly Disagree, Disagree, Neutral, Agree, and Strongly Agree. Each response is assigned a numerical value (e.g., 1 for Strongly Disagree, 5 for Strongly Agree), and the sum or average of these values provides a quantitative measure of the attitude or opinion being studied (Likert, 1932).

The Likert scale is widely used because it is simple to construct, easy to understand, and provides a quantitative measure of subjective data, making it particularly useful in social science research, market research, and educational research. It helps researchers capture the intensity of respondents' feelings or attitudes towards a given statement, providing valuable insights into various phenomena. In social science research, the five-point Likert scale is widely used to measure attitudes, perceptions, and behaviours. For instance, Subedi (2016) explored the reliability and validity of the Likert scale in his study on social science research, addressing common issues and challenges. Similarly, Tanujaya et al. (2022) conducted comprehensive research on the problems and difficulties associated with using the Likert scale in social sciences. Furthermore, Kusmaryono et al. (2022) reviewed the reliability, validity, and potential bias of the Likert scale in education and social science research. These studies highlight the significance and versatility of the five-point Likert scale in capturing nuanced data in social sciences. Additionally, researchers like Davis (1989) have used the five-point Likert scale to assess the acceptance of new technologies. Also, Moghaddam et al. (2023) utilized a five-point Likert scale in their study based on the Theory of Planned Behaviour (TPB), measuring cognitive variables such as attitude, subjective norms, and perceived behavioural control.

For this study, an online questionnaire form was used to gather the study's primary data. Designed based on the Theory of Planned Behaviour (TPB) framework (Ajzen, 1991), with additional constructs like awareness and affordability. Includes demographic sections and Likert-scale items to capture detailed responses (Field, 2018).

The questionnaire's closed-ended format was designed to make data collection much simpler by giving respondents a range of suggested answers to select from. A five-point Likert-scale is used, and all the questions are close-ended. The questions have a ranging from 1 to 5 (1= strongly disagree to 5= strongly agree). According to Cooper & Schindler (2003), among other data-collecting tools, questionnaires are a simple and useful way to collect data. The questionnaire comprised two sections. Section A comprised nine questionnaire items and was used to seek the demographic features of the respondents. Section B comprised fifty (50) questionnaire measures and was used to measure attitude, subjective norms, perceived behavioural control, awareness, affordability, intention, and Health Micro-Takaful adoption.

To ensure that the instrument reflected the study’s conceptual framework, the initial set of items was reviewed by academics and practitioners familiar with Micro-Takaful, Islamic finance, and behavioural research. Their feedback helped refine item clarity and alignment with the constructs. A pilot test was then conducted to identify any issues with wording, comprehension, or item flow. The results of this pilot were used to adjust several items to improve clarity and reduce ambiguity. Reliability tests were also carried out to confirm the internal consistency of the main constructs before proceeding with full data collection.

The constructs or variables used in this questionnaire are adapted from the relevant theory and existing literature. Table (5.1) shows the construct and sources from which it is adapted.

Table 5.1. Construct and sources from which it is adapted

Construct / Variable	Source
Intention	Adapted from: (Hasan & Rahman, 2023), (Zulu et al., 2021)
Attitude	Adapted from: (Hasan & Rahman, 2023), (Zulu et al., 2021)
Subjective Norms	Adapted from: (Hasan & Rahman, 2023)
Perceived Behavioural Control	Adapted from: (Hasan & Rahman, 2023), (Zulu et al., 2021)

Construct / Variable	Source
Awareness	Adapted from: (G et al., 2021), (Razak et al., 2021), (Salman et al.,2017)
Affordability	Adapted from: (Zulu et al.,2021)
Health Micro-Takaful Adoption	Adapted from: (Schmidt,2019), (Bundi J. N Ngirwa,2014), (Mindra et al.,2022)

Several steps were taken to minimise potential biases in the responses. The questionnaire was anonymous. Items were written in neutral, non-leading language to avoid imposing value judgements or prompting specific types of answers, and clear instructions were provided to ensure respondents understood that there were no right or wrong answers. The questionnaire was prepared in English language originally and was translated into Arabic since it is the local spoken language in Sudan. Then the researcher consulted an Arabic language expert to check the translation and made it ready for validity and reliability and then distribution for data collection purposes. Minor adjustments were made to ensure that the wording remained simple, culturally appropriate, and easy to understand. These steps helped avoid misinterpretation and ensured that respondents could answer comfortably and confidently.

5.5.6 Data Analysis

The information was then analysed using the Statistical Package for the Social Sciences (SPSS 24), a potent tool for manipulating and deciphering survey data. The data collected from the survey questionnaire was converted into an Excel file containing each questionnaire and each respondent's answer; each question was given a code, and each answer had a correlated number to represent the answer. Then, SPSS was used to export the survey data; the SAV (Statistical Analysis System Variable) format simplifies the process of extracting, altering, and evaluating the data. SPSS then automatically imported the designated variable names, types, titles, and value labels, which eased the analysis process. This process enables the researcher to answer research questions and find meaningful data. Various methods and tests have been conducted to analyse the survey questionnaire answers, such as descriptive analysis to identify the

gender, age group, educational background, and income level. Then the data was analysed using SmartPLS 3.9 to assess the structural equation model (SEM) and test hypotheses (Ringle et al., 2015). Key variables include awareness, affordability, and behavioural intention (mediator).

5.5.7 Ethical Considerations

This research is committed maintaining the ethical considerations to ensure the rights, dignity, and well-being of all participants are respected. First, participants were fully informed about the purpose, scope, and objectives of the study. They were provided with clear information about their role, the voluntary nature of their participation, and the option to withdraw at any stage without any consequences. Also, protecting participants' identities and personal information is a priority. All data collected during this study was anonymised, and any identifying details were excluded from the analysis and reporting. Additionally, participation in this research was entirely voluntary. No pressure was applied, and participants had the freedom to decline or discontinue their involvement at any time. The research process was conducted with honesty and transparency. Participants were informed about how the findings would be used.

By observing these principles, this research attempts to create a safe and respectful environment for participants while contributing meaningfully to the understanding of Health Micro-Takaful adoption in Sudan.

5.5.8 Recruitment of Data Collector

Before starting the data collection, the researcher had a detailed conversation with a doctor in Omdurman City, Sudan, to explain the purpose of the study and its importance. The researcher also shared the ethical guidelines, including the need to ensure respondents' consent and understanding of the research objectives. The doctor kindly agreed to help by printing and personally distributing 100 questionnaires to people in Omdurman, targeting Sudanese adults over 18 years old, as this was the focus of the study. At that time, internet connectivity in the city wasn't reliable, so digital distribution wasn't an option. The doctor approached respondents in person, explained the study's goals, and encouraged them to participate. After collecting the completed

questionnaires, the doctor reviewed them for completeness and validity. During this process, two questionnaires were excluded due to incomplete responses, leaving 98 valid questionnaires. The doctor then carefully entered the data digitally and sent it back to the researcher. Their support was invaluable in ensuring the data collection process went smoothly and reached the intended respondents.

5.5.9 Validity and Reliability

Validity and reliability are critical concepts in research, particularly in the fields of social sciences and psychology, as they determine the accuracy and consistency of a study's findings (Trochim & Donnelly, 2006).

5.5.9.1 Validity

Validity refers to the extent to which a research instrument or method accurately measures what it is intended to measure. It assesses the truthfulness, authenticity, and effectiveness of the results. There are different types of validity, including:

i. **Construct Validity:** Ensures the test truly measures the concept it claims to measure (Trochim & Donnelly, 2006).

ii. **Content Validity:** Examines whether the test covers the entire range of the concept's meaning (Creswell & Creswell, 2018).

iii. **Face validity:** This is the most subjective aspect of validity testing. Experts and sample participants evaluate whether the questionnaire measures what it intends to measure during clinical sensibility testing (Anastasi & Urbina, 1997).

iv. **Criterion-Related Validity:** Assesses whether the test correlates with other measures that it is expected to correlate with (Heale & Twycross, 2015).

5.5.9.2 Validity of the Questionnaire

To ensure the validity of the research questionnaire, several steps were undertaken: The questionnaire was developed by adapting items from previous studies and aligning them with the Theory of Planned Behaviour (TPB), which serves as the theoretical framework for this study. This approach ensured that the questionnaire captured the key variables under investigation, including awareness, affordability, and using intention as a mediator to assess the adoption of Health Micro-Takaful in Sudan. To further enhance content validity, the questionnaire was reviewed by seven academic experts. Two experts from the International Islamic University Malaysia (IIUM) one from (MMU), one from INCEIF, one from Al-Madinah university in Malaysia, and two from Khartoum university and Al-Neelain university in Sudan, evaluated the questionnaire for clarity, relevance, and comprehensiveness. Based on their feedback, necessary modifications were made to ensure that the instrument effectively covered all aspects of Health Micro-Takaful adoption. The validation process of the questionnaire is discussed below:

5.5.9.3 Content Validity Analysis

To ensure the content validity of the questionnaire, the Content Validity Ratio (CVR) and Content Validity Index (CVI) were calculated based on expert evaluations. A total of seven experts reviewed the 50 items in the questionnaire. The experts were asked to assess each item as "essential," "useful but not essential," or "not necessary."

5.5.9.4 Content Validity Ratio (CVR)

The CVR was calculated for each item using the formula proposed by Lawshe (1975):

$$\text{CVR}=\frac{n_e-\left(\frac{N}{2}\right)}{N/2}$$

Where: CVR is Content Validity Ratio

- ne is the number of panel members indicating “essential”

- N is the total number of panel members (experts)

The results are as follows: 48 items were rated as "essential" by all seven experts, yielding a CVR of 1, indicating perfect agreement, 2 items were rated as "essential" by all experts but required minor language modifications for clarity, yielding a CVR of 1. Based on Lawshe's critical values table, the minimum acceptable CVR for seven experts is 0.99.

Table 5.2. Content Validity Ratio (CVR)

Number of Experts	Minimum Value of CVR	Number of Experts	Minimum Value of CVR
5	0.99	13	0.54
6	0.99	14	0.51
7	0.99	15	0.49
8	0.78	20	0.42
9	0.75	25	0.37
10	0.62	30	0.33
11	0.59	35	0.31
12	0.65	40+	0.29

Source: (Lawshe, 1975)

5.5.9.5 Content Validity Index (CVI)

The CVI was calculated to assess the overall relevance of the questionnaire items. Two levels of CVI were computed:

i. **Item-Level CVI (I-CVI):** For 48 items, all seven experts rated them as relevant, resulting in an I-CVI of 1. For the two items requiring language improvement, the I-CVI was 1.

ii. **Scale-Level CVI (S-CVI):** Universal Agreement (S-CVI/UA): 96% of the items (48 out of 50) achieved universal agreement among the experts.

iii. **Average (S-CVI/Ave):** The average I-CVI across all items was 0.99, indicating high content validity.

Table 5.3. Acceptable content validity index values

Number of experts	Acceptable CVI values	Source of recommendation
Two experts	At least 0.80	Davis (1992)
Three to five experts	Should be 1	Polit & Beck (2006), Polit et al., (2007)
At least six experts	At least 0.83	Polit & Beck (2006), Polit et al., (2007)
Six to eight experts	At least 0.83	Lynn (1986)
At least nine experts	At least 0.78	Lynn (1986)

Source: Yusoff (2019)

The analysis confirmed that the questionnaire has strong content validity, with most items achieving high CVR and CVI values and the two items were revised to improve language clarity based on experts' feedback.

5.5.9.6 Construct Validity

To ensure the reliability and accuracy of the measurements of this study, each variable's measures were adapted from validated instruments used in previous studies. These measures were carefully selected to align with the constructs defined by TPB and the extended variables specific to this research. Statistical validation of the constructs was carried out using Partial Least Squares Structural Equation Modelling (PLS-SEM) in SmartPLS (Hair et al., 2017). For convergent validity, the study will assess key indicators such as factor loadings, Average Variance Extracted (AVE), and composite reliability (CR) to confirm the validity of the constructs (Hair & Alamer, 2022). Additionally, discriminant validity was tested using the Fornell-Larcker criterion (Fornell & Larcker, 1981) and the Heterotrait-Monotrait (HTMT) ratio (Henseler et al., 2014) to confirm that each construct is distinct and measures a unique concept.

5.5.10 Evaluating the PLS Path Model

Once the measurement model is validated, the next step is to assess how well the structural model explains the relationships between variables. This evaluation will include Path coefficients, which indicate the strength and direction of relationships between variables (Chin, 1998). R^2 values, showing how much of the variation in the dependent variable can be explained by the independent variables (Hair & Alamer, 2022). Effect sizes (f^2), which help determine how much each predictor contributes to the model (Hair et al., 2017). Predictive relevance (Q^2) using the Stone-Geisser test, ensures that the model has real-world predictive power (Hair et al., 2017). Bootstrapping analysis is a technique that tests the statistical significance of relationships and supports hypothesis testing (Hair et al., 2017).

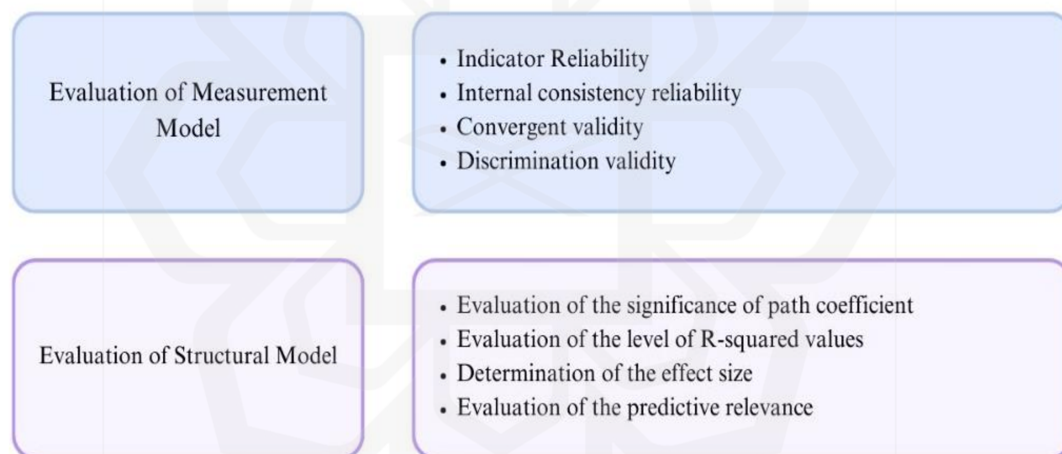

Figure 5.3. Procedures of PLS Path Model Evaluation (Hair et al., 2017)

By following this structured approach, the study ensures that both the measurement and structural models are robust, reliable, and capable of offering meaningful insights into the adoption of Health Micro-Takaful in Sudan.

5.5.11 Reliability

Reliability refers to the consistency and dependability of a measurement or assessment tool in producing stable and consistent results over time and across different situations (Heale & Twycross, 2015). In research, reliability ensures that the data collected are not significantly affected by random errors, biases, or inconsistencies (Drost, 2011). Thus, the reliability test was carried out on all the variables. The research instrument employed in the study consisted of two sections. The first section, which contains nine questions, requested the demographic information of respondents. The subsequent section consists of a total of 50 questions on awareness, affordability, behavioural intention, subjective norms, perceived behavioural control, attitude, and Health Micro-Takaful adoption. All these variables were measured on a 5-point Likert scale.

5.5.12 Reliability of the Questionnaire

In determining the internal consistency of these questionnaires, a reliability test was carried out to determine how internally consistent the questionnaires were in measuring what they intended to measure. In social science research, the most frequently utilized measure of internal consistency, especially when using Likert scales, is Cronbach's Alpha. Cronbach's Alpha assesses how well a set of items measures a single unidimensional latent construct (Heale & Twycross, 2015). It calculates the average correlation among items within a scale, providing a coefficient that represents the overall reliability (Heale & Twycross, 2015).

5.5.13 Interpreting Cronbach's Alpha:

According to Heale & Twycross, (2015): Values below 0.7 may indicate that the items do not consistently measure the same construct and may need revision. A value of 0.7 or higher is generally considered acceptable for internal consistency. Values between 0.8 and 0.9 indicate good reliability, while values above 0.9 suggest excellent reliability (Heale & Twycross, 2015). The most acceptable minimum coefficient for Cronbach's Alpha is generally 0.70. A coefficient of 0.70 or higher is considered acceptable for internal consistency in most social science research contexts (Nunnally & Bernstein, 1994). For pilot research, a reliability coefficient should be equal to or greater than 0.70.

This level is generally considered acceptable for ensuring the internal consistency of the measurement tool, even in preliminary studies (Hertzog, 2008).

5.5.14 Validity, Reliability and Trustworthiness of the Qualitative- interviews

To ensure the validity of the qualitative findings, the interview questions were carefully designed to align with the study objectives and reviewed by two academic staffs of IIUM, three from other universities academic staffs, Multimedia University (MMU), Al-Madinah University-Malaysia, and Khartoum University, and one microfinance expert from Sudan to validate the interview questions. Their feedback was helpful in refining the questions to ensure clarity, relevance, and alignment with the research goals. The final set of questions was then used in an in-depth interview with an experienced professional from the Takaful industry in Sudan, who has over 10 years of expertise. This participant was selected for their extensive knowledge and practical insights into the topic, enhancing the credibility of the findings. Reliability was addressed by maintaining a consistent approach during the interview process.

The same set of questions was used, and the interview was conducted in a structured manner to ensure uniformity. The conversation was recorded and transcribed accurately to preserve the accuracy of the data. These steps ensured that the findings could be consistently replicated under similar conditions. To establish trustworthiness, the study adhered to ethical research practices, including informing the participant about the purpose of the study and ensuring confidentiality. The participant was assured that their identity and responses would remain anonymous, fostering an open and honest discussion. Additionally, the researcher remained aware of potential biases and their influence on the data interpretation process. The credibility of the findings was further enhanced by incorporating feedback from professors during the design phase and selecting participants with large industry experience. These measures contribute to the reliability and confirmability of the study, ensuring that the results are both reliable and grounded in real-world expertise.

Both research instruments (questionnaires and interviews) used the Arabic language to accommodate the linguistic preferences of the respondents. Ethical

approval was obtained before data collection, and informed consent was secured from all participants.

5.6 QUALITATIVE APPROACH

5.6.1 Data Collection

For the qualitative phase, semi-structured interviews were conducted with representatives from the Central Bank of Sudan (CBoS), Family Bank-Sudan, the Insurance Supervisory Authority in Sudan, and Takaful provider to explore opportunities and challenges in detail (Yin, 2018). Legal requirements data was collected from secondary sources such as government publications.

5.6.2 Interview Protocol

The interview protocol was refined based on feedback from five academic experts: two from IIUM and three from other universities' academic staffs, Multimedia University (MMU), Al-Madinah University-Malaysia, and Khartoum University. Their suggestions focused on improving the language clarity, relevance, and alignment of the questions with the research objectives. Following their feedback, the questions were reviewed to ensure they were concise, easy to understand, and capable of obtaining meaningful responses. Additionally, an initial interview was conducted with an employee from an Islamic insurance (Takaful) company with ten years of experience. This pilot interview provided practical insights into the flow of the questions and their effectiveness in capturing relevant information. Based on this, minor adjustments were made to simplify complex questions. These steps ensured that the interview protocol was well-structured and ready for use with the broader participant group.

5.6.3 Participant Recruitment

The recruitment process focused on identifying individuals who could provide diverse and insightful perspectives on the adoption of Health Micro-Takaful in Sudan. Participants were selected using purposive sampling to ensure they represented

policymakers and Takaful regulators. The recruitment process began with reaching out to expert individuals from organizations involved in the Takaful sector. A clear and friendly invitation was sent to potential participants, explaining the purpose of the study and the importance of their input in developing a Health Micro-Takaful framework tailored to Sudanese needs. To facilitate trust and transparency, all participants were provided with a consent form detailing the purpose of the study, the confidentiality of their responses, and their right to withdraw at any time. This careful and ethical approach ensured the recruitment of participants who could contribute valuable insights to the study.

5.6.4 Population

This phase will focus on a targeted study population comprising policymakers and regulators as they play a main role in the adoption of Health Micro-Takaful in Sudan. Policymakers from the Central Bank of Sudan (CBoS), Family Bank, Al Baraka Insurance company, and the Insurance Supervisory Authority in Sudan were included to provide insights into the regulatory frameworks, policies, and strategies influencing Health Micro-Takaful adoption. Additionally, the interviews will help to understand their perspectives on the feasibility, challenges, and opportunities of offering Health Micro-Takaful products. This study population is carefully chosen to ensure that the qualitative data reflects the key drivers and barriers from the supply-side stakeholders, offering a comprehensive understanding of the structural and policy-level factors shaping Health Micro-Takaful adoption in Sudan.

5.6.5 Sampling Method and Sample Size

5.6.5.1 Sampling Method

Below are the commonly used sampling methods and considerations for sample size in qualitative research:

i. **Purposive Sampling:** Researchers select participants based on specific characteristics or criteria relevant to the research question. This method is intentional and focused on obtaining rich, relevant data (Patton, 2002).

ii. **Snowball Sampling:** Current participants refer new participants from their networks. This method is useful for reaching hidden or hard-to-reach populations (Creswell & Creswell, 2018).

iii. **Convenience Sampling:** Participants are selected based on availability and willingness to participate. While not ideal for generalizability, it can be effective for exploratory studies (Marshall, 1996).

iv. **Theoretical Sampling:** Used in grounded theory research, participants are selected based on emerging concepts during data collection and analysis (Glaser & Strauss, 2017).

In this study, a purposive sampling method was employed to select policymakers, and Takaful practitioners with in-depth knowledge of Micro-Takaful (Palinkas et al., 2015).

5.6.5.2 Sample Size

Sample sizes can vary significantly based on the research design and method:

i. **Phenomenological Studies:** Generally, 5 to 25 participants (Creswell, 2013).

ii. **Grounded Theory Studies:** Typically, 20 to 30 participants (Charmaz, 2006).

iii. **Ethnographic Studies:** Often involve extended observations and interactions with a smaller number of participants, sometimes fewer than 10 (Fetterman, 2010).

iv. **Case Studies:** Usually involve in-depth exploration of one or a few cases (Stake, 1995).

Qualitative research typically involves smaller sample sizes compared to quantitative research. The emphasis is on data saturation, where collecting additional data no longer adds new information or insights to the study (Guest et al., 2006).

For this study, the sample size is 6 participants, from the Central Bank of Sudan, the Family Bank in Sudan, Al Baraka Insurance Company, and the Insurance Supervisory Authority in Sudan.

5.6.6 Research Instrument

Qualitative research instruments are tools and methods used to collect non-numerical data to gain insights into people's experiences, behaviours, and perceptions. Some commonly used instruments in qualitative research are briefly discussed below:

i. **Interviews:** Interviews are a primary tool for collecting detailed and in-depth information. They can be structured, semi-structured, or unstructured, depending on the level of flexibility desired (Johnson, 2001; (Kvale, 2007).
ii. **Focus Groups:** Focus groups involve guided discussions with a small group of participants to explore their views and experiences on a particular topic. This method allows for the collection of diverse perspectives (Krueger, 2014).
iii. **Observation:** Observational methods involve systematically watching and recording behaviours and interactions in natural settings. This can be participant observation, where the researcher is actively involved, or non-participant observation, where the researcher is a passive observer (Patton, 2002).
iv. **Document Analysis:** This method involves the systematic examination of documents such as letters, diaries, reports, photographs, and other items to gather data relevant to the research question (Bowen, 2009).
v. **Field Notes:** Researchers use field notes to record observations, reflections, and insights during or immediately after data collection sessions. These notes provide context and detail that can enrich the analysis (Emerson et al., 2011).

This study uses semi-structured interviews in the qualitative phase to capture in-depth insights into the perceptions, opportunities, and challenges related to Health Micro-Takaful adoption in Sudan. This method allows for a guided exploration of key themes while providing respondents with the freedom to express their views in their own words, ensuring that unexpected but relevant issues can emerge freely. Given that Micro-Takaful in Sudan is still immature, semi-structured interviews are particularly valuable in obtaining information that may not be captured through fixed-response surveys. Additionally, this approach aligns well with the study's objectives to

complement the quantitative findings by gaining a deeper understanding of related factors and stakeholder perspectives. Questions are open-ended to allow participants to share insights freely (Rubin & Rubin, 2011).

The study also relied on secondary data including the Central Bank of Sudan reports about the state of the Takaful industry in Sudan as well as the legal and regulatory environment of the Takaful sector. Other existing works including journal articles and documents that were of relevance to the study were accessed.

5.6.7 Data Analysis

Data analysis involves interpreting non-numerical data to understand patterns, themes, and insights. Here are some commonly used qualitative data analysis methods:

i. **Thematic Analysis:** This method involves identifying, analysing, and reporting patterns (themes) within data. It is widely used for its flexibility and can be applied across various research questions (Braun & Clarke, 2006).
ii. **Content Analysis:** Systematically categorizes textual or visual data into themes or patterns. It can be used to analyse written, verbal, or visual communication (Hsieh & Shannon, 2005).
iii. **Grounded Theory:** This approach involves generating theory from data through iterative coding and constant comparison. It is particularly useful for developing new theoretical insights (Glaser & Strauss, 2017).
iv. **Narrative Analysis:** Focuses on the stories and personal accounts of participants, interpreting the structure and content of their narratives to understand how they make sense of their experiences (Riessman, 2008).
v. **Discourse Analysis:** Examines how language is used in texts and conversations to understand social and power dynamics. It explores the ways in which discourse shapes and is shaped by social contexts (Fairclough, 1995).
vi. **Phenomenological Analysis:** Aims to understand the essence of lived experiences from the perspective of the participants. It involves in-depth analysis of participants' descriptions of their experiences (Moustakas, 1994).

vii. **Case Study Analysis:** Involves an in-depth exploration of a single case or a small number of cases within their real-life context. It is useful for gaining a comprehensive understanding of complex issues (Yin, 2018).

Thematic analysis offers several advantages, making it a popular choice for qualitative researchers. Its flexibility allows it to be adapted to various types of qualitative data and research questions, as it is not bound by any specific theoretical framework (Braun & Clarke, 2006). The method is relatively straightforward to learn and apply, providing clear, systematic procedures for data analysis, which makes it accessible to researchers with different levels of experience (Braun & Clarke, 2013). The thematic analysis allows for a detailed and nuanced analysis of data, capturing the richness of participants' meanings and experiences (Guest et al., 2012). The step-by-step process of thematic analysis enhances the transparency of the research, ensuring that findings are well-founded and replicable (Nowell et al., 2017). Additionally, its flexibility means it can be applied to a wide range of qualitative data sources, such as interviews, focus groups, and textual documents, making it suitable for various research contexts (Boyatzis, 1998).

According to Braun and Clarke (2006), the researcher must follow six steps to perform thematic content analysis.

i. **Familiarization with the Data:** Begin by thoroughly reading and re-reading the data to become familiar with the content. This includes noting any initial impressions and thoughts (Braun & Clarke, 2006).
ii. **Generating Initial Codes:** Systematically work through the data to identify meaningful segments. Assign labels (codes) to these segments to capture important aspects of the data that relate to the research question (Boyatzis, 1998).
iii. **Searching for Themes:** Group related codes into potential themes. A theme represents a pattern within the data that is significant to the research question. This step involves organizing codes into broader themes that capture the essence of what is being said (Braun & Clarke, 2006).
iv. **Reviewing Themes:** Refine the themes by checking them against the coded data and the entire dataset. This step ensures that the themes accurately represent the data and are coherent and distinct (Nowell et al., 2017).

v. **Defining and Naming Themes:** Clearly define each theme and determine what aspect of the data it captures. Create concise names for each theme that convey the essence of the theme (Braun & Clarke, 2006).

vi. **Writing the Report:** Present the findings in a coherent and logical manner. This includes a detailed analysis of each theme, supported by relevant data extracts. The report should provide a compelling story of the data in relation to the research question (Braun & Clarke, 2013).

Thematic analysis was chosen for the qualitative data in this study because it provides a flexible and systematic approach to identifying, analysing, and interpreting patterns or themes within the data. This method is particularly well-suited for exploring participants' perceptions and experiences, as it allows the researcher to uncover accurate insights that align with the study's focus on the opportunities and challenges of Health Micro-Takaful adoption in Sudan. By organizing the data into meaningful themes, thematic analysis helps to generate a comprehensive understanding of the contextual factors influencing Health Micro-Takaful adoption in Sudan. The manual coding was used to organize data.

5.7 PILOT STUDY – QUANTITATIVE PHASE

5.7.1 Instrument Reliability Test

The reliability of the instruments was assessed in a quantitative study using the internal consistency reliability test of Cronbach's alpha coefficient. Internal consistency, which examines the correlation between the items, determines the accurate fit of the items in an instrument (DeVon et al., 2007). Cronbach's alpha was used to evaluate the questionnaire's internal consistency. If an instrument includes two or more subscales, Cronbach's alpha should be computed for the whole scale and each subscale. Cronbach's alpha was calculated after construct validation to determine the consistency and reliability of exploring the Adoption of Health Micro-Takaful. Despite differences in opinion regarding the ideal alpha value, the coefficient alpha values range from non-to-perfect reliability (0–1). Several experts suggested that a coefficient value of at least.70 constitutes "acceptable" dependability, while a value of at least.80 indicates "good reliability. "Reliability of .90 is regarded as "excellent" (DeVon et al., 2007; Sekaran &

Bougie, 2010). However, for the variables in this study, the Cronbach's Alpha value for each item was determined using SPSS 24. According to the Table below, all the study's items are above the 07 criteria, indicating that they are acceptable.

Table 5.4. Reliability of Scales and Sub-scales

Sub-Scale	Numbers of Items	Cronbach's Alpha
Attitude	7	.908
Intention	7	.746
Subjective norms	10	.799
Perceived Behavioural Control	6	.949
Awareness	6	.844
Affordability	5	.914
Health Micro-Takaful Adoption	9	.827
Total	50	.910

5.7.2 Insights From the Pilot Interview

The pilot interview offered an early understanding of the practical realities surrounding Health Micro-Takaful adoption in Sudan. The participant highlighted several issues that frequently discourage individuals from enrolling in Takaful schemes. A recurring problem is the limited public awareness of how Takaful products operate, particularly regarding the scope of coverage and the conditions attached to membership. Many potential subscribers are unsure about the benefits included in a policy, while others encounter restrictions related to age or pre-existing illnesses, which leaves vulnerable groups with fewer options for coverage. Affordability also emerged as a central concern. For many individuals, even modest contributions can be difficult to sustain, especially in communities where income levels fluctuate.

The interviewee noted that access to healthcare facilities within the Takaful network is often limited, making it challenging for subscribers who live far from approved hospitals. Concerns about governance and the reliability of Takaful providers

were also mentioned, reflecting broader issues of institutional trust that affect many financial products in Sudan. One of the more specific challenges raised in relation to Health Micro-Takaful is the inconsistency in community contributions. In many local schemes, not all members make their payments consistently, creating financial gaps that risk the sustainability of the programme. This issue is particularly important for a micro-level model that depends on small but regular contributions from participants. The respondent also underscored the need for greater clarity during the contract process. Many subscribers sign documents without understanding the details of what is covered, which often leads to dissatisfaction when expectations do not match the actual services received. In recommending improvements to the proposed Health Micro-Takaful framework, the participant emphasised transparency, clear communication of benefits, and precise definition of the target groups. These elements were viewed as essential for building trust and ensuring that the model responds effectively to the needs of its intended beneficiaries. The insights from the pilot interview serve as an important foundation for the main qualitative phase. They highlight practical gaps and community-level concerns that must be addressed in the final framework to ensure its feasibility and long-term resilience.

5.8 CHAPTER SUMMARY

This chapter outlined the methodological structure adopted for the study and explained how each component contributes to addressing the research questions. It began by presenting the overall research design and theoretical framework, which form the basis for developing the study's hypotheses. The quantitative phase was introduced first, detailing the use of a structured questionnaire, the justification for the instrument, and the procedures for sampling, data collection, and analysis through SmartPLS. The chapter then discussed the study area, population, and sample size, demonstrating how the selected respondents reflect the characteristics required for examining the determinants of Health Micro-Takaful adoption. In the qualitative phase, the chapter described the application of semi-structured interviews, the selection of key informants from regulatory and institutional bodies, and the approach to thematic analysis used to interpret their perspectives. Together, these methodological elements provide a coherent and systematic foundation for the study, allowing it to integrate statistical

evidence with contextual insights to better understand the opportunities and challenges shaping Health Micro-Takaful adoption in Sudan.

CHAPTER SIX

RESULTS AND DATA ANALYSIS

6.1 QUANTITATIVE PHASE - THE QUESTIONNAIRE

6.1.1 Introduction

This chapter presents the research results and data analysis, highlighting each step of the analysis process. The chapter begins with the data screening and cleaning procedures, a crucial step to ensure the accuracy and quality of the data. This involves checking the data for any inconsistencies, errors, or outliers that may affect the results of the research. A descriptive analysis is then conducted to establish the validity and characterize the data distribution. This involves assessing the data’s central tendencies, variances, and distribution shapes, which are fundamental aspects to confirm the data's suitability for further analysis. Subsequently, the measurements and structural models are assessed to test all the postulated hypotheses. This involves evaluating the relationships between variables and determining whether the observed data supports the expected outcomes presented in the hypotheses. Each of these steps is crucial in ensuring the robustness and validity of the study’s findings.

6.1.2 Data Screening and Cleaning

Prior to conducting data analysis, it is essential to perform a thorough screening and cleaning of the dataset to ensure its suitability for analysis (DeSimone et al., 2015). This process is critical for addressing potential issues that could compromise the accuracy or reliability of the findings. The primary objective of this stage is to prepare the dataset for analysis, enabling the testing of the proposed hypotheses effectively (Pallant, 2020). Data screening involves verifying the accuracy of data entry to identify and correct any inconsistencies or errors that may have occurred during the data collection or input process. Additionally, the process includes handling missing values, as missing data can distort results and impact the validity of statistical tests. DeSimone et al. (2015) emphasize that appropriate methods must be applied to address missing data, such as imputation techniques or exclusion criteria, to maintain the integrity of the dataset. By

carefully executing data screening and cleaning, researchers can ensure that the dataset is free from significant errors and ready for meaningful analysis. This step is a fundamental part of the research process, laying the groundwork for generating accurate and reliable conclusions.

6.1.3 Data Coding and Entering

Data coding and entering involve the process of transforming the collected data into a format that can be easily and accurately manipulated in subsequent analyses. Data coding involves assigning numerical values or codes to the variable, and responses collected in the survey or experiment, while data entering refers to the process of inputting the coded data into a software package for statistical analysis. Table 6.1 below presents the applicable variables in the study with their assigned coding.

Table 6.1. Coding Table

S/N	Variables	Coding
1	Attitude	ATT
2	Intention	INT
3	Subjective Norms	SBN
4	Perceive Behavioural Control	PBC
5	Awareness	AWN
6	Affordability	AFR
7	Health Micro-Takaful Adoption	HMTA

6.1.4 Data Screening

Prior to executing the primary analysis, the acquired quantitative data was checked for errors. Pallant, (2020) states that the examination of data prior to the principal analysis is essential for discovering and fixing any problems that may have arisen during data entry or processing. It is crucial to prevent any inaccuracies that may distort data analysis outcomes, including correlations. Four categories of concerns require attention

during the data screening process: missing data and Response Validity, outlier management, and normality (Hair et al., 2012; Pallant, 2020). The following section offers a concise overview of missing data as well as response validity, outlier management, and normality assessment to ensure data integrity, reduce bias, and enhance reliability and validity.

6.1.4.1 Missing Data

Missing data poses a potential threat to the validity of statistical findings, as it can bias parameter estimates and reduce statistical power (Sekaran & Bougie, 2016). In this study, data were collected through both online Google Forms and paper-based questionnaires, resulting in a total of 428 usable responses.

Prior to data analysis, the dataset was carefully screened for missing values. The overall percentage of missing data was very low, at less than 2% across all variables, which is well below the commonly accepted threshold of 5% (Hair et al., 2019). Little's MCAR test was conducted to assess the mechanism of missingness, and the results indicated that the data were Missing Completely at Random (MCAR). This suggests that the probability of missingness was unrelated to either the observed or unobserved data, thereby reducing the risk of systematic bias.

To handle missing data, the mean substitution method was applied, whereby missing values were replaced with the mean of the corresponding item. This approach is considered appropriate for datasets with low levels of missingness (Allison, 2002), as it maintains the overall sample size while minimizing the loss of information. Alternative methods such as listwise deletion were avoided to preserve the statistical power of the analysis.

By adopting this procedure, the dataset was rendered complete, ensuring that subsequent analyses including descriptive statistics, measurement model assessment, and structural model testing were conducted on a reliable and representative sample. This careful treatment of missing data strengthens the robustness and validity of the study's findings.

6.1.4.2 Outlier Screening

Outliers are data points that markedly diverge from the majority findings, potentially distorting the study. Univariate outliers were determined by Z-scores, with values over ±3.29 regarded as exceptional (Ebner & Henze, 2020). Multivariate outliers were identified utilizing Mahalanobis distance, with thresholds established at $p < 0.001$ (Hair et al., 2019). Data entry errors were rectified; however actual extreme values were maintained to uphold the dataset's inherent unpredictability and improve the validity of the findings. After a thorough assessment, no significant outliers were detected, confirming the dataset’s suitability for subsequent analysis.

6.1.4.3 Normality Test

The normality assumption is an important consideration in multivariate analysis, as it influences the choice of statistical techniques and the validity of inferences (Hair et al., 2010). Normality is typically assessed using skewness and kurtosis, which provide information about the symmetry and peakedness of the data distribution, respectively (Little & Rubin, 2019). Skewness values close to zero suggest symmetric distributions, while kurtosis values near zero indicate a mesokurtic (normal-like) distribution. Acceptable thresholds commonly used are ±2 for skewness and ±7 for kurtosis (West et al., 1995; Hair et al., 2017). Table 6.2 presents the results of the normality test using skewness and kurtosis for all study constructs.

Table 6.2. Normality Test using Skewness and Kurtosis

Variables	N	Mean	Std. Deviation	Skewness	Std. Error of Skewness	Kurtosis	Std. Error of Kurtosis
ATT	428	4.3251	.67346	-1.016	.118	1.821	.235
INT	428	4.2438	.69121	-.915	.118	1.836	.235
SBN	428	4.0421	.60382	-1.224	.118	3.126	.235
PBC	428	3.7917	.65506	-.874	.118	1.976	.235
AWN	428	3.8364	.99719	-.540	.118	-.391	.235
AFR	428	3.2145	.65421	.255	.118	-.010	.235
HMTA	428	4.1246	.77462	-.884	.118	1.394	.235

The results show that all skewness values range between -1.224 and +0.255, while kurtosis values range between -0.391 and +3.126. These values fall within the acceptable thresholds (±2 for skewness; ±7 for kurtosis), indicating that none of the constructs deviate significantly from normality. The distributions are therefore approximately normal, though some variables (e.g., Subjective Norms, kurtosis = 3.126) are moderately leptokurtic, suggesting a slightly peaked distribution.

Since this study applies PLS-SEM, strict normality is not required because the method is distribution-free and well-suited for non-normal data (Hair et al., 2017). Nevertheless, confirming approximate normality enhances confidence in the robustness of the results and supports the use of parametric tests for descriptive and comparative analyses conducted prior to SEM. In conclusion, the data in this study can be considered approximately normal, and no severe deviations were detected that would compromise subsequent analyses.

6.1.5 Descriptive Analysis

In this section, the descriptive statistics of the collected data are presented. Descriptive analysis involves examining the basic features of the data to provide a summary and an initial understanding of the variables included in the study. It includes calculating measures such as mean, median, mode, standard deviation, and range for continuous variables, as well as frequency and percentage for categorical variables (Mirkin, 2019). This analysis helps provide a general overview of the data, identify potential outliers or anomalies, and serve as a foundation for further, more complex analyses.

6.1.5.1 Demographic Profiles of the Respondents

In this present study, the respondents' demographic profiles were examined and described according to nine classifications. The respondents' demographic profiles are gender, age, education, marital status, income per month, labour or type of business sector, state or region, Health Takaful status and their working status. The following sections present more of the statistical analysis in a table and corresponding diagrams.

Table 6.3. Demographic Profiles of the Respondents

Variables	Coding	Frequency	Percentage %
Gender	Male	185	43.2
	Female	243	56.8
Age	18 -25	26	6.1
	26 -35	98	22.9
	36 – 45	117	27.3
	46 and above	187	43.7
Educational Level	PhD	96	22.4
	Masters	107	25.0
	Bachelor's	181	42.3
	Diploma	37	8.6
	Secondary school	7	1.6
Marital Status	Single	83	19.4
	Married	326	76.2
	Divorced	9	2.1
	Widow	10	2.3
Income per-month	3,000 – 100,000	88	20.6
	100,001- 200,000	34	7.9
	200,001- 300,000	49	11.4
	300,001 - 400,000	80	18.7
	400,001 - 500,000	177	41.4
Labour/business sector	Agriculture	22	5.1
	Education	128	29.9
	Health	62	14.5
	Communications	28	6.5
	Banking and Financial services	16	3.7
	Police/Army	15	3.5
	Other	157	36.7
State	Khartoum	375	87.6
	Nile River	18	4.2

Variables	Coding	Frequency	Percentage %
	Red Sea	15	3.5
	Others	20	4.7
Working Status	Working	290	67.8
	Not working	117	27.3
	Retired	21	4.9
Health Takaful Status	Insured	145	33.9
	Not Insured	283	66.1
Total		428	100.0

The gender distribution of the respondents, as presented in Table 6.3 and illustrated in Figure 6.1, shows that out of a total sample of 428 respondents, 185 (43.2%) are male, while 243 (56.8%) are female. This indicates that females constitute a larger proportion of the respondents compared to their male counterparts. The graphical representation further reinforces this finding, highlighting a slight gender imbalance in favour of female participants. This distribution may have implications for the study findings, particularly if gender-specific perspectives or behaviours are relevant to the research objectives. Therefore, this imbalance should be taken into consideration when interpreting the results and drawing conclusions.

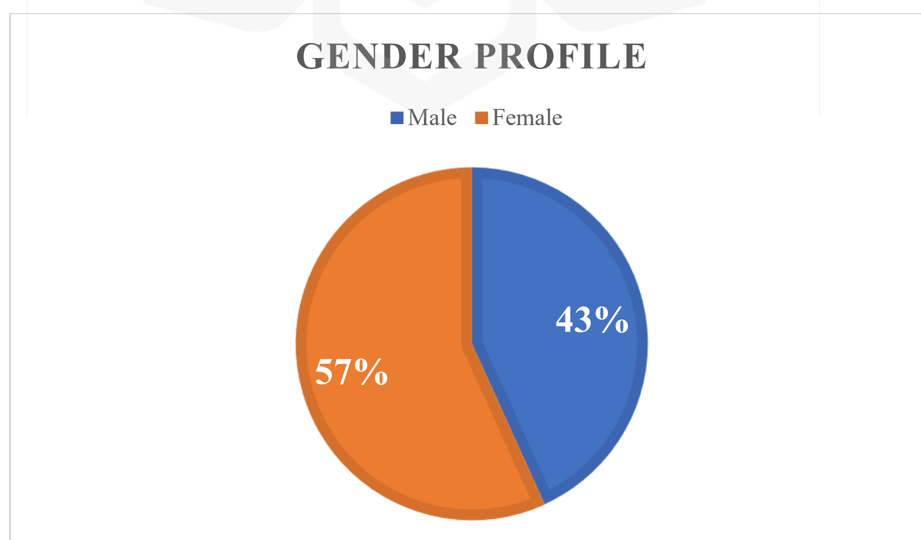

Figure 6.1. Gender profile

The age distribution of the respondents, as shown in Table 6.3 and illustrated in Figure 6.2, indicates that out of the total sample of 428 respondents, the largest proportion, 187 (43.7%), falls within the 46 and above age group. This is followed by 117 (27.3%) respondents aged 36–45, while 98 (22.9%) belong to the 26–35 age category. The smallest group comprises respondents aged 18–25, with 26 (6.1%) participants. The graphical representation in Figure 6.2 further highlights the dominance of older age groups, particularly those aged 46 and above. This distribution suggests that a significant portion of the respondents are middle-aged or older, which may have implications for the study, especially if age-related factors influence the research outcomes. These findings should be carefully considered when analysing and interpreting the results.

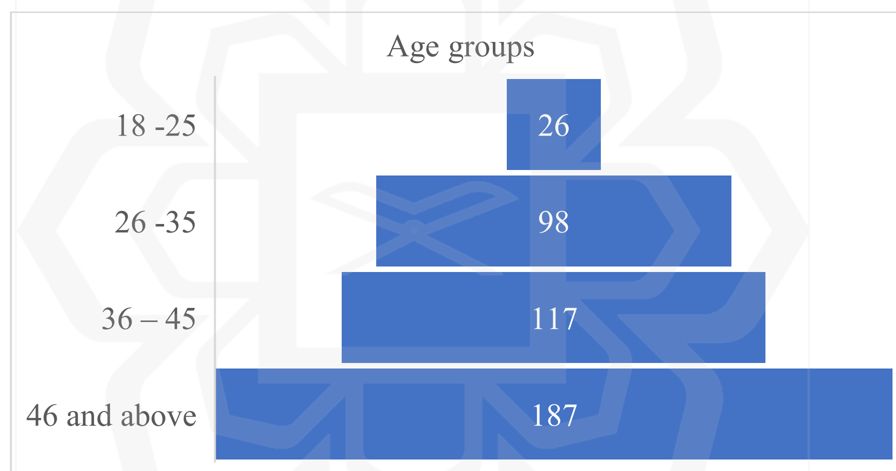

Figure 6.2. Age group profile

The educational level distribution of the respondents, as presented in Table 6.3 and illustrated in Figure 6.3, shows that out of a total sample of 428 respondents, the majority hold a bachelor's degree with 181 (42.3%) participants. This is followed by 107 (25.0%) respondents with a master's degree and 96 (22.4%) holding a PhD. A smaller proportion of respondents have a Diploma, accounting for 37 (8.6%), while only 7 (1.6%) completed up to Secondary school. The graphical representation in Figure 6.4 further reinforces these findings, highlighting the dominance of respondents with higher educational qualifications, particularly at the bachelor's and postgraduate levels. This distribution suggests that the respondent pool is well-educated, which may influence

the study outcomes, particularly in areas where educational attainment plays a significant role in shaping perspectives or behaviours.

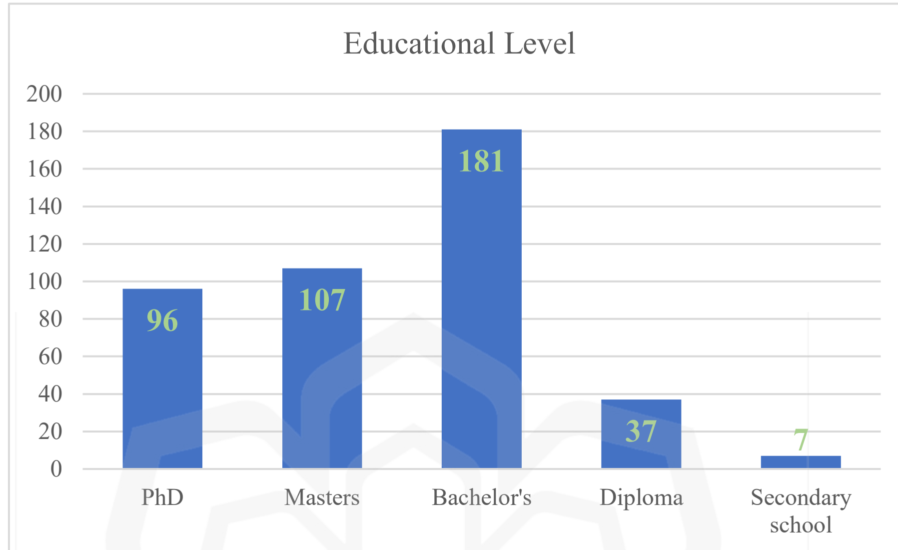

Figure 6.3. Educational Level

The marital status distribution of the respondents, as presented in Table 6.3 and illustrated in Figure 6.4, reveals that out of the total sample of 428 respondents, the majority are Married, accounting for 326 (76.2%). This is followed by 83 (19.4%) respondents who are Single, while smaller proportions are Widow at 10 (2.3%) and divorced at 9 (2.1%). The graphical representation in Figure 6.5 further emphasizes the dominance of married respondents within the sample. This distribution indicates that most of the respondents are in committed marital relationships, which may have implications for the study, particularly if marital status influences the variables or outcomes being examined.

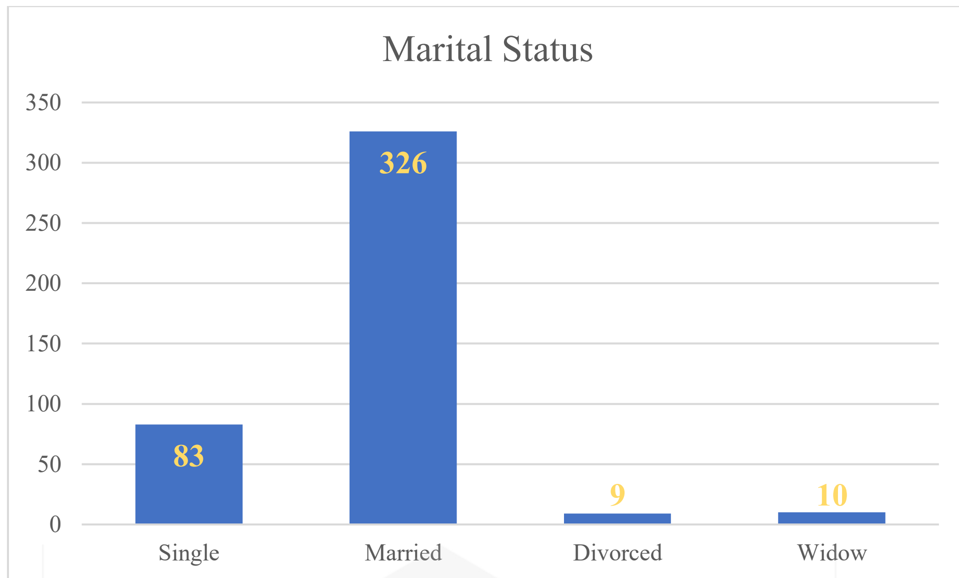

Figure 6.4. Marital Status

The income distribution of the respondents, as shown in Table 6.3 and illustrated in Figure 6.5, indicates that out of the total sample of 428 respondents, the largest proportion, 177 (41.4%), earns between 400,001 – 500,000 per month. This is followed by 88 (20.6%) respondents earning between 3,000 – 100,000, and 80 (18.7%) earning between 300,001 – 400,000. Smaller proportions include 49 (11.4%) earning between 200,001 – 300,000 and 34 (7.9%) earning between 100,001 – 200,000. The graphical representation in Figure 6.6 highlights the dominance of higher-income groups within the sample, particularly those earning between 400,001 and 500,000. This distribution suggests that a substantial portion of the respondents fall within the upper-income bracket, which may influence the study findings, especially if income levels are a significant factor in shaping perceptions or behaviours relevant to the research objectives.

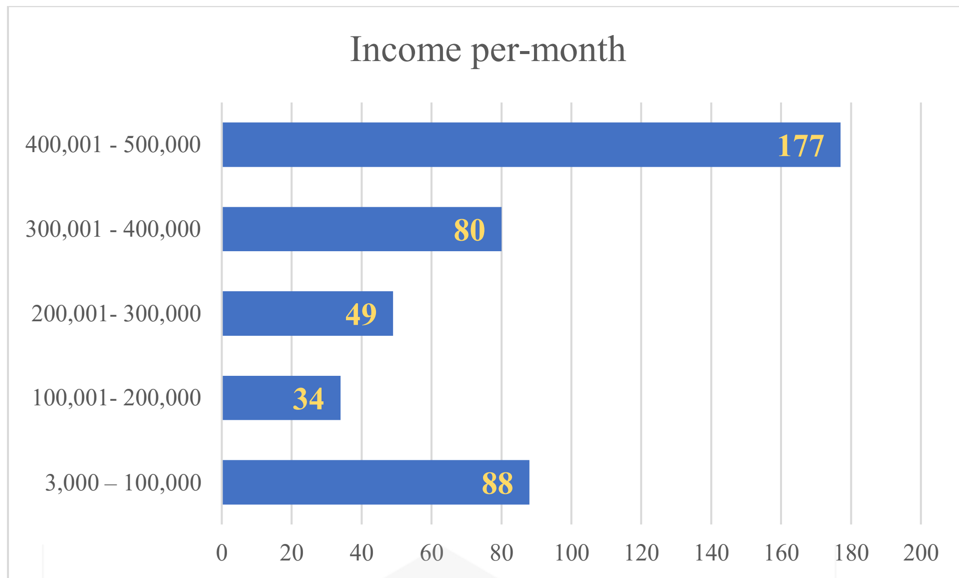

Figure 6.5. Income per month

The labour or business sector distribution of the respondents, as presented in Table 6.3 and illustrated in Figure 6.6 reveals that out of the total sample of 428 respondents the largest proportion, 157 (36.7%) is engaged in sectors categorized as Other. This category includes a range of fields such as Oil and Gas, Engineering, Law, Mining, and Business, with many respondents in the Business sector. Following this, 128 (29.9%) respondents are in the Education sector, 62 (14.5%) in Health, and 28 (6.5%) in Communications. Smaller proportions include 22 (5.1%) in Agriculture, 16 (3.7%) in Banking and Financial services, and 15 (3.5%) in Police/Army. The graphical representation in Figure 6.7 further underscores the diversity of the respondents' occupational sectors, with a notable concentration in Education and Other fields. This distribution highlights a varied representation of labour and business sectors, which may provide diverse perspectives and insights relevant to the research objectives. The inclusion of respondents from a wide range of professional backgrounds, including specialized sectors like Oil and Gas and Engineering, offers a comprehensive view of the workforce, which could be essential for understanding the dynamics of Health Takaful status across different industries.

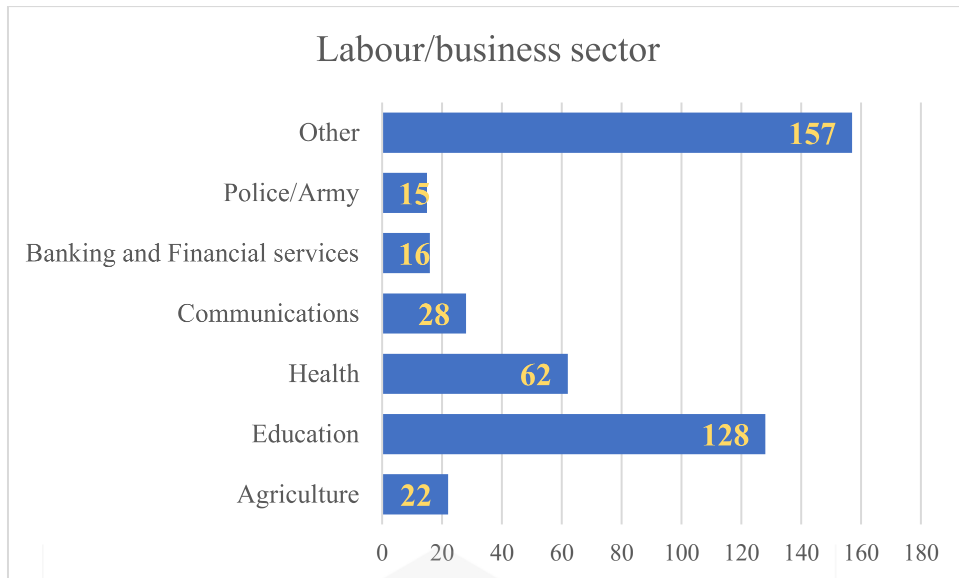

Figure 6.6. Labour/business sector

The state distribution of the respondents, as shown in Figure 6.7, indicates that the majority, 375 (87.6%), reside in Khartoum. This is followed by 18 (4.2%) respondents from the Nile River state, 15 (3.5%) from the Red Sea state, and 20 (4.7%) from other regions. The Other category includes respondents from diverse locations such as Kordofan, and West Kordofan. The largest proportion, Khartoum, represents a predominantly urban sample, with respondents from the Nile River and the Red Sea accounting for a smaller portion of the total. The graphical representation in Figure 6.8 highlights the concentration of respondents in Khartoum, suggesting that the findings are likely reflective of urban populations in Sudan. This geographic distribution may have implications for the study, particularly if location influences perspectives on Health Takaful or other key variables. The prominence of respondents from Khartoum should be considered when interpreting the results, particularly when considering their generalizability to rural or international populations.

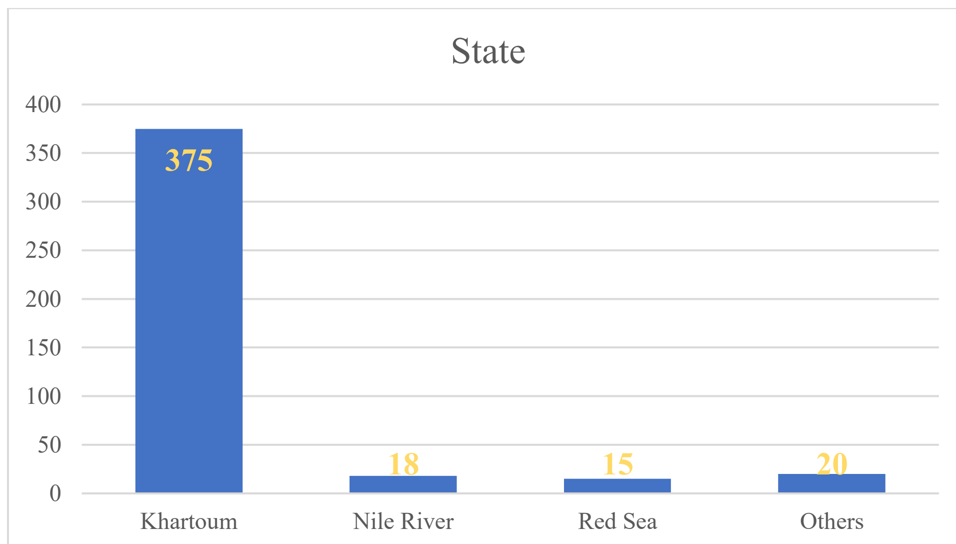

Figure 6.7. State of residence

The working status of the respondents, as shown in Table 6.3 and illustrated in Figure 6.8, reveals that out of the total sample of 428 respondents, the majority, 290 (67.8%), are currently Working. This is followed by 117 (27.3%) respondents who are Not Working, and a smaller proportion, 21 (4.9%), who are Retired. The graphical representation in Figure 6.9 further highlights the dominance of active workers within the sample. This distribution suggests that most of the respondents are economically active, which may have implications for the study, especially if employment status influences the research variables or outcomes.

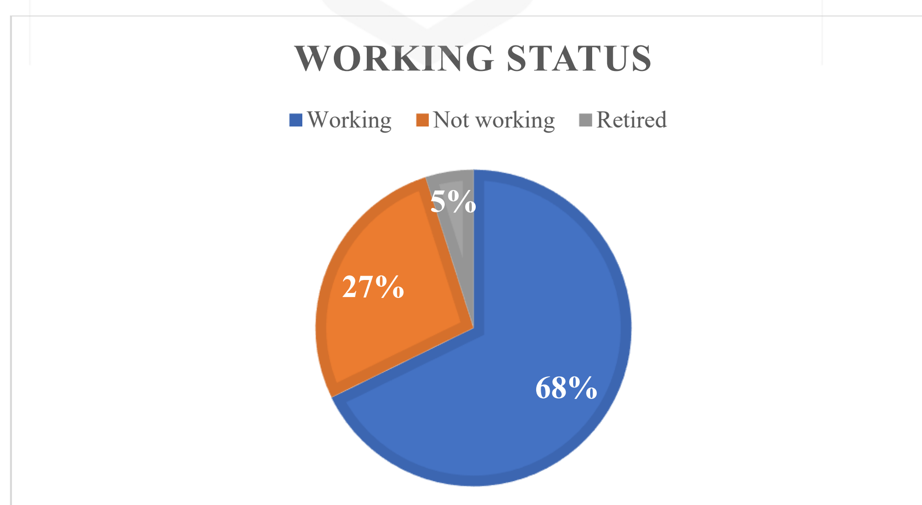

Figure 6.8. Working status

The Health Takaful status of the respondents, as presented in Table 6.3 and illustrated in Figure 6.9, shows that out of a total sample of 428 respondents, the majority, 283 (66.1%), are Not Insured, while 145 (33.9%) are Insured. The graphical representation in Figure 6.10 further emphasizes the significant proportion of uninsured respondents compared to those with Takaful coverage. This distribution highlights a potential gap in Health Takaful access or uptake within the sample, which may influence the study findings, particularly if Health Takaful status impacts the variables or outcomes being explored.

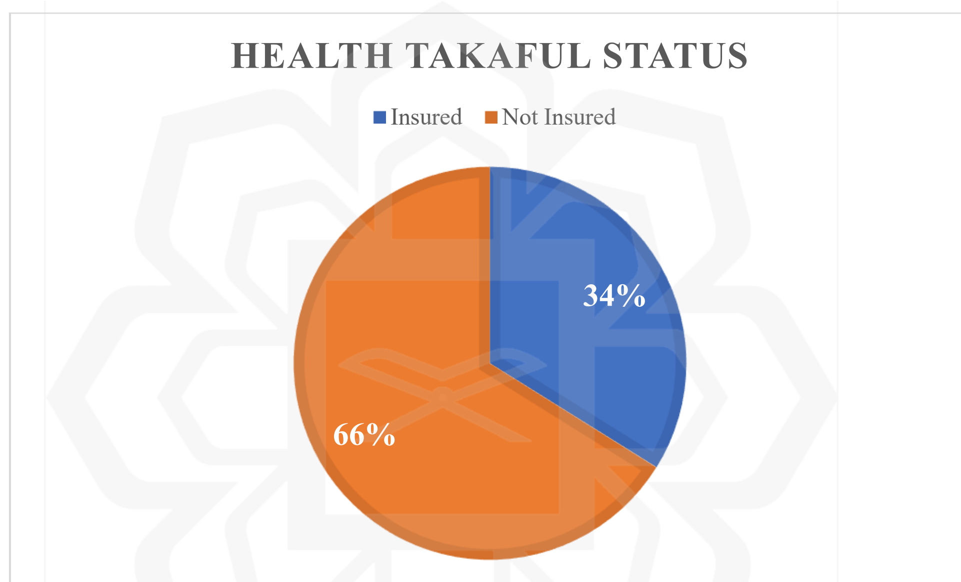

Figure 6.9. Health Takaful status

6.1.5.2 Crosstabulation

This section explores the relationship between the respondents' demographic characteristics and their Health Takaful status using crosstabulation analysis. This method provides insights into how variables such as gender, age, educational level, marital status, income, and employment status influence the availability of Health Takaful among the respondents.

6.1.5.2.1 Age and Health Takaful Status

The crosstabulation of age and Health Takaful status, as shown in Table 6.4, reveals that Health Takaful coverage is generally low across all age groups, with 145 respondents insured and 283 not insured out of a total of 428 respondents.

Table 6.4. Age * Health Takaful status Crosstabulation

Age * Health Takaful status Crosstabulation				
		Health Takaful status		Total
		Insured	Not Insured	
Age	18 -25	10	16	26
	26 -35	39	59	98
	36 – 45	38	79	117
	46 and above	58	129	187
Total		145	283	428

Among younger adults aged 18–25, only 10 are insured compared to 16 who are not, indicating minimal coverage in this group. Coverage improves slightly among those aged 26–35, with 39 insured and 59 not insured, while the 36–45 age group has 38 insured and 79 not insured, highlighting a persistent gap. The 46 and above group has the highest number of insured individuals (58), yet the uninsured remain the majority at 129. These findings suggest that Health Takaful coverage increases with age, likely due to greater health awareness or employment benefits, but significant gaps remain, especially among younger and middle-aged adults. This underscores the need for targeted strategies to improve Health Takaful uptake across all age groups.

6.1.5.2.2 Gender and Health Takaful status

The crosstabulation of gender and Health Takaful status, as shown in Table 6.5, indicates a disparity in Health Takaful coverage between male and female respondents. Out of the total 428 respondents, 145 are insured, while 283 are not insured.

Table 6.5. Gender * Health Takaful status Crosstabulation

Gender * Health Takaful status Crosstabulation				
		Health Takaful status		Total
		Insured	Not Insured	
Gender	Male	68	117	185
	Female	77	166	243
Total		145	283	428

Among males, 68 out of 185 (36.8%) have Health Takaful, whereas the majority (117, 63.2%) do not. Similarly, among females, 77 out of 243 (31.7%) are insured, while the majority (166, 68.3%) remain uninsured. While the number of insured males and females is relatively close (68 vs. 77), the higher number of female respondents results in a slightly larger proportion of uninsured females compared to males. These findings suggest that Health Takaful coverage is generally low across both genders, with females exhibiting a slightly higher rate of being uninsured. This highlights the need for gender-inclusive policies and interventions to increase Health Takaful coverage for both male and female populations.

6.1.5.2.3 Education level and Health Takaful status

The crosstabulation of education level and Health Takaful status, as shown in Table 6.6, highlights variations in Health Takaful coverage across different educational groups. Out of the total 428 respondents, 145 are insured while 283 are not insured. Respondents with a PhD exhibit 29 insured and 67 not insured, indicating a low proportion of coverage despite their higher educational attainment. Similarly, among those with a master's degree, 34 are insured and 73 are not insured, and among bachelor's degree holders, 66 are insured compared to 115 uninsured. For respondents with a Diploma, 11 are insured while 26 are not insured, reflecting a similarly low coverage rate.

Table 6.6. Education * Health Takaful status Crosstabulation

Education * Health Takaful status Crosstabulation				
		Health Takaful status		Total
		Insured	Not Insured	
Education	PhD	29	67	96
	Masters	34	73	107
	Bachelor's	66	115	181
	Diploma	11	26	37
	Secondary school	5	2	7
Total		145	283	428

Interestingly, among those with Secondary school education, 5 are insured, and only 2 are not insured, likely due to their small sample size (7 respondents in total). These findings reveal that higher educational qualifications do not necessarily correlate with better Health Takaful coverage, highlighting the need for broader access to and promotion of Health Takaful irrespective of educational attainment.

6.1.5.2.4 Marital status and Health Takaful status

The crosstabulation of marital status and Health Takaful status, as shown in Table 6.7, reveals significant differences in Health Takaful coverage based on respondents' marital status. Out of the total 428 respondents, 145 are insured, and 283 are not insured. Among the single respondents, 35 are insured, and 48 are not insured, making up a small proportion of insured individuals. The married respondents exhibit the highest coverage, with 104 insured and 222 not insured, although a large majority of married individuals remain uninsured. Among divorced respondents, only 1 is insured, and 8 are not insured, while the widowed category shows 5 insured and 5 not insured, indicating a relatively equal split in this small group.

Table 6.7. Status * Health Takaful status Crosstabulation

Status * Health Takaful status Crosstabulation				
		Health Takaful status		Total
		Insured	Not Insured	
Status	Single	35	48	83
	Married	104	222	326
	Divorced	1	8	9
	Widow	5	5	10
Total		145	283	428

These findings suggest that while marital status does influence Health Takaful uptake, most respondents, regardless of marital status, are uninsured. Notably, married individuals, despite having the highest number of insured respondents, still show a significant gap in Health Takaful coverage, highlighting the need for policies targeting Health Takaful accessibility for all marital statuses.

6.1.5.2.5 Income per month and Health Takaful status

The crosstabulation of income per month and Health Takaful status, as presented in Table 6.8, highlights a clear relationship between income levels and Health Takaful coverage. Out of the total 428 respondents, 145 are insured, while 283 are not insured. Among respondents earning between 3,000 – 100,000, 27 are insured and 61 are not insured, suggesting a relatively low uptake of Health Takaful in this income bracket. For those earning between 100,001 – 200,000, only 12 are insured and 22 are not insured, further indicating limited Takaful coverage in the lower income ranges. The 200,001 – 300,000 group shows 21 insured and 28 not insured, while the 300,001 – 400,000 group has 23 insured and 57 not insured, reflecting a similar trend of lower Takaful coverage at mid-income levels. However, the 400,001 – 500,000 group exhibits the highest number of insured respondents, with 62 insured and 115 not insured, although the majority are still uninsured.

Table 6.8. Income per-month * Health Takaful status Crosstabulation

Income per-month * Health Takaful status Crosstabulation				
		Health Takaful status		Total
		Insured	Not Insured	
Income per-month	3,000 – 100,000	27	61	88
	100,001- 200,000	12	22	34
	200,001- 300,000	21	28	49
	300,001 - 400,000	23	57	80
	400,001 - 500,000	62	115	177
Total		145	283	428

These findings suggest that while higher income correlates with higher Health Takaful coverage, a significant proportion of individuals across all income brackets remain uninsured, highlighting a need for policies that can make Health Takaful more accessible to lower and middle-income groups.

Table 6.9. Labour/business sector * Health Takaful status Crosstabulation

Labour/business sector * Health Takaful status Crosstabulation				
		Health Takaful status		Total
		Insured	Not Insured	
Labour/ business sector	Agriculture	9	13	22
	Education	38	90	128
	Health	17	45	62
	Communications	10	18	28
	Banking and Financial services	7	9	16
	Police/Army	8	7	15
	Other	56	101	157
Total		145	283	428

The crosstabulation of the labour/business sector and Health Takaful status, as shown in Table 6.9, reveals differences in Health Takaful coverage across various sectors. Out of the total 428 respondents, 145 are insured and 283 are not insured. In the Agriculture sector, 9 are insured, and 13 are not insured, representing a small proportion of coverage in this group. For those in Education, 38 are insured, while 90 are not insured, indicating a relatively low coverage despite the large number of respondents in this sector. Among those working in Health, 17 are insured, and 45 are not, suggesting moderate coverage but still a high proportion without Health Takaful. In the Communications sector, 10 are insured, and 18 are not insured, while in the Banking and Financial services sector, 7 are insured, and 9 are not. The Police/Army sector shows 8 insured and 7 not insured, with a nearly equal split. Finally, the other category, with many respondents (157), has 56 insured and 101 not insured, indicating that the largest sector still exhibits a significant uninsured population. These findings highlight that Health Takaful coverage is generally low across all sectors, with the highest coverage seen in the Education sector, though the majority in each sector remain uninsured. This suggests that improvements in Health Takaful access are needed across all labour and business sectors.

Table 6.10. State * Health Takaful status Crosstabulation

State * Health Takaful status Crosstabulation				
		Health Takaful status		Total
		Insured	Not Insured	
State	Khartoum	122	253	375
	Nile River	6	12	18
	Red Sea	7	8	15
	Others	10	10	20
Total		145	283	428

The crosstabulation of state and Health Takaful status, as shown in Table 6.10, reveals significant regional differences in Health Takaful coverage. Out of the total 428 respondents, 145 are insured, while 283 are not insured. In Khartoum, the largest region

with 375 respondents, 122 are insured, and 253 are not insured, indicating a relatively higher number of insured individuals but still a significant proportion without coverage. In the Nile River region, only 6 are insured, and 12 are not insured, showing very low coverage in this area. Similarly, in the Red Sea region, 7 are insured, and 8 are not insured, reflecting limited Health Takaful access. The Other regions, which include 20 respondents, show 10 insured and 10 not insured, indicating an equal split in this small sample. These findings suggest that Health Takaful coverage is most prevalent in Khartoum, while other regions, especially the Nile River and the Red Sea, exhibit very low coverage, highlighting regional disparities that may require targeted interventions to increase Health Takaful access in less covered areas.

6.1.6 Descriptive Statistics of Item's Mean and Standard Deviation

This section presents the descriptive statistics of the survey items, focusing on their mean and standard deviation. These measures provide an overview of participants' responses, highlighting central tendencies and the variability of their perceptions across the different constructs studied. This analysis offers valuable insights into the data distribution and overall trends within the dataset.

Table 6.11. Descriptive Statistics of Attitude

Tags	Items	Mean	SD
ATT1	Having Health Takaful is crucial for an individual	4.46	.664
ATT2	Having Health- Takaful is crucial for a family	4.48	.665
ATT3	Health Takaful provides better treatment opportunities for individuals	4.34	.778
ATT4	Health Takaful provides treatment opportunities for emergency health situations (for example, accidents)	4.37	.753
ATT5	Health Takaful covers the cost of most of the health problems I face	4.06	1.011
ATT6	I feel safe/protected knowing I have Health Takaful coverage	4.35	.714

Tags	Items	Mean	SD
ATT7	I benefit from health services covered by Health Takaful	4.21	.841

The descriptive statistics in Table 6.11 reveal that respondents generally hold a positive attitude towards Health Takaful, with mean scores ranging from 4.06 to 4.48 across all items, suggesting strong agreement about its importance and benefits. The highest mean scores are observed for items related to the importance of Health Takaful for individuals and families (ATT1: 4.46, ATT2: 4.48), as well as its role in providing treatment opportunities during emergencies (ATT4: 4.37). Respondents also feel a strong sense of security with Health Takaful coverage (ATT6: 4.35). However, ATT5 ("Health Takaful covers the cost of most of the health problems I face") has a slightly lower mean of 4.06 and the highest standard deviation (1.011), indicating some uncertainty or variability in perceptions regarding the coverage of Health Takaful. Despite this, the overall data indicates a positive perception of Health Takaful's value, particularly in enhancing treatment opportunities and providing peace of mind, although there may be concerns about the extent of its coverage in addressing all health-related expenses.

Table 6.12. Descriptive Statistics of Intention

Tags	Items	Mean	SD
INT1	I make sure to have Health Takaful	4.31	.726
INT2	I advise others to get Health Takaful	4.31	.739
INT3	I intend to purchase a Health Takaful scheme soon	4.24	.784
INT4	Obtaining Health Takaful is important in achieving my financial goals	4.13	.886
INT5	I am willing to bear the costs related to obtaining Health Takaful	4.13	.868
INT6	I am convinced that Health Takaful will benefit me in the long run	4.35	.752

The descriptive statistics in Table 6.12 indicate that respondents have a strong intention to obtain and recommend Health Takaful coverage, with mean scores ranging from 4.13 to 4.35 across the items. The highest mean scores are observed for INT1 ("I make sure to have Health Takaful") and INT2 ("I advise others to get Health Takaful"), both scoring 4.31, reflecting a strong personal commitment to having Health Takaful and recommending it to others. Additionally, INT7 ("I am convinced that Health Takaful will benefit me in the long run") shows a mean of 4.35, highlighting respondents' belief in the long-term benefits of Health Takaful. The mean for INT3 ("I intend to purchase a Health Takaful scheme soon") is slightly lower at 4.24, suggesting that while respondents are positive about obtaining Health Takaful, there may be some hesitation or delay in immediate action. The lowest mean scores are found in INT5 ("Obtaining Health Takaful is important in achieving my financial goals") and INT6 ("I am willing to bear the costs related to obtaining Health Takaful"), both with means of 4.13, indicating that although respondents recognize the importance of Health Takaful for their financial goals and are willing to bear associated costs, there may be some reservation or concern regarding the financial burden. Overall, the findings suggest strong intentions to acquire Health Takaful and advocate for its benefits, with some mild concerns regarding its financial implications.

Table 6.13. Descriptive Statistics of Subjective Norms

Tags	Items	Mean	SD
SBN1	I think I should have Health Takaful like my family	4.29	.767
SBN2	I think I should have Health Takaful like my friends	4.16	.873
SBN3	Most people important to me think that Health Takaful is useful	4.21	.832
SBN4	Most of the important people in my life have Health Takaful	3.18	1.105
SBN5	My friends always advise me on the importance of participating in a Health Takaful program	3.98	1.001
SBN6	My family thinks I should get Health Takaful	4.20	.859
SBN7	My family supports my decision to get Health Takaful	4.28	.774

Tags	Items	Mean	SD
SBN8	I believe that Health Takaful has become a societal requirement	4.33	.747
SBN9	I believe that having Health Takaful provides peace of mind	4.33	.754
SBN10	I discuss with my friends and get their opinions before purchasing any Health Takaful program	2.64	1.075

The descriptive statistics in Table 6.13 highlight respondents' perceptions of subjective norms regarding Health Takaful. The mean scores range from 2.64 to 4.33, indicating varied levels of influence from family, friends, and society on the decision to obtain Health Takaful. The highest mean scores are observed in items that emphasize societal and familial support: SBN8 ("I believe that Health Takaful has become a societal requirement") and SBN9 ("I believe that having Health Takaful provides peace of mind"), both scoring 4.33, suggesting a strong belief in the societal value and personal benefits of Health Takaful. Similarly, SBN7 ("My family supports my decision to get Health Takaful") and SBN1 ("I think I should have Health Takaful like my family") show strong mean scores (4.28 and 4.29, respectively), reflecting a high level of familial influence. In contrast, SBN4 ("Most of the important people in my life have Health Takaful") and SBN10 ("I discuss with my friends and get their opinions before purchasing any Health Takaful program") have the lowest mean scores (3.18 and 2.64, respectively), suggesting less emphasis on the actual behaviour of important people in the respondents' lives and a lack of active discussions with friends about Health Takaful. The variability in standard deviations, particularly in SBN4 and SBN10, indicates greater disagreement among respondents regarding the influence of others on their Health Takaful decisions. Overall, these findings suggest that while societal and family norms strongly influence respondents' perceptions of Health Takaful, the influence of friends and the actual participation of important people in their lives is less significant.

Table 6.14. Descriptive Statistics of Perceive Behavioural Control

Tags	Items	Mean	SD
PBC1	I am comfortable with the idea of purchasing a Health Takaful program	4.31	.710
PBC2	I have the knowledge/understanding necessary to choose a Health Takaful program wisely	3.36	1.086
PBC3	I know how to find information about different Health Takaful options	3.14	1.099
PBC4	I am aware of the requirements for purchasing Health Takaful programs	3.88	1.107
PBC5	I can overcome the obstacles or difficulties I may face in purchasing Health Takaful	3.91	1.045
PBC6	I feel relieved that I can control my decision to enrol in Health Takaful	4.15	.853

The descriptive statistics in Table 6.14 reveal respondents' perceptions of their perceived behavioural control (PBC) over purchasing Health Takaful programs. The mean scores range from 3.14 to 4.31, indicating varied levels of confidence and control among respondents. The highest mean score is observed for PBC1 ("I am comfortable with the idea of purchasing a Health Takaful program"), which scored 4.31, suggesting that respondents generally feel comfortable with the concept of purchasing Health Takaful. In contrast, the lowest mean scores are found for items related to knowledge and information about Health Takaful options: PBC3 ("I know how to find information about different Health Takaful options") and PBC2 ("I have the knowledge/understanding necessary to choose a Health Takaful program wisely"), with scores of 3.14 and 3.36, respectively. These lower scores indicate that respondents may feel less confident in their ability to access information or make informed decisions about Health Takaful programs. Items like PBC4 ("I am aware of the requirements for purchasing Health Takaful programs") and PBC5 ("I can overcome the obstacles or difficulties I may face in purchasing Health Takaful") show mean scores of 3.88 and 3.91, suggesting that while respondents acknowledge some challenges, they feel moderately capable of overcoming them. Lastly, PBC6 ("I feel relieved that I can

control my decision to enrol in Health Takaful") has a mean of 4.15, indicating a sense of relief and control over the decision-making process. The overall findings suggest that while respondents are generally comfortable with the idea of purchasing Health Takaful, there is a notable gap in their knowledge and access to information, which could potentially affect their decision-making process.

Table 6.15. Descriptive Statistics of Awareness

Tags	Items	Mean	SD
AWN1	I am aware of the different Health Takaful policies	3.65	1.204
AWN2	I am familiar with how Health Takaful premiums are calculated	3.61	1.240
AWN3	I am aware of the coverage provided by Health Takaful programs	3.76	1.170
AWN4	I am aware of the advantages of having Health Takaful	4.04	.960
AWN5	I know how to choose the level of protection that suits me	3.91	1.082
AWN6	I know the potential consequences of not having Health Takaful	4.05	.992

The descriptive statistics in Table 6.15 illustrate respondents' awareness of Health Takaful policies and related aspects. The mean scores range from 3.61 to 4.05, indicating a general awareness, though with some variability in the specific areas of knowledge. The highest mean score is for AWN6 ("I know the potential consequences of not having Health Takaful"), which scored 4.05, suggesting that respondents are relatively aware of the risks associated with not having Health Takaful. Following closely is AWN4 ("I am aware of the advantages of having Health Takaful") with a mean of 4.04, indicating that respondents recognize the benefits of Health Takaful. AWN5 ("I know how to choose the level of protection that suits me") scored 3.91, suggesting that while respondents have some awareness of how to select appropriate coverage, there is room for improvement in their understanding of this aspect. On the lower end, AWN1 ("I am aware of the different Health Takaful policies") and AWN2

("I am familiar with how Health Takaful premiums are calculated") scored 3.65 and 3.61, respectively, reflecting a lower level of awareness regarding the range of Health Takaful policies and how premiums are determined. AWN3 ("I am aware of the coverage provided by Health Takaful programs") has a mean of 3.76, indicating a moderate awareness of the scope of coverage offered by these programs. Overall, these findings suggest that while respondents have a reasonable understanding of the benefits and consequences of Health Takaful, there is a notable gap in their awareness of specific policies and the details of premium calculations, which may affect their ability to make fully informed decisions.

Table 6.16. Descriptive Statistics of Affordability

Tags	Items	Mean	SD
AFR1	I compare different Health Takaful plans to determine which plan suits me	3.74	.606
AFR2	I can choose Health Takaful because I have the required financial resources	3.50	.927
AFR3	I have cut back on spending on necessities like food/clothes over the past 12 months to pay for Health Takaful	2.68	1.039
AFR4	The prices of Health Takaful policies are affordable	2.85	1.056
AFR5	I am satisfied with the coverage I get for the premium I pay	3.30	.915

The descriptive statistics in Table 6.16 reveal insights into respondents' perceptions of the affordability of Health Takaful. The mean scores range from 2.68 to 3.74, indicating varied perceptions of affordability. The highest mean score is for AFR1 ("I compare different Health Takaful plans to determine which plan suits me"), which scored 3.74, suggesting that respondents are actively engaged in comparing different plans to find the most suitable option. However, when it comes to the financial feasibility of purchasing Health Takaful, the mean scores are lower. AFR2 ("I can choose Health Takaful because I have the required financial resources") scored 3.50,

indicating that while some respondents feel financially capable of affording Health Takaful, there is still a significant proportion who may not share this sentiment. On the lower end, AFR3 ("I have cut back on spending on necessities like food/clothes over the past 12 months to pay for Health Takaful") scored 2.68, reflecting a lower level of respondents who have had to reduce spending on essentials to afford the premiums. Similarly, AFR4 ("The prices of Health Takaful policies are affordable") scored 2.85, indicating that many respondents perceive the prices of Health Takaful policies to be less affordable, which could potentially be a barrier to widespread adoption. Finally, AFR5 ("I am satisfied with the coverage I get for the premium I pay") scored 3.30, suggesting a moderate level of satisfaction with the balance between the premium cost and coverage provided. Overall, these findings suggest that while some respondents feel capable of affording Health Takaful, many perceive the policies as financially burdensome, which may influence their decision to purchase or continue with Health Takaful coverage.

Table 6.17. Descriptive Statistics of Health Micro-Takaful Adoption

Tags	Items	Mean	SD
HMTA1	The idea of Health Micro-Takaful is easy to understand	4.05	.899
HMTA2	I think Health Micro-Takaful fits my lifestyle	3.99	.917
HMTA3	I'm considering getting Health Micro-Takaful for myself if available	4.07	.895
HMTA4	I'm considering getting a Health Micro-Takaful for my family if available	4.10	.892
HMTA5	I think Health Micro-Takaful is a good idea	4.21	.818
HMTA6	I believe that having Health Micro-Takaful reduces financial stress on individuals	4.20	.823
HMTA7	I think Health Micro-Takaful is beneficial because I will save money by not paying high Health Takaful premiums	4.14	.892
HMTA8	Health Micro-Takaful is a practical solution, especially for low-income families	4.20	.832

Tags	Items	Mean	SD
HMTA9	I like to participate in Health Micro-Takaful because what I pay contributes to the service and development of society	4.16	.869

The descriptive statistics in Table 6.17 provide insights into the respondents' perceptions and attitudes toward Health Micro-Takaful adoption. The mean scores range from 3.99 to 4.21, indicating a generally positive outlook toward this concept. The highest mean score is for HMTA5 ("I think Health Micro-Takaful is a good idea"), which scored 4.21, suggesting that respondents overwhelmingly view the idea of Health Micro-Takaful favourably. Closely following this, HMTA6 ("I believe that having Health Micro-Takaful reduces financial stress on individuals") scored 4.20, reflecting a strong belief that this form of Takaful can alleviate financial burdens. Similarly, HMTA8 ("Health Micro-Takaful is a practical solution, especially for low-income families") scored 4.20, highlighting the perception that Health Micro-Takaful is seen as a viable option for low-income families. Other items, such as HMTA4 ("I'm considering getting a Health Micro-Takaful for my family if available") and HMTA7 ("I think Health Micro-Takaful is beneficial because I will save money by not paying high Health Takaful premiums"), scored 4.10 and 4.14, respectively, suggesting that respondents are open to the idea of adopting Health Micro-Takaful both for themselves and their families, with the added benefit of saving money on premiums. Items like HMTA1 ("The idea of Health Micro-Takaful is easy to understand") and HMTA9 ("I like to participate in Health Micro-Takaful because what I pay contributes to the service and development of society") scored slightly lower at 4.05 and 4.16 but still indicate a high level of understanding and willingness to engage with Health Micro-Takaful from a societal perspective. Overall, these findings suggest that Health Micro-Takaful is viewed as a promising and accessible alternative to Health Takaful, particularly among individuals seeking affordable solutions and those who value its potential societal impact. Table 6.16 below provides the descriptive statistics of all variables.

Table 6.18. Descriptive Statistics of Variables

Variables	N	Min.	Max.	Mean	S. D
Attitude	428	1.00	5.00	4.3251	.67346
Intention	428	1.00	5.00	4.2438	.69121
Subjective Norms	428	1.00	5.00	4.0421	.60382
Perceived Behavioural Control	428	1.00	5.00	3.7917	.65506
Awareness	428	1.00	5.00	3.8364	.99719
Affordability	428	1.40	5.00	3.2145	.65421
Health Micro-Takaful Adoption	428	1.00	5.00	4.1246	.77462
Valid N (listwise)	428				

6.1.7 Evaluation of the Model

SmartPLS 3.9, a statistical application with a graphical user interface for variance-based structural equation modelling (SEM) using the partial least squares (PLS) path modelling method was used in this research to conduct the inferential statistical analysis that determines the predicting Attitude, Subjective Norms, Perceived Behavioural Control, Awareness, Affordability, and Health Micro-Takaful adoption among Sudanese adults 18 years old and above using Behavioural Intention as a mediator. There are two stages normally for conducting statistical analysis in SmartPLS, which are examining the measurement model and the structural model.

In Stage 1, the measurement model was used to evaluate various reliability metrics (outer loadings, Cronbach's alpha, and composite reliability), convergent validity (average variance extracted or AVE), and discriminant validity (Fornell-Larcker criterion, cross-loadings, and Heterotrait-Monotrait Ratio or HTMT). The process included estimating measurement parameters, which encompassed the relationships between constructs and their associated items (loadings) and the linear relationships among constructs (path coefficients), all assessed concurrently (Hair Jr et al., 2017). Reflective constructions were employed in this study, and SmartPLS was utilized to validate their reliability as well as their convergent and discriminant validity.

Stage 2 involved an evaluation of the structural model for the final research framework. This phase included testing the study hypotheses by analysing the

significance and relevance of structural model path coefficients. Key tests performed included examining the coefficient of determination (R^2), path coefficients, variance inflation factor (VIF), effect sizes (f^2), and predictive relevance (Q^2).

6.1.7.1 Stage 1: Measurement Model Assessment

In this first phase, the assessment of the measurement model is carried out. The measurement model is critical as it establishes the relationships between the observed and latent variables. It is important to assess the measurement model before evaluating the structural model to ensure the validity and reliability of the constructs (Hair Jr et al., 2017). This assessment involves several steps, which are carried out in the subsequent sections.

6.1.7.1.1 Indicator Reliability (Factor Loadings)

Factor loadings assess the strength of the relationship between observed variables (indicators) and their corresponding latent constructs. A factor loading value of 0.7 or above is generally deemed acceptable, as it signifies that the indicator explains at least 50% of the variance of the latent variable. This threshold ensures that the observed variables reliably represent their underlying constructs, supporting the validity of the measurement model (Hair Jr et al., 2017).

Table 6.19. Indicator Reliability (Factor Loadings)

Items	AFR	ATT	AWN	HMTA	INT	PBC	SBN
AFR1	Deleted						
AFR2	0.964						
AFR3	Deleted						
AFR4	0.520						
AFR5	0.663						
ATT1		0.882					
ATT2		0.890					
ATT3		0.889					
ATT4		0.881					
ATT5		0.808					
ATT6		0.910					
ATT7		0.843					

Items	AFR	ATT	AWN	HMTA	INT	PBC	SBN
AWN1			0.907				
AWN2			0.898				
AWN3			0.922				
AWN4			0.886				
AWN5			0.926				
AWN6			0.848				
HMTA1				0.812			
HMTA2				0.883			
HMTA3				0.913			
HMTA4				0.900			
HMTA5				0.919			
HMTA6				0.920			
HMTA7				0.881			
HMTA8				0.903			
HMTA9				0.879			
INT1					0.883		
INT2					0.896		
INT3					0.887		
INT4					0.820		
INT5					0.862		
INT6					0.893		
PBC1						0.845	
PBC2						Deleted	
PBC3						Deleted	
PBC4						0.849	
PBC5						0.864	
PBC6						0.898	
SBN1							0.877
SBN2							0.846
SBN3							0.864
SBN4							Deleted
SBN5							0.795
SBN6							0.905
SBN7							0.904
SBN8							0.864
SBN9							0.871
SBN10							Deleted

Table 6.19 provides the factor loadings for assessing the indicator reliability of constructs, highlighting retained and deleted items. Several items were removed because their loadings fell below the acceptable threshold (usually 0.7), ensuring the constructs' reliability and validity. Deleted items include AFR1 and AFR3 under Affordability (AFR), PBC2 and PBC3 under Perceived Behavioural Control (PBC), and

SBN4 and SBN10 under Subjective Norms (SBN). However, certain items like AFR4 (loading: 0.520) and AFR5 (loading: 0.663) were retained despite marginal performance. This decision was justified because the Average Variance Extracted (AVE) and Cronbach's Alpha (CA) for the construct met the required thresholds, affirming their overall reliability (Cheung et al., 2023).

The retained items across most constructs demonstrated strong factor loadings. For example, the Attitude (ATT) construct exhibited loadings ranging from 0.808 to 0.910, and Awareness (AWN) had loadings between 0.848 and 0.926, indicating highly reliable measures. Similarly, the Health Micro-Takaful Adoption (HMTA) construct displayed robust loadings between 0.812 and 0.920, while Subjective Norms (SBN) retained eight strong items, with loadings ranging from 0.795 to 0.905, reinforcing its reliability. Although PBC required the deletion of two items, the remaining items retained high loadings, ranging from 0.845 to 0.898, ensuring the construct's validity.

The findings indicate that while some items were removed to improve the measurement model, the retained items demonstrate strong reliability and validity. Marginal items like AFR4 and AFR5 highlight the need to balance individual item performance with overall construct adequacy. These decisions underscore the robustness of the constructs and their capacity to accurately measure the latent variables within the study, aligning with the research objectives.

6.1.7.1.2 Composite Reliability (CR) and Cronbach's Alpha

Composite Reliability (CR) and Cronbach's Alpha are key metrics for assessing the internal consistency of a scale or questionnaire, indicating how well the items within a construct measure the same underlying concept. Both values range from 0 to 1, with values of 0.7 or higher generally deemed acceptable for establishing reliability. While Cronbach's Alpha has been widely used, CR is often preferred for its greater accuracy and reduced bias in estimating internal consistency, particularly in structural equation modelling (Hair Jr et al., 2017).

Table 6.20. Measures of internal consistency and reliability

Constructs	Composite Reliability	Cronbach's Alpha
Affordability	0.772	0.750
Attitude	0.957	0.947
Awareness	0.962	0.952
Health Micro-Takaful Adoption	0.972	0.967
Intention	0.951	0.938
Perceived Behavioural Control	0.922	0.888
Subjective Norms	0.960	0.952

Table 6.20 presents the measures of internal consistency and reliability, reporting both Composite Reliability (CR) and Cronbach's Alpha for all constructs in the study. These indicators collectively demonstrate the degree to which the items within each construct consistently capture the intended latent variable. The Cronbach's Alpha values across constructs range from 0.750 for Affordability (the lowest) to 0.967 for Health Micro-Takaful Adoption (the highest). While the Affordability construct records the lowest alpha value, it still exceeds the minimum threshold of 0.70 (Nunnally & Bernstein, 1994), thereby reflecting acceptable internal consistency. All other constructs exceed 0.90, suggesting excellent reliability.

However, Cronbach's Alpha assumes tau-equivalence (i.e., that all items contribute equally to the construct), which is often too restrictive. For this reason, Composite Reliability (CR) is regarded as a more robust measure in PLS-SEM (Hair et al., 2019). CR does not assume equal indicator loadings and therefore provides a more accurate reliability assessment. The CR values in this study range from 0.772 (Affordability) to 0.972 (Health Micro-Takaful Adoption). All values surpass the recommended threshold of 0.70 (Fornell & Larcker, 1981; Hair et al., 2019). Constructs such as Attitude (0.957), Awareness (0.962), Intention (0.951), and Subjective Norms (0.960) all demonstrate very high CR, confirming strong internal consistency and reliable measurement of their underlying theoretical dimensions.

Importantly, the high CR values across constructs indicate that the measurement model is robust and stable, with items contributing meaningfully and consistently to

their respective constructs. These results, when considered alongside Cronbach's Alpha, confirm that the reliability requirements for reflective measurement models in PLS-SEM are fully satisfied, thereby reinforcing the trustworthiness of the study's findings.

6.1.7.1.3 Convergent Validity (Average Variance Extracted (AVE))

Convergent validity evaluates how well a construct correlates with its own indicators, ensuring that the indicators effectively represent the intended construct. It is commonly assessed through the Average Variance Extracted (AVE), which measures the proportion of variance captured by the construct relative to the variance attributed to measurement error. An AVE value of 0.5 or higher is considered acceptable, as it indicates that the construct explains more than 50% of the variance in its indicators, demonstrating good convergent validity (Hair Jr et al., 2017). Table 6.19 displays the AVE values for the constructs, confirming strong convergent validity for all constructs, as their AVE values exceed the minimum threshold of 0.5.

Table 6.21. Convergent validity with Average Variance Extracted (AVE)

Constructs	AVE
Affordability	0.546
Attitude	0.761
Awareness	0.807
Health Micro-Takaful Adoption	0.794
Intention	0.764
Perceived Behavioural Control	0.747
Subjective Norms	0.751

The results presented in Table 6.21 provide evidence of the convergent validity of the constructs through their Average Variance Extracted (AVE) values. Convergent validity ensures that the items within a construct are well-correlated and measure the same underlying concept. The AVE values for all constructs surpass the commonly

accepted threshold of 0.5, indicating that more than 50% of the variance in the observed indicators is captured by their respective constructs.

The construct with the lowest AVE is Affordability, with a value of 0.546, which, while slightly above the threshold, suggests the need for potential refinement of its measurement items to enhance its explanatory power. On the other hand, Awareness shows the highest AVE value at 0.807, demonstrating a strong ability to represent its latent construct. Other constructs, including Attitude (0.761), Intention (0.764), Perceived Behavioural Control (0.747), and Subjective Norms (0.751), also display high AVE values, confirming their robustness and strong convergent validity. Similarly, Health Micro-Takaful Adoption exhibits a notable AVE value of 0.794, further supporting its reliability as a construct. Overall, these findings affirm the adequacy of the measurement model, with all constructs demonstrating their capacity to account for the variance of their indicators. This strengthens the validity of the model and its applicability in achieving the study's objectives.

6.1.7.1.4 Discriminant Validity

Discriminant validity is the degree to which a construct varies from other constructs and may be assessed using three approaches. The first method is Fornell-Lacker, which investigates the degree of correlation between the construct and other constructs, while the second method is cross-loading, which investigates the degree to which the items of a construct reflect the construct and its differentiation from all other constructs, and HTMT refers to the ratio of correlations within the construct to those of other constructs (Hair Jr et al., 2017; Ramayah et al., 2018). In the next part, this study gave discriminant validity results utilizing Fornell-Lacker, cross-loading, and HTMT.

6.1.7.1.5 Discriminant Validity Using the Fornell-Larcker Criterion

The Fornell-Larcker criterion is used to assess discriminant validity by comparing the square root of each construct's AVE with the correlations between that construct and other constructs (Hair Jr et al., 2017). Discriminant validity is achieved when the square root of a construct's AVE is greater than its correlations with any other construct.

Table 6.22. Discriminate validity using the Fornell-Lacker criterion

	AFR	ATT	AWN	HMTA	INT	PBC	SBN
AFR	**0.739**						
ATT	0.335	**0.872**					
AWN	0.460	0.624	**0.898**				
HMTA	0.355	0.746	0.667	**0.891**			
INT	0.354	0.839	0.674	0.785	**0.874**		
PBC	0.479	0.741	0.838	0.746	0.823	**0.864**	
SBN	0.383	0.847	0.694	0.759	0.896	0.835	**0.866**

The results in Table 6.22 examine the discriminant validity of the constructs using the Fornell-Larcker criterion. Discriminant validity is essential to confirm that the constructs are distinct from one another and that the items measure their intended latent variable rather than overlapping with others. The diagonal values represent the square root of the Average Variance Extracted (AVE) for each construct, while the off-diagonal values represent the correlations between constructs. For adequate discriminant validity, the square root of the AVE of each construct should be greater than its correlations with any other construct.

The results show that the square root of the AVE for all constructs is consistently higher than the inter-construct correlations, affirming strong discriminant validity across the constructs. For example, the square root of the AVE for Affordability (AFR) is 0.739, which is higher than its correlations with other constructs, such as Attitude (ATT) at 0.335 and Awareness (AWN) at 0.460. Similarly, Awareness (AWN) demonstrates a square root of AVE of 0.898, which surpasses its correlations with constructs like Health Micro-Takaful Adoption (HMTA) at 0.667 and Perceived Behavioural Control (PBC) at 0.838.

The construct with the highest correlations is Intention (INT), particularly with Attitude (0.839) and Subjective Norms (SBN) at 0.896. However, even in these cases, the square root of the AVE for Intention (0.874) remains higher, demonstrating that each construct retains its distinctiveness. Perceived Behavioural Control (PBC) also shows high correlations with Awareness (0.838) and Health Micro-Takaful Adoption

(0.746), but the square root of its AVE (0.864) validates its unique contribution to the model.

In summary, the results confirm that the constructs maintain their discriminant validity, indicating that the items are not only measuring their respective constructs effectively but are also sufficiently distinct from one another. This reinforces the reliability and robustness of the measurement model for addressing the study's research objectives.

6.1.7.1.6 Discriminant Validity Using the Cross-Loading Criterion

The cross-loading criterion assesses discriminant validity by comparing the loadings of each indicator on its assigned latent construct with its loadings on other constructs. For discriminant validity to be established, an indicator should have the highest loading on its respective construct compared to its loadings on other constructs (Hair Jr et al., 2017).

Table 6.23. Discriminant Validity Using the Cross-Loading Criterion

	AFR	ATT	AWN	HMTA	INT	PBC	SBN
AFR2	0.964	0.343	0.476	0.376	0.368	0.494	0.389
AFR4	0.520	-0.072	0.063	-0.004	-0.017	0.053	-0.025
AFR5	0.663	0.147	0.204	0.130	0.145	0.215	0.182
ATT1	0.246	0.882	0.536	0.628	0.751	0.632	0.753
ATT2	0.258	0.890	0.515	0.635	0.764	0.635	0.759
ATT3	0.336	0.889	0.552	0.648	0.734	0.660	0.734
ATT4	0.293	0.881	0.526	0.652	0.718	0.627	0.723
ATT5	0.302	0.808	0.557	0.604	0.671	0.631	0.706
ATT6	0.325	0.910	0.559	0.718	0.769	0.681	0.779
ATT7	0.284	0.843	0.568	0.664	0.711	0.658	0.712
AWN1	0.444	0.524	0.907	0.577	0.579	0.762	0.591
AWN2	0.422	0.500	0.898	0.552	0.556	0.725	0.576
AWN3	0.448	0.561	0.922	0.589	0.598	0.768	0.618
AWN4	0.430	0.644	0.886	0.646	0.667	0.780	0.697
AWN5	0.405	0.568	0.926	0.619	0.616	0.752	0.634
AWN6	0.331	0.550	0.848	0.598	0.605	0.719	0.611
HMTA1	0.319	0.598	0.607	0.812	0.644	0.659	0.637

	AFR	ATT	AWN	HMTA	INT	PBC	SBN
HMTA2	0.298	0.652	0.639	0.883	0.706	0.669	0.675
HMTA3	0.283	0.653	0.604	0.913	0.726	0.665	0.682
HMTA4	0.321	0.660	0.597	0.900	0.727	0.683	0.677
HMTA5	0.313	0.690	0.605	0.919	0.708	0.672	0.688
HMTA6	0.359	0.724	0.607	0.920	0.714	0.680	0.712
HMTA7	0.299	0.644	0.540	0.881	0.652	0.620	0.650
HMTA8	0.351	0.708	0.586	0.903	0.704	0.678	0.695
HMTA9	0.301	0.642	0.556	0.879	0.710	0.655	0.667
INT1	0.304	0.792	0.603	0.661	0.883	0.716	0.823
INT2	0.322	0.761	0.599	0.675	0.896	0.730	0.809
INT3	0.300	0.715	0.570	0.670	0.887	0.719	0.799
INT5	0.283	0.652	0.530	0.667	0.820	0.698	0.732
INT6	0.330	0.692	0.662	0.712	0.862	0.742	0.737
INT7	0.314	0.780	0.569	0.732	0.893	0.713	0.796
PBC1	0.356	0.810	0.631	0.737	0.838	0.845	0.856
PBC4	0.358	0.547	0.824	0.572	0.622	0.849	0.627
PBC5	0.476	0.519	0.726	0.584	0.627	0.864	0.613
PBC6	0.474	0.632	0.740	0.655	0.716	0.898	0.742
SBN1	0.338	0.775	0.594	0.659	0.820	0.754	0.877
SBN2	0.307	0.686	0.561	0.623	0.764	0.701	0.846
SBN3	0.325	0.728	0.623	0.663	0.764	0.752	0.864
SBN5	0.366	0.630	0.613	0.600	0.679	0.701	0.795
SBN6	0.329	0.713	0.615	0.652	0.788	0.721	0.905
SBN7	0.337	0.770	0.637	0.687	0.818	0.737	0.904
SBN8	0.276	0.733	0.572	0.651	0.779	0.694	0.864
SBN9	0.376	0.818	0.600	0.719	0.789	0.726	0.871

The results presented in Table 6.23 analyse discriminant validity using the cross-loading criterion, a robust approach to assess whether individual indicators are more strongly associated with their respective constructs than with others. Each indicator's loading on its associated construct should exceed its loadings on other constructs, demonstrating adequate discriminant validity.

The findings confirm that all indicators display higher loadings on their respective constructs compared to cross-loadings with other constructs. For instance, the loading of AFR2 on Affordability (AFR) is 0.964, significantly higher than its loadings on other constructs, such as Attitude (ATT) at 0.343 and Awareness (AWN) at 0.476. Similarly, ATT1 exhibits a strong loading on Attitude (0.882), which is

distinctly higher than its loadings on Awareness (0.536) and Health Micro-Takaful Adoption (HMTA) at 0.628. Health Micro-Takaful Adoption (HMTA) indicators also demonstrate strong discriminant validity. For example, HMTA3 shows a loading of 0.913 on HMTA, far exceeding its correlations with constructs like Awareness (0.604) and Intention (INT) at 0.726. Likewise, Intention (INT) indicators such as INT2 exhibit robust loadings on their intended construct (0.896), substantially higher than their cross-loadings on other constructs, such as Subjective Norms (SBN) at 0.809. The Perceived Behavioural Control (PBC) construct also displays adequate discriminant validity. For example, PBC6 has a loading of 0.897 on PBC, which is higher than its loadings on constructs such as Awareness (0.740) and Health Micro-Takaful Adoption (0.655). Indicators for Subjective Norms (SBN), such as SBN7, demonstrate a strong loading of 0.904 on their construct, exceeding cross-loadings on constructs like Attitude (0.770) and Awareness (0.637).

Overall, the results confirm that each indicator loads more strongly on its respective construct than on any other construct, thereby providing evidence of discriminant validity. This reinforces the robustness of the measurement model and supports the distinctiveness of the constructs, ensuring their appropriateness for further structural model evaluation.

6.1.7.1.7 Discriminant Validity Using the HTMT Criterion

The Heterotrait-Monotrait Ratio (HTMT) is a measure used to assess discriminant validity by examining the ratio of correlations within a construct to those of other constructs. For discriminant validity to be established, HTMT values should generally be less than 0.90 (Ramayah et al., 2018).

Table 6.24 evaluates discriminant validity using the Heterotrait-Monotrait Ratio (HTMT) criterion. The HTMT is a more stringent test of discriminant validity compared to traditional approaches, and it ensures that constructs are empirically distinct. The recommended threshold for HTMT values is generally below 0.85 for conceptually distinct constructs and below 0.90 for constructs that are closely related.

Table 6.24. Discriminant Validity Using the HTMT Criterion

	AFR	ATT	AWN	HMTA	INT	PBC
AFR						
ATT	0.273					
AWN	0.359	0.655				
HMTA	0.253	0.778	0.693			
INT	0.264	0.889	0.711	0.825		
PBC	0.386	0.791	0.917	0.795	0.889	
SBN	0.291	0.890	0.728	0.790	0.947	0.893

The results indicate that most HTMT values meet the acceptable thresholds, confirming adequate discriminant validity across the constructs. For instance, the HTMT value between Affordability (AFR) and Attitude (ATT) is 0.273, well below the threshold, which indicates that these constructs are empirically distinct. Similarly, the HTMT value between AFR and Awareness (AWN) is 0.359, further reinforcing their discriminant validity. Health Micro-Takaful Adoption (HMTA) demonstrates adequate separation from other constructs, such as Affordability (HTMT = 0.253) and Attitude (HTMT = 0.778). While the HTMT value between HMTA and AWN is slightly higher at 0.693, it remains within acceptable limits, indicating sufficient discriminant validity. Intention (INT) also exhibits distinctiveness from other constructs. For example, the HTMT value between INT and Attitude is 0.889, which is within the threshold for closely related constructs, and the value between INT and Awareness is 0.711, reinforcing their distinction. The HTMT values for Perceived Behavioural Control (PBC) also meet the criteria, with values such as 0.386 for AFR and 0.917 for AWN. Although the latter is close to the upper limit, it remains acceptable. Subjective Norms (SBN) similarly satisfy the HTMT criterion, with values such as 0.291 for AFR and 0.890 for ATT. The HTMT value between SBN and INT is 0.947, which is slightly higher but may still be considered acceptable for highly interrelated constructs. In conclusion, the HTMT analysis confirms that the constructs in the measurement model exhibit adequate discriminant validity, as most HTMT values are below the recommended thresholds. This ensures that the constructs are empirically distinct and appropriate for further structural model analysis.

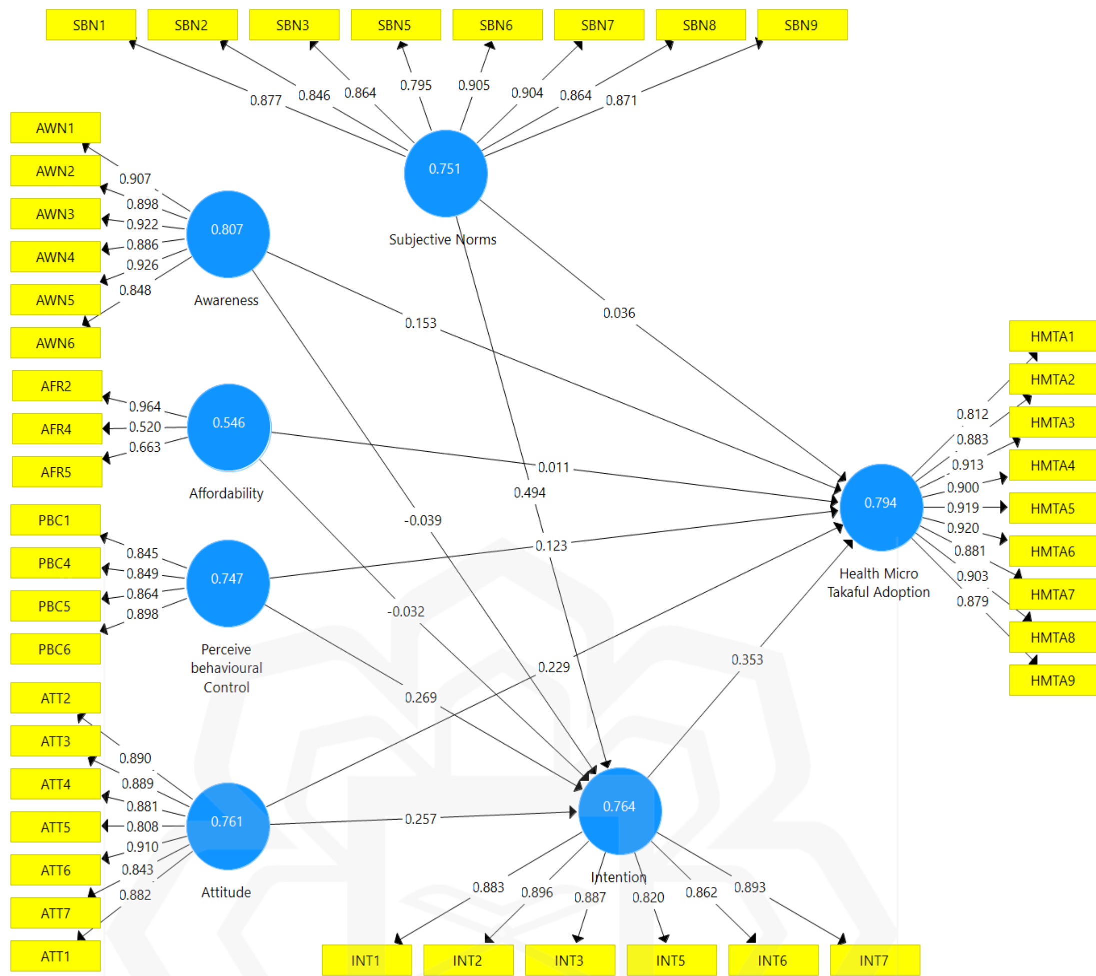

Figure 6.10. Measurement Model Assessment

After assessing the factor loadings, CR, AVE, and discriminant validity, the measurement model can be deemed adequate if all the criteria are met. Any observed variable that does not meet the criteria should be considered for removal from the model. This may involve re-specifying the model and re-assessing its adequacy. Once the measurement model is assessed and deemed adequate, the next step is to assess the structural model (Hair Jr et al., 2017).

6.1.7.2 Stage 2: Structural Model (Inner Model) Assessment

The structural model is evaluated by conducting hypothesis testing in accordance with the research questions. Based on the applicable research framework, this study proposed six research hypotheses. According to Ramayah et al. (2018), structural model

assessment identifies the relevant and effective routes for supporting the hypothesis. The model is also clarified in the structural model evaluation. To evaluate the structural model, the Coefficient of Determination or the R^2 Value must be assessed, followed by the assessment of the Effect Size or the f^2 Value and finally measuring the Predictive Relevance of the Model or the Q^2 Value, which are all carried out in the following sections.

Bootstrapping was employed in this study to evaluate the statistical significance of the path coefficients in the structural model. Bootstrapping is a non-parametric resampling procedure widely recommended in PLS-SEM, as it does not assume normality of the data and provides robust estimates of standard errors and significance levels (Hair et al., 2017).

Table 6.25. Bootstrapping settings

	Selected option	Reference
Sub-samples	10,000	Hair et al. (2017)
Sign changes	No sign changes	
Number of results	Complete bootstrapping	
Cases	428	

As shown in Table 6.25, this study used 10,000 subsamples, which exceeds the commonly recommended minimum of 5,000 resamples (Hair et al., 2017), thereby ensuring greater stability and reliability of the results. The bootstrapping was conducted with the “no sign changes” option, which maintains consistency in the direction of parameter estimates across samples. A total of 428 cases were included in the resampling procedure, reflecting the full dataset used for the analysis.

Confidence intervals (CIs) of 95% were applied to determine the significance of path coefficients, following conventional standards in PLS-SEM. If the CI for a path coefficient does not include zero, the relationship is considered statistically significant. This enhances the robustness of hypothesis testing by accounting for sampling variability and reducing the risk of Type I and Type II errors.

Overall, the bootstrapping results provided the necessary t-values, standard errors, and confidence intervals to determine the statistical significance of hypothesized relationships. This rigorous procedure confirms the reliability of the inferential conclusions drawn from the structural model.

6.1.7.2.1 Multicollinearity Assessment

Before assessing the structural model, it is essential to ensure that multicollinearity does not bias the estimation of path coefficients. Multicollinearity occurs when independent variables are highly correlated, which can inflate standard errors and weaken the reliability of results. In PLS-SEM, this is typically assessed through the Variance Inflation Factor (VIF). According to Hair et al. (2011, 2019), a VIF value of 5 or below indicates no severe multicollinearity issues, while a more conservative cut-off of 3.3 has been suggested by Diamantopoulos and Siguaw (2006).

Table 6.26 presents the VIF values for the predictor constructs of Health Micro-Takaful Adoption. The results show that all VIF values fall between 1.326 and 4.872, well below the maximum threshold of 5. Specifically, Affordability (1.326) indicates very low collinearity, while Subjective Norms (4.872) records the highest value but still within the acceptable range. Attitude (3.998), Awareness (3.414), and Perceived Behavioural Control (4.386) also remain below the cut-off point, suggesting that each construct provides unique explanatory power without excessive overlap.

Table 6.26. Collinearity of Structural Model

Relationships	VIF
Affordability -> Health Micro Takaful Adoption	1.326
Attitude -> Health Micro Takaful Adoption	3.998
Awareness -> Health Micro Takaful Adoption	3.414
Perceive behavioural Control -> Health Micro Takaful Adoption	4.386
Subjective Norms -> Health Micro Takaful Adoption	4.872

Note. VIF ≤ 5 (Hair et al, 2011)

These findings confirm that multicollinearity is not a concern in this model. The results strengthen the robustness of the structural model estimation, as the path coefficients can be interpreted without the distortion typically caused by high inter-correlations among predictors. This ensures that each construct's effect on Health Micro-Takaful Adoption is distinct and reliable.

6.1.7.2.2 Assessment of Coefficient of Determination (R^2 Value)

The coefficient of determination (R^2) measures how well the independent variables in a statistical model predict the outcome variable. It evaluates the proportion of variance in the dependent variable that is explained by the independent constructs in the model. R^2 values range from 0 to 1, with higher values indicating better predictive accuracy. Field (2024) describes R^2 as the shared variance between two variables, while Hair Jr et al. (2017) emphasize its role in quantifying the strength of the relationship between the predicted and dependent constructs. According to Pallant (2020), R^2 also reflects the extent to which the independent constructs impact the dependent construct, providing insight into the explanatory power of the model.

Table 6.27. Assessment of Coefficient of Determination (R^2 Value)

Endogenous construct	R^2	STDEV	T Statistics	Relationship
Health Micro-Takaful Adoption	0.673	0.036	18.867	Large effects size
Intention	0.842	0.021	39.490	Large effects size

The R^2 statistic ranges from 0 to 1. Where 0.01 is considered a small effect, 0.09 is a medium effect, and 0.25 is a large effect (Wall Emerson, 2023). Table 6.27 assesses the coefficient of determination (R^2) values for the endogenous constructs in the model, providing insight into the model's explanatory power. The R^2 values represent the proportion of variance in the endogenous constructs explained by the exogenous constructs, with thresholds of 0.19, 0.33, and 0.67 indicating weak, moderate, and substantial effects, respectively.

The R^2 value for Health Micro-Takaful Adoption is 0.673, which denotes a substantial effect size. This indicates that 67.3% of the variance in Health Micro-Takaful Adoption is explained by the predictors in the model. The standard deviation (STDEV) of 0.036 and a high T-statistic of 18.867 further confirm the robustness and significance of this result.

Similarly, the R^2 value for Intention is 0.842, representing a very high explanatory power. This means that 84.2% of the variance in Intention is accounted for by its predictors. The STDEV of 0.021 and the extremely high T-statistic of 39.490 highlight the strong predictive validity and statistical significance of the relationships influencing Intention.

In summary, the results demonstrate that both constructs exhibit large effect sizes, with the model showing strong explanatory power for the variance in Health Micro-Takaful Adoption and Intention. These findings validate the model's predictive accuracy and underscore the importance of the exogenous constructs in explaining the targeted endogenous constructs.

6.1.7.2.3 Effect Size (f^2 Value)

The effect size (f^2 value) assesses the relative contribution of each independent construct to the dependent construct, highlighting the practical importance of these relationships in the model. It quantifies the impact of an independent variable on the dependent variable beyond what other predictors in the model can explain. Effect sizes are categorized as small ($f^2 \geq 0.02$), medium ($f^2 \geq 0.15$), and large ($f^2 \geq 0.35$), as suggested by Hair Jr et al. (2017) and Ramayah et al. (2018).

The analysis of the effect size (f^2) presented in Table 6.28 evaluates the relative importance of independent constructs on the dependent construct, Health Micro-Takaful Adoption (HMTA). The f^2 value measures how much each independent variable contributes to the variance explained in the dependent variable, indicating the practical significance of these relationships. The results indicate that affordability has an f^2 value of 0.000, with a T-statistic of 0.045 and a standard deviation (STDEV) of 0.006. This implies a non-significant relationship (NR), suggesting that affordability does not have a notable practical impact on HMTA within this model. Similarly,

perceived behavioural control (PBC) and subjective norms (SBN) exhibit non-significant effects with f^2 values of 0.007 and 0.001, respectively. These findings indicate that neither PBC nor SBN substantially contributes to the variance in HMTA beyond the effects of other predictors.

Table 6.28. Effect Size (f^2 Value)

Constructs	f^2	STDEV	*T* Statistics	Relationship
Affordability	0.000	0.006	0.045	NR
Attitude	0.040	0.030	1.344	Small
Awareness	0.021	0.020	1.045	Small
Intention	0.060	0.039	1.550	Small
Perceive Behavioural Control	0.007	0.013	0.542	NR
Subjective Norms	0.001	0.006	0.093	NR

*Dependent construct: Health Micro-Takaful Adoption (small, medium, large)

In contrast, attitude demonstrates a small but meaningful effect, with an f^2 value of 0.040, a T-statistic of 1.344, and an STDEV of 0.030. This result suggests that a positive attitude towards Health Micro-Takaful plays a modest but statistically relevant role in influencing its adoption. Similarly, awareness has an f^2 value of 0.021, meeting the threshold for a small effect. Despite its small size, awareness contributes to the understanding and consideration of HMTA adoption among participants.

Finally, intention exhibits the highest f^2 value among the significant constructs, at 0.060, with a T-statistic of 1.550 and an STDEV of 0.039. This underscores its relatively stronger, though still small, contribution to explaining variance in HMTA. Intention emerges as a critical driver, reinforcing the notion that participants' behavioural intentions are pivotal in shaping adoption behaviour.

In summary, while affordability, PBC, and SBN exhibit negligible contributions to HMTA, attitude, awareness, and intention demonstrate small but meaningful impacts. Intention stands out as a more influential factor in this model, highlighting the importance of fostering strong behavioural intentions to enhance the adoption of Health Micro-Takaful.

6.1.7.2.4 Predictive Relevance of the Model (Q^2 Value)

The blindfolding approach enables the determination of Stone-Geisser's Q^2 value, which is used to measure a model's predictive significance (Hair et al., 2017). This is a method of systematic resampling inside an indication in which the data value is detected and then eliminated. This method is designed to anticipate the relevance of a measurement model with dependent components (Hair et al., 2017). The omission distance (D) guides the eliminated data values while using the blindfolding approach. A Q^2 greater than 0 indicates that the model is sufficiently predictive. In the current study, the blindfolding technique was used with an omission distance of D = 7. Based on the blindfolding assessment, the predictive relevance Q^2 values for the Health Micro-Takaful Adoption (0.526), and for the Intention to Use (0.635), indicate that the model has a predictive relevance since the Q^2 values were considerably above zero.

6.1.8 Empirical Results of Hypothesis Testing

This section presents the empirical results of hypothesis testing, providing insights into the relationships between constructs in the research model. The analysis is divided into two subsections. The analysis of the direct relationship focuses on testing the direct effects of independent variables on dependent variables, highlighting the significance and strength of these relationships, and the analysis of the mediating effects to explore the role of mediating constructs, examining how they influence the relationship between predictors and outcomes. Together, these analyses provide a comprehensive understanding of the model’s predictive power and the pathways through which the constructs interact to achieve the study's objectives.

6.1.8.1 Analysis of the Direct Relationship

The direct relationships between constructs as proposed in the study’s hypotheses. Using the structural model, the direct paths are analysed to determine the strength, direction, and statistical significance of these relationships. The analysis is based on path coefficients (Beta), standard deviation, T-statistics, and p-values, which collectively assess the validity of each hypothesis. Table 6.29 summarizes the results, highlighting which direct relationships are supported by the data.

Table 6.29. Hypotheses Testing Results of the Direct Relationship

Hy.	Path	Beta	S. D	*T* Statistics	*P* Values	Result
H_1	AFR -> HMTA	0.011	0.041	0.262	0.794	Not Significant
H_2	ATT -> HMTA	0.229	0.076	3.027	0.002	Significant
H_3	PBC -> HMTA	0.123	0.097	1.267	0.205	Not Significant
H_4	AWN -> HMTA	0.153	0.068	2.230	0.026	Significant
H_5	SBN -> HMTA	0.036	0.090	0.397	0.692	Not Significant

The direct relationships between the independent constructs and the dependent construct, Health Micro-Takaful Adoption (HMTA), are analysed in Table 6.29. The results reveal the strength and significance of these relationships, providing critical insights into the direct effects of affordability, attitude, perceived behavioural control, awareness, and subjective norms on HMTA.

Hypothesis H_1, which examines the direct effect of affordability (AFR)** on HMTA, shows a beta coefficient of 0.011, with a T-statistic of 0.262 and a P-value of 0.794. This indicates a non-significant relationship, suggesting that affordability does not play a substantial direct role in influencing the adoption of HMTA. Similarly, H3, which assesses the impact of perceived behavioural control (PBC) on HMTA, presents a beta value of 0.123, a T-statistic of 1.267, and a P-value of 0.205, also revealing a non-significant effect. Likewise, H5, addressing the influence of subjective norms (SBN), yields a beta of 0.036, a T-statistic of 0.397, and a P-value of 0.692, highlighting another non-significant relationship.

In contrast, H_2, which explores the effect of attitude (ATT) on HMTA, demonstrates a significant relationship with a beta value of 0.229, a T -statistic of 3.027, and a P-value of 0.002. This indicates that a positive attitude significantly and directly contributes to the adoption of HMTA, emphasizing its importance as a determinant. Similarly, H4, examining the direct impact of awareness (AWN) on HMTA, reports a beta of 0.153, a T -statistic of 2.230, and a P-value of 0.026, also indicating a significant relationship. Awareness appears to play a crucial role in encouraging the adoption of HMTA among the respondents.

In conclusion, the analysis highlights the significance of attitude and awareness as direct predictors of HMTA, while affordability, perceived behavioural control, and subjective norms do not demonstrate substantial direct effects. These findings underscore the importance of fostering positive attitudes and increasing awareness to enhance the adoption of Health Micro-Takaful, as also illustrated in Figure 6.11.

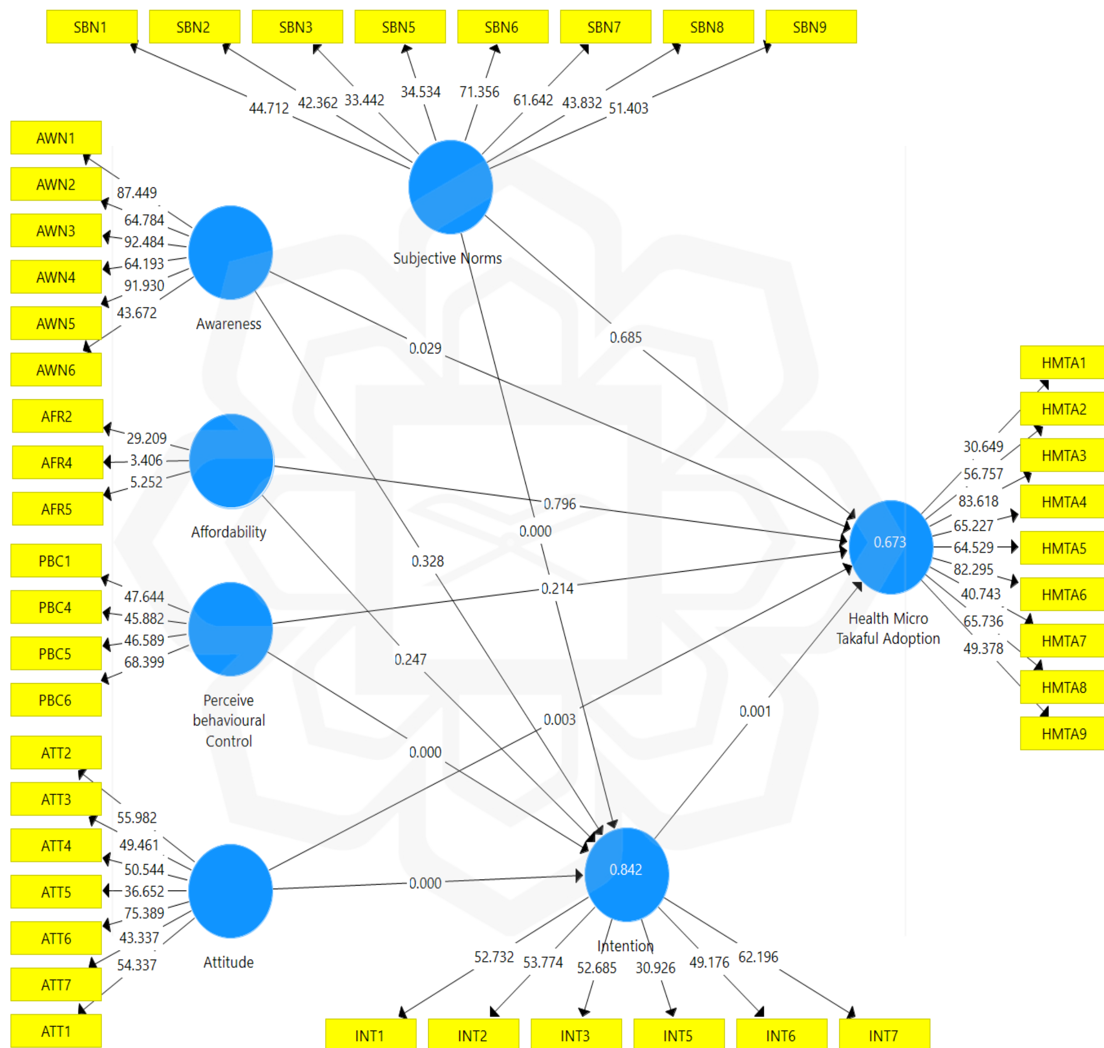

Figure 6.11. Structural Model Assessment

6.1.8.2 Analysis of the Mediating Effects

This subsection examines the mediating effects of specific constructs on the relationships between independent and dependent variables. Mediators help clarify the underlying mechanisms through which predictors influence outcomes. The analysis

evaluates the indirect effects by assessing path coefficients (Beta), standard deviation, T-statistics, and p-values. Table 6.30 summarizes the results of the hypotheses testing for mediating effects.

Table 6.30. Hypotheses Testing Results for Mediating Effects

Hy.	Path	Beta	S. D	*T* Statistics	*P* Values	Result
$H6_a$	AFR -> INT -> HMTA	-0.011	0.011	1.058	0.290	Not Significant
$H6_b$	ATT -> INT -> HMTA	0.091	0.035	2.561	0.010	Significant
$H6_c$	AWN -> INT -> HMTA	-0.014	0.015	0.950	0.342	Not Significant
$H6_d$	PBC -> INT -> HMTA	0.095	0.034	2.797	0.005	Significant
$H6_e$	SBN-> INT -> HMTA	0.174	0.058	3.023	0.003	Significant

The results presented in Table 6.30 examine the mediating effects of intention (INT) in the relationships between various independent variables and Health Micro-Takaful Adoption (HMTA). These hypotheses testing results reveal the significance of different paths, offering insights into the indirect effects of affordability (AFR), attitude (ATT), awareness (AWN), perceived behavioural control (PBC), and subjective norms (SBN) on HMTA through the mediating role of intention.

For H6a (AFR → INT → HMTA), the beta value is -0.011, with a T-statistic of 1.058 and a P-value of 0.290, indicating that this mediating effect is not significant. This suggests that affordability does not significantly influence Health Micro-Takaful Adoption through intention, emphasizing that other factors likely play a more critical role in shaping adoption behaviour.

The path H6b (ATT → INT → HMTA), however, shows a beta value of 0. 035, a T-statistic of 2.561, and a P-value of 0.010, indicating a statistically significant mediating effect. This result implies that attitude indirectly influences Health Micro-Takaful Adoption through intention, underscoring the importance of a positive attitude in fostering both intention and subsequent adoption behaviour.

In contrast, H6c (AWN → INT → HMTA) reveals a beta value of -0.014, a T-statistic of 0.950, and a P-value of 0.342, showing that this mediating effect is not significant. This indicates that awareness, even when mediated through intention, does not play a meaningful role in influencing Health Micro-Takaful Adoption. Awareness alone may not be sufficient to drive either intention or behaviour.

The path H6d (PBC → INT → HMTA) demonstrates a beta value of 0.095, with a T-statistic of 2.797 and a P-value of 0.005, confirming a significant mediating effect. This suggests that perceived behavioural control, when mediated through intention, positively impacts Health Micro-Takaful Adoption. Individuals who feel they have greater control over their actions are more likely to form intentions and ultimately adopt the program.

Finally, H6e (SBN → INT → HMTA) has the highest beta value of 0.174, a T-statistic of 0.058, and a P-value of 0.003, indicating a highly significant mediating effect. This result highlights the critical role of subjective norms in shaping intention and driving adoption behaviour. Social and cultural influences are thus pivotal in fostering both the intention to adopt and the subsequent adoption of Health Micro-Takaful.

In summary, the findings indicate that attitude, perceived behavioural control, and subjective norms significantly influence Health Micro-Takaful Adoption through intention, with subjective norms showing the strongest effect. In contrast, affordability and awareness do not exhibit significant mediating effects, suggesting that they are less influential in this context. These insights are valuable for designing targeted interventions to improve the adoption of Health Micro-Takaful.

6.1.9 Discussion of Findings

To achieve the objectives of examining Sudanese perceptions of Health Takaful and Health Micro-Takaful, the findings reveal a complex relationship between demographic, socioeconomic, and attitudinal factors that shape public views. The study highlights that while respondents generally perceive Health Takaful positively, particularly for its role in enhancing treatment opportunities and providing peace of mind, significant gaps in awareness and access to information remain. Many

respondents expressed limited knowledge about specific policies and premium calculations, which could hinder informed decision-making.

This gap highlights the need for targeted awareness campaigns to bridge the knowledge divide, making Health Takaful more accessible and understandable to the public. When it comes to Health Micro-Takaful, the findings suggest that it is widely regarded as a promising and affordable alternative to Health Takaful, especially among those seeking cost-effective solutions. The societal value of Health Micro-Takaful has the potential to address the financial and healthcare needs of lower-income groups. However, perceptions of affordability remain a critical factor, as many individuals view the financial implications of both Health Takaful and Health Micro-Takaful policies as worrying.

Addressing these concerns through affordable pricing models and subsidies could enhance acceptance and uptake. In identifying the factors influencing Sudanese adoption of Health Takaful and Health Micro-Takaful, the findings highlight the essential role of demographic characteristics such as gender, age, income, and education. Demographic characteristics such as age, gender, education level, and income are often pivotal in understanding public perceptions and adoption behaviours (Christia & Ard, 2016). Research indicates that men and women often have different preferences and attitudes towards products, which can influence their likelihood of adoption (Lin et al., 2018). This study's findings suggest that Health Takaful coverage is generally low across both genders, with females exhibiting a slightly higher rate of being uninsured. This highlights the need for gender-inclusive policies and interventions to increase Health Takaful coverage for both male and female populations. Studies have shown that younger consumers are generally more open to adopting new technologies and products compared to older consumers, who may exhibit more caution and resistance to change (Bhardwaj et al., 2023).

Also, studies have shown that Income level is another important factor affecting product adoption (Triwijayati et al., 2020). Higher-income individuals are often more willing to invest in new technologies, perceiving them as valuable enhancements to their lifestyle (Bhardwaj, 2023). While, lower-income consumers may prioritize affordability and practicality, leading to a more cautious approach to adopting new products (Bhardwaj, 2023). For instance, in this study, while higher income and older

age groups show better coverage rates, gaps continue across all segments, suggesting that affordability and accessibility are universal challenges. Research suggests that unmarried individuals may exhibit a greater tendency to adopt new products compared to their married counterparts, who may be more risk-averse and focused on family-oriented products (Triwijayati et al., 2020). In this study, marital status also emerges as a relevant factor, with married individuals showing the highest number of insured respondents yet still reflecting significant coverage gaps. Education level influences consumer perceptions and adoption behaviours as well. Educated consumers tend to be more informed about product features and benefits, which can lead to a greater willingness to adopt innovative solutions (Kumar, 2023).

This study's findings reveal that higher educational qualifications do not necessarily correlate with better Health Takaful coverage, highlighting the need for broader access to and promotion of Health Takaful irrespective of educational attainment. Previous studies discussed the role of the labour or business sector on adoption among low-income populations. Studies exploring health insurance adoption in low-income countries highlighted some differences in perceptions between the formal and informal sectors (Triwijayati et al., 2020). Informal sector workers often face barriers such as low income, limited awareness, and lack of trust in insurance systems, which negatively influence their perceptions. For instance, Sales et al. (2020) found that individuals in the informal sector in the Philippines struggled with understanding the benefits of insurance, emphasizing the need for targeted outreach to improve awareness. Similarly, Ndomba and Maluka (2019) noted that informal workers in Tanzania perceived health insurance as irrelevant due to economic challenges and low awareness levels. Sisimwo et al. (2022) observed in Kenya that dissatisfaction with the quality of services under national schemes contributed to an unwillingness among informal workers to renew their insurance, contrasting with the more positive experiences of formal sector employees. In Ethiopia, Hussien et al. (2022) identified economic instability and mistrust in Community-Based Health Insurance schemes as key factors shaping negative perceptions among informal workers. These findings collectively underscore the importance of addressing economic and informational barriers to enhance the perception and adoption of Health Takaful among informal sector workers. Mohsin et al. (2021) explored the willingness to pay for Health Takaful among government and non-government employees in Bangladesh. Their study found

that informal sector workers are less willing to pay for Health Takaful due to low income and a lack of perceived value, highlighting a significant gap in perceptions between the two sectors.

This study's findings highlight that Health Takaful coverage is generally low across all sectors, with the highest coverage seen in the Education sector, though the majority in each sector remain uninsured. This suggests that improvements in Health Takaful access are needed across all labour and business sectors.

Perceptions of Health Takaful often vary across regions, due to differences in access to healthcare services; in regions with scarce or low-quality facilities, individuals may see little value in Takaful coverage (James & Acharya, 2022; Habib & Zaidi, 2021). In this study, findings suggest that Health Takaful coverage is most widespread in Khartoum state, while other regions, especially the Nile River and Red Sea states, exhibit very low coverage, highlighting regional disparities that may require targeted interventions to increase Health Takaful access in less covered areas. On the other hand, Community-Based Health Insurance models have shown promise in fostering trust and improving perceptions, especially in low-income areas where collective efforts resonate with local values (Okunogbe et al., 2022; Afriyie et al., 2022).

Additionally, the study reveals that societal and family norms strongly influence perceptions and decisions regarding Health Takaful, whereas the influence of friends and the actual participation of important people in their lives is less significant. Overall, the findings emphasize the need for inclusive, gender-sensitive, and regionally targeted policies to address differences in Health Takaful coverage. By addressing affordability concerns, increasing awareness, and enhancing accessibility, both Health Takaful and Health Micro-Takaful can become more effective tools in meeting the healthcare needs of Sudanese communities.

The quantitative analysis presented above answered the study's questions; (How do Sudanese perceive Health Takaful?) and (How do Sudanese perceive Health Micro-Takaful?).

6.1.10 Hypotheses Testing Results and Discussion

The third objective of this research is to identify the determinant factors of adopting Health Micro-Takaful in Sudan based on the TPB and two extended variables (awareness and affordability) with the mediating role of behavioural intention, the researcher developed six (6) hypotheses. Tables 6.31 and 6.32 present the summary results of the hypothesis testing of the structural model. Each of the hypotheses listed below is analysed based on findings related to the hypothesis followed by the discussion.

Table 6.31. Hypothesis Testing

No	Assumptions	Results
H1	Affordability significantly influences the adoption of Health Micro –Takaful in Sudan	Rejected
H2	Attitudes significantly influence the adoption of Health Micro - Takaful in Sudan	Accepted
H3	Perceived Behavioural Control significantly influences the adoption of Health Micro -Takaful in Sudan	Rejected
H4	Awareness significantly influences the adoption of Health Micro –Takaful in Sudan	Accepted
H5	Subjective norms significantly influence the adoption of Health Micro–Takaful in Sudan.	Rejected

H1: Affordability Significantly Influences the Adoption of Health Micro–Takaful in Sudan. The Hypothesis testing shows a beta coefficient of 0.011, with a T-statistic of 0.262 and a P-value of 0.794, indicating a non-significant relationship, suggesting that affordability does not play a substantial direct role in influencing the adoption of Health Micro-Takaful Adoption. On the other hand, a previous study by Rapi and Kassim (2023) found a positive link between affordability and Micro-Takaful acceptance, reinforcing the idea that pricing influences decisions. Similarly, findings by Ramamoorthy et al., (2014) and Mohamed (2017) as cited by Rapi and Kassim (2023) showed that affordability plays a key role in purchasing behaviour. This difference in

findings might be due to Sudan’s economic situation of inflation, financial instability, or a lack of financial literacy might mean that affordability alone isn’t enough to drive adoption. Future research could dive deeper into these other influences to get a clearer picture of what truly drives people to adopt Health Micro-Takaful in Sudan.

H2: Attitudes Significantly Influence the Adoption of Health Micro-Takaful in Sudan. Hypothesis 2, which explores the effect of attitude on Health Micro-Takaful Adoption with a beta value of 0.229, a T -statistic of 3.027, and a P-value of 0.002, demonstrates a significant relationship. This indicates that a positive attitude significantly and directly contributes to the adoption of Health Micro-Takaful in Sudan, emphasizing its importance as a determinant. The significant relationship suggests that when individuals hold a positive view toward Health Micro-Takaful, they are more likely to adopt it. This insight reinforces the idea that attitude is a powerful driver in decision-making. This result aligns with findings of prior research indicating that a positive attitude toward financial behaviours often leads to their adoption.

Studies by Sulaiman et al. (2023); Aji et al. 2020; Ali et al. 2017; Amin et al. 2011; Bidin et al. 2009; Effendi et al. 2020; Farouk et al. 2018; Al Jaffri et al. 2020; Kashif and Run 2015; Kashif et al. 2015; Ram and Haniffa 2014; Raut et al. 2020 cited by Ghaouri,2022) have shown that attitude directly influences behaviour in financial contexts. Specifically, in the realm of Takaful and Micro-Takaful, Rapi and Kassim (2023), Kazaure (2019), Maizaitulaidawati and Asmak (2016) and Shabiq and Hassan (2016), as cited by Rapi and Kassim (2023), found that a positive attitude significantly boosts Takaful adoption. Further supporting this, Kazaure and Abdullah (2019) discovered that a positive attitude significantly influences the acceptance of Islamic Health Insurance. In conclusion, this research adds to the growing evidence that fostering positive attitudes toward Health Micro-Takaful can play a key role in encouraging its adoption.

H3: Perceived Behavioural Control Significantly Influences the Adoption of Health Micro-Takaful in Sudan. Hypothesis 3, which assesses the impact of perceived behavioural control on Health Micro-Takaful Adoption presents a beta value of 0.123, a T-statistic of 1.267, and a P-value of 0.205, revealing a non-significant effect. This suggests that feeling in control of the decision, whether through knowledge, financial capability, or ease of access may not be a strong determinant in whether

Sudanese people choose to adopt Health Micro-Takaful. This outcome differs from the body of existing research, where Perceived Behavioural Control is often found to be a significant factor in shaping intention to adopt and behaviour. Armitage & Conner, 2001; Godin & Kok, 1996; Kidwell & Jewell, 2003 cited by Kazaure & Abdullah, 2019) have consistently highlighted Perceived Behavioural Control as a strong predictor of behavioural intention across various contexts. Specifically, in Islamic Health Insurance adoption, studies by Amin, 2012; Rahim & Amin, 2011; Husin & Rahman, 2013; Souiden, Jabeur, & Estelami, 2015; Maiyaki & Ayuba, 2015; Mas'ud, 2016; cited by Kazaure & Abdullah, 2019) have all found a significant and positive relationship between Perceived Behavioural Control and adoption. Similarly, Sulaiman et al. (2023) reported a statistically significant impact of Perceived Behavioural Control on Islamic Health Insurance acceptance.

This difference in findings might be due to the Sudanese context may present unique barriers that weaken the effect of Perceived Behavioural Control. For example, even if individuals feel confident in their ability to adopt Health Micro-Takaful, external challenges such as a lack of accessible providers, regulatory uncertainties, or economic instability may prevent them from acting on that confidence. Second, awareness and trust in Health Micro-Takaful could be low, meaning that even those who feel capable of purchasing the product may still hesitate due to uncertainty. Finally, it is possible that Perceived Behavioural Control plays an indirect role in Sudan, influencing adoption through intention rather than acting as a direct determinant.

H4: Awareness Significantly Influences the Adoption of Health Micro–Takaful in Sudan. Hypothesis 4, examining the direct impact of awareness on Health Micro-Takaful Adoption reports a beta of 0.153, a T-statistic of 2.230, and a P-value of 0.026, indicating a significant relationship. Awareness appears to play a crucial role in encouraging the adoption of Health Micro-Takaful Adoption among the respondents. This suggests that when individuals are well-informed about Health Micro-Takaful, its benefits, principles, and accessibility they are more likely to adopt it. The strong relationship between awareness and adoption underscores the importance of education and outreach efforts in driving participation. These findings align with previous research showing that knowledge levels significantly impact consumer acceptance. Yinde and Echchabi (2012), and Wu and Peng (2024) found that higher awareness leads

to greater acceptance of financial products, while Akotey et al. (2011), Husin and Rahman (2016), and Yusoff et al. (2020) all reported that awareness and knowledge strongly influence decisions to purchase Micro-Takaful services. This body of evidence highlights the idea that awareness is not just an informational factor it directly shapes consumer behaviour. However, not all studies support this direct link. Kazaure (2019) and Sulaiman et al. (2023) found that awareness did not significantly influence Takaful acceptance.

Health Micro-Takaful is still a relatively new concept in Sudan, meaning that many potential users may be unfamiliar with how it works. In such cases, raising awareness can have a direct and powerful impact on adoption. These findings highlight the need for targeted awareness campaigns that not only educate potential users about Health Micro-Takaful but also address their concerns and build trust.

H5: Subjective Norms Significantly Influence the Adoption of Health Micro–Takaful in Sudan. Hypothesis 5 yields a beta of 0.036, a T-statistic of 0.397, and a P-value of 0.692, addressing the influence of subjective norms highlighting a non-significant relationship. This suggests that social pressure or the influence of others may not be a strong motivator for individuals when deciding whether to adopt Health Micro-Takaful in Sudan. This contrasts with several earlier studies done by Arsyianti and Adelia (2019), Dandago et al. (2016), Niswah et al. (2019), and Zanellia et al. (2023) where subjective norms were found to significantly impact product adoption. Similarly, studies by Amin (2012), Rapi and Kassim (2023), Khairi et al. (2020), Husin and Rahman (2016), and Razak et al. (2018) all reported a positive and statistically significant effect of subjective norms on adoption behaviour. Sulaiman et al. (2023) also reinforced this finding, emphasizing the role of social influence in decision-making. This study showed different results, and this might be due to cultural and social dynamics in Sudan that might differ from those in previous studies. In some societies, social approval plays a strong role in financial decisions, while in others, individuals may rely more on personal judgment. Also, economic factors might overshadow social influence even if social circles promote Health Micro-Takaful, individuals may prioritize perceived value or personal financial circumstances over societal expectations. These findings highlight the need for targeted awareness campaigns that go beyond relying on social influence. Instead, efforts should focus on building trust,

demonstrating the benefits of Health Micro-Takaful, and addressing individual concerns to encourage broader adoption in Sudan.

Table 6.32. Hypothesis Testing

No	Assumptions	Results
H_{6a}	Intention mediates the relationship between affordability and Health Micro –Takaful adoption	Rejected
H_{6b}	Intention mediates the relationship between attitude and Health Micro –Takaful adoption	Accepted
H_{6c}	Intention mediates the relationship between awareness and Health Micro –Takaful adoption	Rejected
H_{6d}	Intention mediates the relationship between perceived behavioural control and Health Micro –Takaful adoption	Accepted
H_{6e}	Intention mediates the relationship between subjective norms and Health Micro –Takaful adoption	Accepted

H6: Intention Mediates the Relationship Between Affordability, Attitude, Awareness, Perceived Behavioural Control, Subjective Norms, and Health Micro–Takaful Adoption in Sudan.

H6a: Intention mediates the relationship between affordability and Health Micro –Takaful adoption. Hypothesis testing with the beta value is -0.011, with a T-statistic of 1.058 and a P-value of 0.290 indicates that this mediating effect is not significant. This suggests that affordability does not significantly influence Health Micro-Takaful Adoption through intention, emphasizing that other factors likely play a more critical role in shaping adoption behaviour in Sudan. A review of previous studies reveals that there is limited research examining the mediating role of intention between affordability and financial product adoption. While affordability is often highlighted as a key factor influencing adoption, most studies focus on its direct impact rather than its influence through intention. This absence of direct empirical support suggests that affordability may operate differently compared to other factors, such as trust or perceived usefulness, in shaping financial decision-making.

For example, previous studies have shown that trust in financial institutions, religious considerations, and perceived service quality have a more direct influence on the intention and subsequent adoption of Islamic financial products (Kazaure & Abdullah, 2019; Sulaiman et al., 2023). Given these insights, future research could explore other potential mediators between affordability and Health Micro-Takaful Adoption. For instance, trust, financial literacy, and perceived usefulness might provide a stronger explanatory link between affordability and adoption. If people do not trust the provider or do not see value in the product, affordability alone is unlikely to drive uptake. Furthermore, it may be useful to examine whether affordability becomes a stronger determinant of intention in specific contexts for example, among lower-income groups where financial constraints are more pressing, or in environments where Micro-Takaful awareness is already high.

H6b: Intention mediates the relationship between attitude and Health Micro –Takaful adoption. Hypothesis testing shows a beta value of 0. 035, a T-statistic of 2.561, and a P-value of 0.010, indicating a statistically significant mediating effect. This result implies that attitude indirectly influences Health Micro-Takaful Adoption through intention, underscoring the importance of a positive attitude in fostering both intention and subsequent adoption behaviour. This finding aligns with previous studies. Khairi et al. (2020) found that intention significantly mediates the relationship between attitude and adoption of Takaful schemes. Also (Kusumawati et al., 2014) found that Intention significantly mediates the relationship between attitude and adoption behaviour. This might mean that awareness efforts and promotional strategies should not just focus on shaping positive attitudes toward Health Micro-Takaful. They also need to strengthen the intention to adopt. This could involve highlighting success stories, simplifying the enrolment process, or addressing common concerns that prevent people from turning their positive perceptions into real action. By closing this gap, might help more people take the step from awareness to adoption.

H6c: Intention mediates the relationship between awareness and Health Micro –Takaful adoption. Hypothesis testing reveals a beta value of -0.014, a T-statistic of 0.950, and a P-value of 0.342, showing that this mediating effect is not significant. This indicates that awareness, even when mediated through intention, does not play a meaningful role in influencing Health Micro-Takaful Adoption. Awareness

alone may not be sufficient to drive either intention or behaviour in Sudan. This finding contradicts with previous study by Hassan & Abbas, (2019), Khairi et al. (2020) found that intention significantly mediates the relationship between awareness and adoption. Another study by Ali et al., (2019) found that intention positively and significantly mediates the relationship between awareness and adoption of Takaful products. This difference in results might be due to the explanation that awareness alone does not address deeper concerns potential Sudanese users may have about Health Micro-Takaful. People might be aware of the concept but still, hesitate due to affordability concerns or uncertainty about how the system works in practice. Additionally, if awareness campaigns focus only on information without addressing emotional or practical barriers, they may fail to generate a strong intention to adopt. Instead of just spreading awareness, efforts should focus on building trust, demonstrating value, and addressing common concerns. Simply knowing about Health Micro-Takaful isn't enough people need to feel confident, motivated, and reassured before they act. Future research could explore what additional factors, beyond awareness, contribute to intention and adoption in the Sudanese context.

H6d: Intention mediates the relationship between perceived behavioural control and Health Micro –Takaful adoption. Hypothesis testing demonstrates a beta value of 0.095, with a T-statistic of 2.797 and a P-value of 0.005, confirming a significant mediating effect. This suggests that perceived behavioural control, when mediated through intention, positively impacts Health Micro-Takaful Adoption. Individuals who feel they have greater control over their actions are more likely to form intentions and ultimately adopt the program. Also (Kusumawati et al., 2014) found that Intention mediates the relationship between perceived behavioural control and adoption behaviour. Ultimately, strengthening both perceived control and intention could be a key to increasing Health Micro-Takaful adoption in Sudan.

H6e: Intention mediates the relationship between subjective norms and Health Micro –Takaful adoption. Hypothesis testing has the highest beta value of 0.174, a T-statistic of 0.058, and a P-value of 0.003, indicating a highly significant mediating effect. This result highlights the critical role of subjective norms in shaping intention and driving adoption behaviour. Social and cultural influences are thus pivotal in fostering both the intention to adopt and the subsequent adoption of Health Micro-

Takaful. This finding aligns with previous studies. Khairi et al. (2020) found that intention significantly mediates the relationship between subjective norms and the adoption of Takaful schemes. Also, Kusumawati et al. (2014) found that Intention significantly mediates the relationship between subjective norms and adoption behaviour. Since social and cultural expectations strongly influence Health Micro-Takaful adoption, awareness campaigns and promotional strategies should influence community engagement and trusted figures. Ultimately, this study's findings highlight that adoption is not just an individual decision but one shaped by collective influences. By tapping into these social and cultural dynamics, policymakers and providers can create more effective strategies to encourage adoption.

In conclusion, the analysis highlights the significance of attitude and awareness as direct predictors of Health Micro-Takaful Adoption, while affordability, perceived behavioural control, and subjective norms do not demonstrate substantial direct effects. These findings underscore the importance of fostering positive attitudes and increasing awareness to enhance the adoption of Health Micro Takaful. Also, the findings indicate that attitude, perceived behavioural control, and subjective norms significantly influence Health Micro-Takaful Adoption through intention, with subjective norms showing the strongest effect. In contrast, affordability and awareness do not exhibit significant mediating effects, suggesting that they are less influential in this context. These insights are valuable for designing targeted interventions to improve the adoption of Health Micro-Takaful.

6.2 QUALITATIVE PHASE - THE INTERVIEW

6.2.1 Introduction

In this research, the qualitative interviews were conducted after the quantitative analysis was completed. The interviews aimed to answer the research questions (What are the Opportunities that face Health Micro-Takaful adoption in Sudan?) and (What are the Challenges that face Health Micro-Takaful adoption in Sudan?). Each qualitative interview took about 45 minutes to one hour on average and then the analysis was accomplished. This analysis draws on insights from six interviews conducted with the top management representatives of the Central Bank of Sudan (CBoS), the Family

Bank, Al Baraka Insurance Company, and senior executives from the Insurance Supervisory Authority (ISA). Family Bank in Sudan plays a vital role in supporting financial inclusion, particularly for women and youth, through microfinance initiatives. Established with a capital of USD 35 million, the bank focuses on poverty alleviation and job creation by offering micro-financing solutions to underserved communities. With 42 branches across Sudan, it has been involved in funding small businesses, including women-led enterprises in food processing, handicrafts, and herbal cosmetics, with total financing reaching 577.6 million Sudanese pounds and benefiting over 84,000 individuals. The bank also collaborates with organizations like the National Youth Union and the Association of Working Women to expand its impact. Given its experience in financial inclusion and community engagement, Family Bank's insights are highly relevant to this study on Health Micro-Takaful adoption. Their expertise in addressing affordability challenges, building trust, and integrating financial solutions at the basic level makes them a key stakeholder in understanding the opportunities and challenges to adopting Health Micro-Takaful in Sudan.

To gain an in-depth understanding of Sudan's Takaful landscape, the researcher conducted an interview with a senior executive from one of the country's early-established Takaful companies, Al Baraka insurance company, founded in 1985. Given that Sudan was home to the world's first Islamic insurance (Takaful) company in 1979, Al Baraka company is among the pioneers in the field, with decades of experience in Takaful operations. It plays a significant role in Sudan's Takaful market, offering a range of services, including health, marine, vehicle, fire, and accident Takaful. Its long-standing presence and expertise in Takaful make it a valuable source of insight for this research. Engaging with a senior executive from such a well-established institution ensures a deeper understanding of the challenges and opportunities surrounding the adoption of Health Micro-Takaful in Sudan.

The interviews' discussions focus on challenges, opportunities, and strategies for adopting and sustaining Health Micro-Takaful in Sudan. The discussion of results includes quotes from interviewees. The quotation of each interviewee is numbered when needed (there are three interviewees from the Insurance Supervisory Authority in Sudan), to refer to the profile of the respondent. All interviews were conducted primarily in Arabic as it is the spoken language in Sudan. After collecting the data by

Zoom recording except for one interviewee (ISA1) the interview questions were sent to them and they gave back their written responses, then the data was transcribed, hand-coding, and analysed thematically to propose the common themes that represent the views of the participants (Creswell,2014).

Table 6.33. Profile of Experts

Respondent	Institute	Years of Experience
FB	The Family Bank	20 years
CBoS	CBoS	12years
ISA1	ISA	13years
ISA2	ISA	12 years
ISA3	ISA	More than15 years
IP	Al Baraka Bank	21 years

6.2.2 Thematic Analysis of Interview Data

After the thematic analysis, the researcher identified five major themes. These themes include regulatory and structural challenges, awareness and accessibility, economic and social barriers, strategies for sustainability, and suggested model development for Health Micro-Takaful.

Theme 1. Regulatory and Structural Challenges: One of the most pressing challenges facing Health Micro-Takaful in Sudan is the absence of a unified regulatory framework (ISA2). Currently, each type of Takaful operates under a separate legal structure, with the first Takaful law dating back to 1960. A representative from the Insurance Supervisory Authority in Sudan (ISA2) emphasized the urgent need for a comprehensive legislative framework that consolidates all forms of Takaful under one law, ensuring better organization and supervision. He noted, "*We need a law that governs all Takaful sectors under one umbrella. Right now, the fragmentation is causing inefficiencies and making regulation more difficult*," "*Each type of Takaful has its own law, and the first was issued in 1960. Sudan needs comprehensive legislation to organize all types of Takaful under one framework*" (ISA2). Additionally, (IP) noted

that "*The Takaful industry struggles with regulatory gaps and inefficiencies in administration due to limited expertise in managing health Takaful schemes*." which has led to widespread misuse of health Takaful services, particularly in the form of excessive claims and fraudulent activities. Fraud is widespread with many claims being unnecessary or fraudulent, straining the system and hospitals focusing on profit causing some private hospitals to prioritize revenue over patient care, reducing service quality.

An interviewee from ISA highlighted, "*One of the biggest challenges we face is the widespread misuse of health Takaful, and the quality of medical services provided is not consistent. Many people file unnecessary claims, and some providers even engage in fraudulent billing*" (ISA1, ISA2). Poor service quality among healthcare providers further worsens the issue, as many private hospitals prioritize profit over patient care. "*Hospitals and clinics are more focused on making money than on providing quality care*"(ISA1). These regulatory and structural weaknesses align with findings from previous research, which highlight the importance of strong governance and legal frameworks in ensuring the success of Micro-Takaful schemes (Fikri et al., 2021; Osifodunrin, 2023). Furthermore, technological limitations hinder the efficiency of Takaful operations, as there are no digital platforms to facilitate policy management and claims processing. "*There is no technical application to support Takaful products*." (ISA2). Interviewees (IP and ISA3), an industry expert, echoed with similar concerns, emphasizing the regulatory fragmentation that hinders efficiency. They stated, "*The lack of a unified health Takaful law leads to inefficiencies and creates legal gaps that are exploited by both providers and policyholders.*" Furthermore, IP and ISA3 noted that the absence of strict monitoring mechanisms enables fraudulent claims, which further strains the financial sustainability of Takaful providers.

The integration of technology in Micro-Takaful has been widely recognized as a key enabler in improving service delivery and reducing administrative costs (Ariffin et al., 2023), suggesting that Sudan could benefit from digital innovations to enhance the efficiency of its Takaful sector. Concerns were raised about the dominance of profit motives in private health facilities, often at the expense of quality care. "*The profit-driven approach of hospitals and clinics compromises the quality of services provided to beneficiaries*" (ISA1).

Interviewee (IP) added, "*There is a severe shortage of experienced professionals in the health Takaful sector, which impacts the efficiency of administration and regulation. Without a skilled workforce, it is difficult to enforce policies effectively and ensure compliance.*" This highlights a critical human resource gap that needs to be addressed to enhance regulatory efficiency.

Theme 2. Awareness and Accessibility: Limited public awareness remains a significant barrier to the adoption of Health Micro-Takaful in Sudan. The interviewees noted that even within government institutions, knowledge about Takaful remains minimal. (ISA2) pointed out, "*Many people, including those in government positions, do not fully understand how Takaful works or why it is important.*" This lack of awareness makes it difficult to promote voluntary participation in Micro-Takaful schemes. "*Takaful awareness is very low, even at the level of state institutions* (ISA2)." Given this gap, community organizations and civil society groups were identified as essential partners in raising awareness. (ISA1) emphasized, "*Social networks, including civil society organizations, play a crucial role in spreading awareness and educating people about the benefits of Health Micro-Takaful*." Collaboration with civil society and community-based organizations was suggested as an effective strategy to raise awareness. "*Community organizations play an active role in educating the public about Health Micro-Takaful* (ISA1)." Studies on Micro-Takaful adoption have similarly highlighted the role of community-based education in increasing awareness and encouraging participation (Nadzli et al., 2024; Beshir et al., 2023; Rapi et al., 2022).

The interviewee (IP) stressed, "*Many people do not see the importance of Health Takaful until they face a medical emergency. There is a strong need for awareness through media and community programs*." This reinforces the need for targeted communication efforts to improve awareness levels.

The interviewees also stressed the importance of leveraging mass media and digital platforms to spread information about Health Micro-Takaful. A participant from the Insurance Supervisory Authority suggested, "*We should use television, radio, and social media to communicate with people in simple and relatable ways* (ISA1)." Research has shown that targeted awareness campaigns significantly improve Micro-Takaful uptake, particularly in low-income communities where financial literacy is low (Yusoff et al., 2022; Rapi et al., 2022).

Theme 3. Economic and Social Barriers: Economic instability, particularly high inflation, has severely impacted the affordability of Health Takaful in Sudan. One interviewee from ISA noted, "*Before the war, an annual medical Takaful policy cost between 70,000 and 80,000 Sudanese pounds. Now, some companies charge as much as 500,000 pounds, which is completely unaffordable for most families* (ISA2)." The rising cost of healthcare further compounds the problem, as medical service providers adjust their fees in response to economic pressures (ISA1).

The interviewee (IP) highlighted, "*Affordability is a huge issue. Without subsidies, many low-income families cannot afford premiums*." This insight supports the argument for government or donor-funded financial support mechanisms to improve accessibility.

These affordability challenges are consistent with global research on Micro-Takaful, which highlights that price sensitivity is a major determinant of adoption among low-income populations (Nadzli et al., 2024; Rapi et al., 2022; Yusoff et al., 2020). Additionally, the lack of flexible payment options limits accessibility for financially constrained households. (ISA1) interviewee suggested, "*We need to introduce flexible payment plans—monthly or even weekly premiums—so that low-income families can afford to participate*." Similar strategies have been successfully implemented in other developing countries, where Micro-Takaful providers have adopted flexible premium payment models to accommodate the irregular income patterns of low-income households (Salleh et al., 2024; Rapi et al., 2022). Another factor influencing access to Health Micro-Takaful is social inclusion. The Family Bank interviewee emphasized the importance of targeting vulnerable groups, particularly women, as they are overly affected by poverty and lack of healthcare access. "*Women, especially in rural areas, are the most vulnerable. If we design Micro-Takaful products that cater to their needs, we can make a real difference in their lives*," they stated. Research has consistently shown that gender-sensitive Micro-Takaful models can significantly enhance financial protection for women and their families (Rosman et al., 2024).

Theme 4. Strategies for Sustainability: Ensuring the long-term sustainability of Health Micro-Takaful in Sudan requires a combination of legal, financial, and institutional strategies as well as technological applications for Takaful management

and claims processing. Several interviewees highlighted the need for mandatory Takaful legislation to create a stable demand for health coverage. CBoS representative argued, "*If participation remains voluntary, it will be difficult to sustain Micro-Takaful programs. We need legal backing to make enrolment mandatory for certain groups* (ISA2)." The role of government support was also emphasized, with suggestions to integrate Health Micro-Takaful into broader social welfare programs. (ISA2) interviewee proposed, "*Instead of giving one-time financial aid, humanitarian organizations should invest in Micro-Takaful funds that provide long-term health security for the poor*." Integration with Social Welfare Programs, coordinating efforts between government agencies, NGOs, and private insurers can enhance the reach and effectiveness of Health Micro-Takaful.

"*We need to work with humanitarian organizations to establish Takaful funds dedicated to the poor* (ISA1)." Suggestions included creating health cards for low-income individuals and establishing specialized clinics or hospitals managed by insurers.

"*If Takaful companies collaborate to build hospitals, it will ensure sustainability and reduce losses* (ISA2)." These recommendations align with studies on Micro-Takaful sustainability, which emphasize the importance of public-private partnerships in ensuring long-term viability (Salleh et al., 2024; Rapi et al., 2022).

Interviewee (ISA3) suggested, "*Recruiting the informal sector is a challenge, but if we create tailored strategies such as flexible enrolment models, we can include them in Micro-Takaful programs effectively*." This emphasizes the need for adaptable enrolment processes to expand coverage.

Theme 5. Model Development for Health Micro-Takaful: The development of an effective Health Micro-Takaful model in Sudan must be based on reliable data and risk-sharing mechanisms. An interviewee from ISA highlighted, "*We need accurate statistics on the target population to design a sustainable model. Right now, we lack comprehensive data on health risks and income levels* (ISA2)." Research on Micro-Takaful design has similarly emphasized the role of actuarial data in ensuring financial sustainability (Mohamad et al., 2023; H Ahmed, 2014). Expanding the risk pool by

increasing the number of insured individuals was also identified as a key factor in reducing costs:

Interviewee (ISA3) emphasized, "*Our coverage reached 50.7% only... there are considerable disparities in Takaful coverage between rural and urban areas and between formal and informal sectors*." This highlights the unequal access to Takaful services and the need for targeted expansion efforts.

"*If we can enrol a large number of people, we can distribute risks more effectively and keep premiums affordable* (ISA2)." "*The model must be based on reliable statistics to calculate costs effectively and should be designed for a large number of participants to lower costs* (ISA2)."

Additionally, the interviewees highlighted the need for collaborative funding models that involve multiple stakeholders and building special cooperative funds and community-managed Health Takaful programs. The ISA interviewee proposed, "*We should leverage zakat funds and humanitarian contributions to subsidize premiums for the poorest families* (ISA2)." This aligns with findings from Micro-Takaful studies, which suggest the need for collaborative funding models that can enhance affordability and social acceptance (Ariffin et al., 2023). The Family Bank interviewee emphasized the importance of designing products tailored to women and low-income households to maximize impact: "*Women should be the main beneficiaries of these programs to achieve economic empowerment* (FB)."

"*To design a model that meets the needs of Health Micro-Takaful in Sudan, it is essential to understand the needs of the community while considering the healthcare infrastructure, financial costs, medical networks, and types of treatment coverage. This can be achieved by establishing special cooperative funds and forming community associations to manage Health Takaful programs locally. These associations can collect premiums and negotiate with healthcare providers to secure lower prices* (ISA1)".

In conclusion, the interviews revealed many challenges and opportunities for adopting Health Micro-Takaful in Sudan. While regulatory gaps, economic instability, and limited awareness remain major obstacles, the proposed strategies such as mandatory legislation, community collaboration, and innovative service delivery offer promising solutions. Leveraging community-based awareness campaigns and adopting

flexible payment models can enhance accessibility and participation. Additionally, integrating Health Micro-Takaful with social welfare programs and exploring collaborative funding mechanisms can ensure long-term sustainability. By targeting vulnerable groups, leveraging partnerships, and adopting a data-driven approach, a sustainable Health Micro-Takaful model can be developed to address the needs of Sudan's low-income population.

6.3 CHAPTER SUMMARY

This chapter provided a comprehensive analysis of the research data and presented the results in a structured manner. It began with an introduction outlining the analytical process, followed by data screening and cleaning procedures to ensure accuracy and consistency in the dataset. The demographic profiles of respondents were analysed alongside descriptive statistics of item means and standard deviations to provide context for the subsequent model evaluation. The chapter progressed with Stage 1: Measurement Model Assessment, which examined indicator reliability, composite reliability, convergent validity (using AVE), and discriminant validity through multiple criteria, including Fornell-Larcker, cross-loading, and HTMT. The results confirmed the robustness and reliability of the measurement model. In Stage 2: Structural Model Assessment, the analysis focused on the coefficient of determination (R^2), effect sizes (f^2), and predictive relevance (Q^2) to evaluate the model's explanatory and predictive capabilities. The findings indicated strong predictive power for key constructs, highlighting the model's effectiveness in capturing the relationships between variables. Finally, the empirical results of hypothesis testing were presented, with an analysis of direct relationships and mediating effects. Significant relationships were identified, emphasizing the influence of attitude, awareness, intention, perceived behavioural control, subjective norms, and Health Micro-Takaful adoption. The summary of hypothesis results provided a clear distinction between supported and unsupported relationships, offering insights into the model's dynamics. This chapter also explored the findings from interviews with key stakeholders involved in the regulation, supervision, and provision of Micro-Takaful in Sudan. The discussions revealed both challenges and opportunities that influence the adoption of Health Micro-Takaful in the country. The challenges discussed are, the absence of a comprehensive regulatory

framework, lack of technological infrastructure, limited empirical studies, and low awareness of Takaful, both among the public and within government institutions further hindering adoption. Economic instability, particularly high inflation, has also made it difficult for insurers to offer affordable coverage. Another major challenge is the reluctance of re-Takaful companies to support new Micro-Takaful products, given the uncertainties caused by the COVID-19 pandemic and the ongoing conflict in Sudan. Despite these challenges, there are several opportunities that could facilitate the adoption of Health Micro-Takaful in Sudan. One is the introduction of mandatory Takaful policies to ensure sustainability. Additionally, increasing awareness through coordinated efforts between Takaful providers, government agencies, and humanitarian organizations. Leveraging social and community networks to establish dedicated Takaful funds for low-income populations rather than relying on one-time financial assistance. The findings further emphasized the importance of designing a Health Micro-Takaful model that ensures affordability and sustainability. Respondents agreed that large-scale participation is essential to reducing costs and spreading risk. Additionally, integrating Health Micro-Takaful with existing social protection programs, such as Zakat funds, was proposed to support vulnerable populations. Some respondents also suggested that Takaful companies could consider investing in healthcare infrastructure to improve service quality and reduce long-term financial losses. In conclusion, while Sudan faces significant obstacles in adopting Health Micro-Takaful, the findings highlight practical strategies that could enhance its feasibility. Strengthening the regulatory framework, increasing public awareness, leveraging social protection mechanisms, and ensuring affordability through large-scale participation are crucial elements in developing a sustainable Health Micro-Takaful model in Sudan.

CHAPTER SEVEN

CONCLUSION AND RECOMMENDATIONS

7.1 INTRODUCTION

This chapter is divided into five main sections. First is the contribution of the study, and second section is the implications of the study to the industry and policymakers. The third section discusses the proposed framework for Health Micro-Takaful in Sudan. The fourth section is the limitations of the study. The fifth section lists some recommendations for future direction, while the fifth section is the chapter conclusion.

7.2 CONTRIBUTION

7.2.1 Theoretical Contribution

This study makes an important contribution to the Theory of Planned Behaviour (TPB) by testing its applicability in the context of Health Micro-Takaful adoption in Sudan. The findings align closely with the original TPB framework, which posits that attitude, subjective norms, and perceived behavioural control shape behavioural intention, which in turn influences actual behaviour. One of the key insights from this study is that before introducing intention as a mediator, attitude and awareness showed a significant direct effect on adoption but after introducing intention as a mediator, attitude, subjective norms, and perceived behavioural control became the primary predictors of intention, while awareness lost its direct significance.

Affordability remained insignificant throughout the analysis, reinforcing the idea that behavioural adoption is driven more by psychological and social influences than purely financial constraints. These findings confirm the core structure of TPB while also offering valuable refinements. The fact that awareness alone does not directly lead to adoption suggests that simply informing people about Health Micro-Takaful is not enough. Instead, individuals need social reinforcement (subjective norms) and a sense of control over the enrolment process (perceived behavioural control) to translate awareness into intention and action. This reinforces the idea that interventions should

focus on trust-building, process simplification, and leveraging community influence rather than just increasing awareness. Furthermore, the insignificance of affordability suggests that financial constraints are not the main barrier to adoption in Sudan rather, the perception of accessibility and the ease of participation play a greater role.

This has important theoretical implications, as it shifts the focus from purely economic determinants to behavioural and psychological factors, expanding the practical applications of TPB in financial inclusion research. By extending the TPB framework with the introduction of awareness and affordability, this study contributes to both theoretical and empirical discussions on behavioural drivers of Health Micro-Takaful adoption. It highlights the need for behavioural models in financial services research to consider trust, social influences, and perceived ease of participation, especially in markets like Sudan where formal Takaful adoption remains low.

7.2.2 Practical Contribution

This study offers practical guidance for policymakers, insurers, and financial institutions seeking to design an accessible and sustainable Health Micro-Takaful system for Sudan. The findings show that improving adoption requires interventions aligned with the behavioural determinants highlighted in the Theory of Planned Behaviour (TPB), particularly strengthening awareness (attitude), improving affordability (perceived behavioural control), and building trust to enhance intention. A central implication from this research is the need for strong community engagement to build confidence in Micro-Takaful products. Partnerships with religious leaders, local NGOs, and community committees can help distribute accurate information and shape positive perceptions. Social media platforms, messaging applications, and simplified educational materials can further support public understanding of Micro-Takaful mechanisms. Implementing customer-feedback systems and transparent communication channels such as hotlines and simplified claims information strengthens trust by addressing subjective norms and perceived behavioural control. The study highlights the importance of digital enablement that fits Sudan's infrastructural realities. Lessons from innovative organizations such as Kenya's Pula[5], which uses satellite data

[5] https://empowerafrica.com

and machine learning to deliver affordable insurance solutions, demonstrate that technology can be adapted to reflect people's real economic conditions. Similar approaches in Sudan could help design Micro-Takaful plans that remain affordable without compromising coverage. Mobile-based enrolment, SMS communication, and simple mobile-money channels are practical tools for reaching low-income and unbanked populations while reducing administrative costs, given Sudan's uneven smartphone penetration but widespread basic mobile usage.

The results also demonstrate the need for segmented product strategies. Rural communities, informal-sector workers, and urban low-income households face differing risks and financial capacities; thus, a single Micro-Takaful design is inadequate. Tailored contribution levels, benefit packages, and delivery channels are necessary to meet these diverse needs. Regulatory clarity is another essential factor. Without a well-defined framework, insurers face uncertainty, slowing the development of affordable and reliable products. Policymakers could introduce waqf-based or Zakat-supported buffers to reduce risk exposure for operators and maintain affordability for vulnerable groups. Public-private partnerships, including subsidies or co-financing mechanisms, can further lower participation costs and enhance product viability.

To ensure realistic implementation, this study proposes a phased and evidence-based strategy:

i. Short term: targeted awareness campaigns, digital registration pilots, and simplified educational tools.
ii. Medium term: regulatory adjustments, governance standards for Micro-Takaful operators, and structured partnerships with telecommunications companies.
iii. Long term: digital infrastructure development, broader integration of mobile-payment ecosystems, and alignment with national social-protection strategies.

Finally, the study emphasizes the importance of pilot testing before nationwide rollout. Small-scale pilots across selected states can examine affordability, claims procedures, customer satisfaction, and the overall feasibility of the system. Key evaluation metrics include enrolment trends, consistency in contributions, intention to renew rates, and user experience feedback.

Overall, this research provides a comprehensive and practical roadmap for developing Health Micro-Takaful solutions in Sudan that are affordable, trustworthy, digitally enabled, and behaviourally informed. It offers actionable insights that insurers, policymakers, and financial institutions can use to design accessible protection mechanisms that genuinely benefit low-income Sudanese families.

7.2.3 Implication

This study provides important insights for both the Takaful industry and policymakers in Sudan. Understanding the challenges and opportunities in Health Micro-Takaful adoption allows these stakeholders to take targeted actions that can improve accessibility, affordability, and overall success.

7.2.3.1 Implications for the Takaful Industry

The findings highlight the need for affordable and flexible Health Micro-Takaful models that are truly tailored to the needs of low-income households in Sudan. Insurers and financial institutions can consider the following, making Health Micro-Takaful more affordable by offering low-cost premiums with instalment-based payments to ease financial burdens on policyholders. Also, community-supported funding models, such as Zakat-based contributions or cooperative risk-sharing, enhance affordability. Developing tiered Takaful plans, allowing people to start with basic coverage and scale up as their financial situation improves might be another solution. Using mobile technology to streamline enrolment and premium collection, especially for people in rural areas. Many Sudanese remain doubtful about Takaful due to misinformation or past negative experiences if insurers collaborate with religious leaders, NGOs, and local influencers to educate the public about the Islamic and ethical principles of Takaful and Micro-Takaful that might enhance trust and lead to community engagement. Lastly, transparency in claims processes and policy terms is essential to increase confidence and encourage long-term adoption.

7.2.3.2 Implications for Policymakers

This study highlights key areas where government intervention and regulatory improvements can make an essential impact. The lack of specific legislation for Health Micro-Takaful creates uncertainty for insurers and discourages investment in this sector. Policymakers should establish clear guidelines that support Micro-Takaful, ensuring both financial sustainability and religious acceptability. Regulatory bodies should work on standardizing policy structures and simplifying compliance requirements to encourage more providers to enter the market. Subsidies or co-financing mechanisms could help lower costs, making Health Micro-Takaful more affordable for the poorest segments of society.

The Sudanese government could partner with NGOs, Zakat funds, and international organizations to provide financial backing for Micro-Takaful schemes. Expanding government-supported awareness campaigns can help increase public understanding of Micro-Takaful benefits. For instance, many Sudanese adults are not familiar with how Micro-Takaful works, leading to low participation rates. The government, in collaboration with insurers and community leaders, should launch nationwide awareness campaigns through media channels (TV, radio, and social media) to explain Health Micro-Takaful benefits. Also, educational programs in schools and community centres promote financial literacy and community engagement initiatives where officials interact directly with citizens to address concerns and answer questions. For Micro-Takaful to increase in Sudan, a collaborative effort is needed. Insurers must innovate to make their products more affordable, accessible, and transparent, while policymakers must create an enabling environment through strong regulations, partnerships, and awareness campaigns. If these steps are taken, Sudan might establish a sustainable Health Micro-Takaful system that provides real financial protection for low-income families.

7.3 PROPOSED COMMUNITY-BASED HEALTH MICRO-TAKAFUL FRAMEWORK

To address the healthcare challenges identified in this study, the researcher proposed a Community-Based Health Micro-Takaful Framework tailored to Sudan's unique socio-economic and cultural context. This model emphasizes community involvement,

Islamic financial principles, corporate waqf, and institutional support from businesses (CSR), NGOs, and potentially the government to create a sustainable healthcare solution.

Vision: To establish a sustainable, Shari'ah-compliant, and community-driven healthcare financing framework that enhances accessibility and financial protection for underserved populations in Sudan.

Mission: To integrate Islamic financial principles, community participation, and corporate contributions to create a self-sustaining health protection mechanism for vulnerable groups.

7.3.1 Rationale for Developing the Framework

This framework was developed to address critical gaps in Sudan's healthcare financing system, particularly for low-income populations. The study identified the absence of affordable Health Takaful, regulatory inconsistencies, and financial barriers as key obstacles to healthcare access in Sudan. Drawing from empirical research and comparative studies on existing models, this framework aims to provide a tailored solution leveraging Islamic financial principles and community support structures.

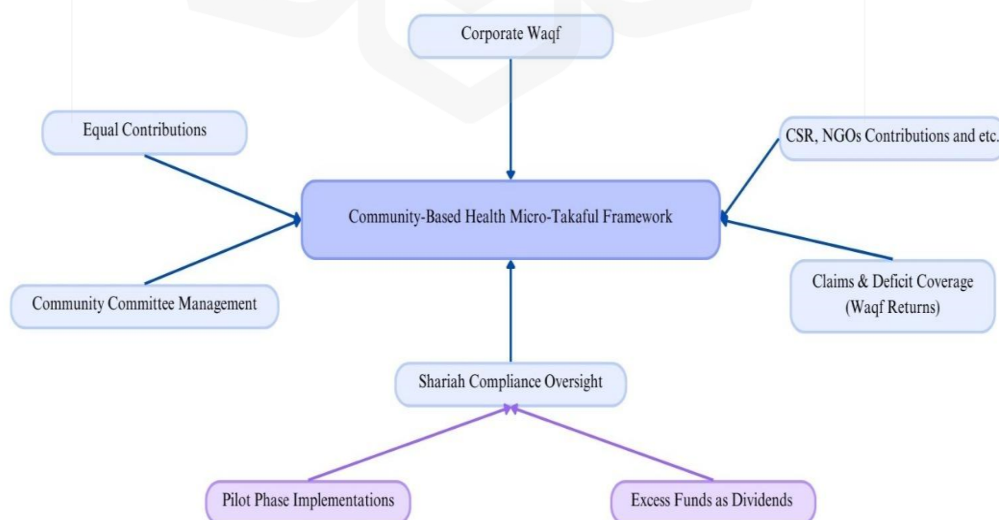

Figure 7.1. Proposed Community-Based Health Micro-Takaful Framework

7.3.2 Framework Constitution

This framework was structured based on insights from the literature review and empirical studies of Health Micro-Takaful and Islamic finance models. It incorporates elements from:

i. **Comparative Study with Literature Review Models**: Models like the Self-Employed Women's Association[6] (SEWA) in India have demonstrated the effectiveness of community-managed health insurance in improving access to care for low-income populations.
ii. **Empirical Study Insights**: Interviews result of this study provided real-world challenges and opportunities that shaped this framework.
iii. **Waqf-Based Healthcare Services:** Historically, waqf has been instrumental in funding healthcare institutions across Islamic countries (Rifin et al., 2022), providing sustainable financial support for hospitals and clinics. Examples of healthcare facilities that are still operating and funded by waqf are: Al-Shifa Trust Eye Hospital in Pakistan: This hospital provides free eye care services to the underprivileged and is funded by waqf donations. Also, Waqf-based Healthcare Facilities in Malaysia and Indonesia that cater to the needs of the poor and underserved populations (Sulistyowati et al., 2022).
iv. **Micro-Takaful Principles**: Ensuring risk-sharing, solidarity, and affordability for low-income populations.

Objectives:

The primary objectives behind developing this framework include:

i. Ensuring affordable access to healthcare services for low-income communities.
ii. Establishing a Shari'ah-compliant financial structure for health coverage.
iii. Encouraging community participation in healthcare financing.
iv. Utilizing corporate waqf, CSR, and NGOs support to enhance fund sustainability.

[6] www.sewa.org

v. Developing a financially resilient and transparent management system.

Target Group:

This framework is aimed at:

i. Low-income households and informal sector workers without access to formal health Takaful.
ii. Community-based organizations seeking sustainable healthcare solutions.
iii. Corporations and NGOs that are willing to support healthcare initiatives through waqf or CSR contributions.
iv. Policymakers interested in integrating Islamic financial mechanisms into healthcare financing.

7.3.3 Key Components of the Framework

The effectiveness of the Community-Based Health Micro-Takaful Framework depends on several critical components that ensure their sustainability, transparency, and accessibility, these key components are:

7.3.3.1 Funding Sources

A diversified funding approach to ensure financial sustainability and inclusiveness from:

i. **Equal Participant Contributions:** Each member of the community contributes a monthly standardized amount, encouraging a sense of ownership and mutual support. Equal contributions were chosen to maintain fairness and social harmony, addressing potential concerns about unequal payment structures.
ii. **Corporate Waqf Initiatives:** Businesses and contributions as Qard-Hasan to establish corporate Waqf (endowments), dedicating assets or funds to support community healthcare needs. The returns from these investments are reinvested into the Health Micro-Takaful fund to subsidize healthcare costs, ensuring financial sustainability and long-term viability.

iii. **Corporate Social Responsibility (CSR) Contributions:** Companies allocate a portion of their CSR budgets to strengthen the Health Micro-Takaful fund, expanding its capacity to cover more participants and improve healthcare accessibility.
iv. **NGO Contributions**: National and international NGOs focused on healthcare and financial inclusion may contribute funds, provide technical support, or assist in community awareness campaigns.
v. **Potential Government Support:** Government involvement could enhance the framework's reach and sustainability through subsidies, policy incentives, such as tax breaks for corporate contributors (waqf or CSR), and infrastructure support through public healthcare partnerships.

Further research and stakeholder discussions might assess the feasibility of government participation.

7.3.3.2 Management and Oversight

To regulate fund operations, safeguard participant contributions, and align financial activities with Shari'ah principles the selected oversight mechanisms below, draw from successful models to enhance community engagement and institutional trust.

i. **Community Committee Governance:** A locally elected committee is responsible for overseeing fund operations, ensuring transparency, and aligning financial management with community healthcare priorities. To incentivize continued engagement and ensure accountability, committee members receive dividends from corporate waqf returns. The governance structure includes clear decision-making protocols, financial reporting mechanisms, and conflict resolution strategies.
ii. **Shari'ah Compliance Supervision:** The government's Shari'ah committee will review and approve all fund transactions and investment activities before launching the pilot phase and throughout its implementation. This ensures adherence to Islamic financial principles, fostering trust and religious integrity.

7.3.3.3 Claims and Financial Management

These elements were identified through comparative analysis of existing models to improve fund resilience and efficiency:

i. **Shari'ah Pre-Approval and Pilot Phase Introduction:** Before launching the pilot, the framework is recommended to undergo a Shari'ah compliance review to ensure full alignment with Islamic financial principles.
ii. **Deficit Coverage through Waqf Returns:** In cases where claims exceed available funds from participant contributions, returns from corporate waqf investments cover the shortfall. This mechanism ensures financial resilience and prevents fund reduction.
iii. **Surplus Distribution as Dividends:** If the fund generates a surplus after settling claims and administrative expenses, participants receive dividends, incentivizing long-term engagement and reinforcing collective responsibility.

7.3.3.4 Implementation Strategy

i. **Pilot Phase Introduction:** The framework will be initially implemented as a pilot program in a selected community to assess its feasibility, gather participant feedback, and refine operational strategies before nationwide scaling. The government's Shari'ah committee will continue oversight throughout the pilot phase to ensure compliance.
ii. **Challenges and Mitigation Strategies:** The implementation of the Community-Based Health Micro-Takaful Framework may face several challenges that could hinder its effectiveness and sustainability. One of the primary concerns is regulatory uncertainty, as Sudan lacks a comprehensive legal framework to support Micro-Takaful schemes, which may create obstacles in obtaining government recognition and institutional backing. Financial sustainability is another critical issue, as reliance on participant contributions and external funding sources such as corporate waqf and CSR may be inconsistent, potentially leading to funding shortfalls. Additionally, public awareness and trust in the system may be limited, as many

communities are unfamiliar with Micro-Takaful principles and may be hesitant to participate. Operational challenges, such as ensuring transparency in fund management, preventing fraudulent claims, and maintaining efficient oversight, also pose risks to the framework's success. To mitigate these challenges, it is recommended to advocate for supportive policies and regulatory frameworks that recognize and facilitate Health Micro-Takaful operations. Diversifying funding sources and creating long-term financial strategies, including partnerships with government and international organizations, can enhance financial sustainability. Public education campaigns should be conducted to increase awareness and build trust among communities. Furthermore, robust governance mechanisms, including digital financial management tools and independent audits, should be implemented to ensure transparency, prevent fraud, and strengthen oversight. By addressing these challenges proactively, the framework can be positioned for long-term success and provide sustainable healthcare solutions for vulnerable populations.

By integrating these strategies, the proposed framework seeks to establish a financially sustainable, Shari'ah-compliant, and community-driven Health Micro-Takaful system in Sudan. Through structured contributions, corporate support, and effective governance, this framework might have the potential to enhance healthcare accessibility and financial protection for underserved populations in Sudan. Further engagement with policymakers, businesses, and Islamic finance experts will refine the framework and assess the feasibility of government support. If successfully implemented, this initiative has the potential to transform healthcare financing in Sudan, ensuring that vulnerable populations receive the protection they need.

7.4 LIMITATIONS OF THE STUDY

This study has some limitations that should be acknowledged. The first limitation is that this study is about Health Micro-Takaful adoption in Sudan, so the findings might not be the same for other areas. Another limitation is that the data collected is self-reported so that common bias might be present. More studies need to be done to get more inclusive, accurate results. Also, one of the main issues was the dependence on an online

questionnaire for data collection. Internet connectivity in Sudan, especially in rural areas, is often unreliable. This likely limited access to the survey for some potential participants, reducing the number of responses the researcher received. With a better internet connection, it's possible that more people could have participated, which might have provided a more accurate and representative picture. Future studies might consider using online and face-to-face questionnaires. Another major challenge was the timing of data collection, which overlapped with a period of political instability and civil war in Sudan. These circumstances make it harder for some people to participate. These factors are important to consider, as they may have impacted the responses and the overall findings of the study. One of the other limitations is that some of the respondents may not have been fully aware or fully educated about Micro-Takaful and therefore may not have answered the data most accurately. Given all these reasons, it may not be possible to generalize the study's results in a different circumstance.

7.5 RECOMMENDATIONS FOR FUTURE DIRECTION

Since Micro-Takaful is still in its early stages in Sudan, future research can build on this study's findings in several ways. First, expanding the TPB model future studies could explore additional psychological or social factors, such as trust in financial institutions, community influence, and personal risk perception, to gain a deeper understanding of adoption behaviours. Second, this research used a sample size of 428 respondents, future research may use a larger sample size so that the results might be more accurate. Also, long-term Studies and future research could track the impact of awareness campaigns and policy changes over time to see if they lead to sustained adoption.

Furthermore, behavioural experiments, testing different pricing models, payment methods, and incentives could help identify what works best for increasing Micro-Takaful uptake. In addition to this, the inclusion of vulnerable groups, while gender was not a primary focus of this study, future research could examine how Micro-Takaful adoption varies among women, rural populations, and informal workers, who may face unique barriers. Finally, since this study interviews primarily focused on the perspectives of regulators and financial institutions, future research could incorporate the voices of beneficiaries, low-income individuals and families who would be the

primary users of Health Micro-Takaful. Understanding their specific needs, preferences, and barriers to enrolment would provide a more complete view of how to design a model that truly serves them.

By addressing these areas, future research can contribute to building a more effective and sustainable Micro-Takaful system in Sudan, ensuring that vulnerable populations have access to affordable healthcare protection.

7.6 CONCLUSION

This study has explored the challenges, opportunities, and key factors influencing the adoption of Health Micro-Takaful in Sudan. Through a mixed-methods approach, combining insights from policymakers, regulators, and financial experts, it has become clear that while Health Micro-Takaful holds important potential to expand healthcare access for low-income populations, its implementation faces notable structural, economic, and awareness-related barriers. One of the central findings of this research is the critical role of regulatory frameworks in shaping the success of Micro-Takaful. The absence of comprehensive legislation specific to Health Micro-Takaful has created uncertainty, making it difficult for insurers to develop sustainable products. Additionally, economic instability, particularly high inflation rates, has significantly impacted affordability, making it harder for insurers to maintain reasonable premium levels. Beyond these systemic challenges, limited public awareness and trust in Takaful remain key barriers, highlighting the need for targeted educational campaigns and community engagement strategies. Despite these obstacles, the study has also identified promising opportunities. The willingness of regulatory bodies to consider policy reforms, the potential integration of digital solutions to improve accessibility, and the involvement of social institutions such as Zakat funds and NGOs all point toward a pathway for progress. Importantly, collaboration among insurers, policymakers, and community-based organizations will be essential in ensuring that Health Micro-Takaful is both financially viable and socially inclusive. Ultimately, for Health Micro-Takaful to thrive in Sudan, a multi-stakeholder effort is needed to address existing gaps while capitalizing on emerging opportunities. By fostering a supportive regulatory environment, leveraging technology, and prioritizing community engagement, Health Micro-Takaful can become a practical solution for ensuring healthcare protection for

Sudan's most vulnerable populations. This study provides a foundation for future research and policy development, offering insights that can contribute to the creation of a more resilient and inclusive healthcare financing system.

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APPENDIX A

SURVEY QUESTIONS - ARABIC

استبانة لتقييم مدى ملاءمة التأمين الصحي الأصغر للسودان

عزيزي/عزيزتي،

أنا طالبة دكتوراة تخصص صيرفة وتمويل إسلامي في الجامعة العالمية الإسلامية بماليزيا!

تهدف الإستبانة لتحديد العوامل التي تؤثر على تبني التأمين الصحي الأصغر في السودان كجزء من رسالة الدكتوراة الخاصة بي. لأجل ذلك، أعددت استبانة لجمع آرائكم وأفكاركم القيمة.

مشاركتكم سيكون لها تأثير إيجابي كبيرفي إنجاز هذا البحث. أشكركم مقدماً على التطوع بالإجابة عليها، علماً بأنه لن يتم الكشف عن هوية المشاركين .

للاستفسار، يمكنكم التواصل معي عبر:

البريد الإلكتروني: reem.1913054@gmail.com

شكرًا جزيلاً على دعمكم للبحث الأكاديمي وتفضلوا بقبول فائق الامتنان!

يرجى قراءة التعريف التالي قبل البدء في الاجابة.

التأمين الصحي الأصغر:

هو تأمين صحي تُبنى فكرته على توفير تغطية علاجية وخدمات صحية لذوي الدخل المحدود. تعتمد ميزانيته على مساهمات الافراد المشاركين حيث يدفع الفرد اشتراك سنوي بمبلغ رمزي ثابت. وتُستخدم هذه الأموال لتغطية تكاليف العلاج والخدمات الصحية عند الحاجة. ويختلف عن التأمين الصحي في قيمة الاشتراك السنوي ونطاق الخدمات المقدمة ولا يشترط للاشتراك في هذا التأمين عمر أو مستوى دخل معين.

الاستبانة

القسم الأول: المعلومات الديموغرافية:

1. الجنس

1) ذكر
2) أنثى

2. العمر

1) 18 – 25
2) 26 - 35
3) 36 - 45
4) 46 فما فوق

3. المستوى التعليمي

1) دون الثانوية
2) الثانوية
3) دبلوم
4) بكالوريوس
5) ماجستير فما فوق

4. الحالة الاجتماعية

1) أعزب
2) متزوج
3) مُطلق
4) أرمل

5. إجمالي الدخل الشخصي شهرياً (بالجنيه السوداني)

1) 3,000– 100,000
2) 100,001 – 200,000
3) 200,001 – 300,000
4) 300,001 – 400,000
5) 400,001 – 500,000
6) أكثر من 500,000

6. قطاع العمل

1) الزراعة
2) التعليم
3) الصحة
4) الاتصالات
5) الخدمات المصرفية والمالية
6) أخرى (أذكرها

7. الولاية

1) الخرطوم

2) نهر النيل

3) البحر الأحمر

4) غيرها (أذكرها) -------

8. الحالة الوظيفية

1) أعمل

2) لا أعمل

3) متقاعد

9. حالة التأمين الصحي:

1- لدي تأمين صحي

2- ليس لدي تأمين صحي

القسم الثاني: أسئلة الإستبانة الرئيسية

يحتوي هذا القسم على أسئلة الإستبانة الرئيسية والتي ستساعد على تقييم مدى جدوى التأمين الصحي الأصغر في السودان.

يرجى تحديد درجة موافقتك على العبارات التالية باستخدام المقياس التالي: (لا أوافق بشدة — لا أوافق – محايد – أوافق – أوافق بشدة)

الموقف/ الاتجاه

من وجهة نظرك يعتبر:

الرقم	الفقرة	لا أوافق بشدة	لا أوافق	محايد	أوافق	أوافق بشدة
1	الحصول على تأمين صحي أمر بالغ الأهمية للفرد.					
2	الحصول على تأمين صحي أمر بالغ الأهمية للأسرة.					
3	التأمين الصحي يوفر فرص علاجية أفضل للأفراد.					
4	التأمين الصحي يوفر فرص علاجية للمواقف الصحيّة الطارئة (مثل الحوادث).					
5	التأمين الصحي يغطي تكلفة أغلب المشاكل الصحيّة التي أواجهها.					
6	أشعر بالأمان /الحماية عندما أعلم أنني أتمتع بتغطية التأمين الصحي.					
7	استفيد من الخدمات الصحية التي يغطيها التأمين الصحي.					

النية السلوكية

الرقم	الفقرة	لا أوافق بشدة	لا أوافق	محايد	أوافق	أوافق بشدة
1	أحرص على امتلاك التأمين الصحي.					
2	أنصح الاخرين بالاشتراك في التأمين الصحي.					
3	أنوي الحصول على تأمين صحي قريباً .					
4	الحصول على تأمين صحي خطوة مهمة لتحقيق اهدافي المالية.					
5	انا مستعد لتحمل التكاليف المتعلقة بالحصول على تأمين صحي.					
6	انا مقتنع بأن التأمين الصحي سيكون مفيداً لي على المدى البعيد.					

المعايير الذاتية

الرقم	الفقرة	لا أوافق بشدة	لا أوافق	محايد	أوافق	أوافق بشدة
1	أعتقد أنني يجب أن امتلك تأمين صحي مثل عائلتي.					
2	أعتقد أنني يجب أن امتلك تأمين صحي مثل أصدقائي.					
3	يعتقد معظم الأشخاص المهمين بالنسبة لي أن التأمين الصحي مفيد.					
4	معظم الأشخاص المهمين في حياتي لديهم تأمين صحي.					
5	ينصحني أصدقائي دائما بأهمية الاشتراك في أحد برامج التأمين الصحي.					
6	تعتقد عائلتي أنني يجب أن أحصل على تأمين صحي.					

7	تدعم عائلتي قراري بالحصول على برنامج التأمين الصحي.					
8	أعتقد أن التأمين الصحي أصبح متطلبات مجتمعية.					
9	أعتقد أن وجود التأمين الصحي يوفر راحة البال.					
10	أناقش اصدقائي وآخذ ارائهم قبل الاشتراك في اي برنامج تأمين صحي.					

التحكم الشخصي المُدرَك

الرقم	الفقرة	لا أوافق بشدة	لا أوافق	محايد	أوافق	أوافق بشدة
1	أنا مرتاح لفكرة الحصول على برنامج التأمين الصحي.					
2	لدي المعرفة /الفهم اللازمين لاختيار برنامج التأمين الصحي بحكمة.					
3	لدي المعرفة الكاملة بطرق العثور على معلومات حول خيارات التأمين الصحي المختلفة.					
4	انا على اطلاع بمتطلبات الحصول على التأمين الصحي.					
5	أستطيع التغلب على العقبات أو الصعوبات التي قد تواجهني في الحصول على التأمين الصحي.					
6	أشعر بالراحة في القدرة على التحكم في قرار حصولي على التأمين الصحي.					

الوعي

الرقم	الفقرة	لا أوافق بشدة	لا أوافق	محايد	أوافق	أوافق بشدة
1	أنا على علم بسياسات (لوائح) وثائق التأمين الصحي المختلفة.					
2	أنا على معرفة بكيفية حساب أقساط التأمين الصحي.					
3	أنا على علم بالتغطية التي توفرها برامج التأمين الصحي المختلفة.					
4	أنا على معرفة بمزايا الحصول على التأمين الصحي.					
5	أنا على علم بكيفية اختيار مستوى التغطية التي تناسبني.					
6	أنا على علم بالعواقب المحتملة لعدم الحصول على التأمين الصحي.					

المقدرة على تحمل التكلفة

الرقم	الفقرة	لا أوافق بشدة	لا أوافق	محايد	أوافق	أوافق بشدة
1	أقارن برامج التأمين الصحي المختلفة لتحديد البرنامج المناسب لي.					
2	يمكنني الحصول على التأمين الصحي لأن لدي الموارد المالية المطلوبة.					
3	قمت بتقليص إنفاقي على الضروريات مثل الطعام /الملابس خلال الـ 12 شهرًا الماضية لدفع تكاليف التأمين الصحي.					

4	أعتقد أن برامج التأمين الصحي المختلفة ميسورة التكلفة.					
5	أشعر بالرضا عن التغطية التي أحصل عليها مقابل الأقساط التي أدفعها.					

تبني التأمين الصحي الأصغر

يرجى قراءة التعريف التالي قبل البدء في الاجابة.

التأمين الصحي الأصغر:

هو تأمين صحي تُبنى فكرته على توفير تغطية علاجية وخدمات صحية لذوي الدخل المحدود. تعتمد ميزانيته على مساهمات الافراد المشاركين حيث يدفع الفرد اشتراك سنوي بمبلغ رمزي ثابت. وتُستخدم هذه الأموال لتغطية تكاليف العلاج والخدمات الصحية عند الحاجة. ويختلف عن التأمين الصحي في قيمة الاشتراك السنوي ونطاق الخدمات المقدمة ولا يشترط للاشتراك في هذا التأمين عمر أو مستوى دخل معين.

الرقم	الفقرة	لا أوافق بشدة	لا أوافق	محايد	أوافق	أوافق بشدة
1	أعتقد أن فكرة التأمين الصحي الأصغر سهلة الفهم.					
2	اعتقد أن التأمين الصحي الأصغر مناسب لأسلوب حياتي.					
3	أعتقد أنني سأحصل (أشترك) على تأمين صحي أصغر لنفسي إذا كان متوفراً.					
4	أعتقد أنني سأحصل (أشترك) على تأمين صحي أصغر لعائلتي إذا كان متوفراً.					
5	أعتقد أن التأمين الصحي الأصغر فكرة جيدة.					
6	أعتقد أن وجود التأمين الصحي الأصغر يقلل من الضغط المالي على الأفراد.					

7	أعتقد أن التأمين الصحي الأصغر مفيدٌ لأنني سأوفر المال من خلال عدم دفع أقساط تأمين صحي عالية.					
8	يعتبر التأمين الصحي الأصغر حلاً عملياً خاصة للأسر ذات الدخل المنخفض.					
9	أحب المشاركة في التأمين الصحي الأصغرلأن ما أدفعه يساهم في خدمة وتنمية المجتمع.					

APPENDIX B

SURVEY QUESTIONS - ENGLISH

Dear Sir/Ms,

I am a PhD candidate specializing in Islamic Banking and Finance at the Institute of Islamic Banking and Finance, International Islamic University Malaysia.

I am currently conducting research on the adoption of Health Micro-Takaful in Sudan as part of my doctoral thesis. To gather valuable insights and opinions, I have prepared a questionnaire, the details of which are enclosed with this message.

Your participation in responding to the attached questionnaire would be immensely valuable. Please note that your involvement is entirely voluntary. Rest assured, the questionnaire is designed to maintain anonymity, and the information gathered will be used strictly for academic purposes. The results will contribute to my thesis, and no individual participant will be identifiable from the published findings.

I assure you of the confidentiality of your responses. Your feedback will be treated with the utmost respect and will solely serve academic objectives. There is no requirement to disclose your name or personal details in the questionnaire.

Your support in contributing to my research endeavour would be greatly appreciated. Your feedback will significantly enhance the depth and quality of this study.

Should you have any queries or require further details, please feel free to reach out to me at:

Name: Reem Abbas Abubaker
Email: reem.1913054@gmail.com

Thank you very much for considering participation and supporting academic research.

Please read the following definition before answering.

Health Micro-Takaful:

Health Micro-Takaful is a type of Health Takaful designed to provide medical coverage and healthcare services for low-income individuals. Its funding is based on contributions from participating individuals, who pay a fixed annual subscription at a nominal rate. These funds are then used to cover medical treatment costs and healthcare services as needed. It differs from traditional Health Takaful in terms of the annual subscription fee and the scope of services provided. Additionally, there are no age or income level requirements for enrolment in this scheme.

QUESTIONNAIRE

Section 1: Demographics

Gender

1/ Male
2/ Female

Age

1/ 18 -25
2/ 26 -35
3/ 36 – 45
4/ 46 and above

Educational level

1/ Below secondary school
2/ Secondary school
3/ Diploma
4/ Bachelor's
5/ Master's and above

Marital status

1/ Single
2/ Married
3/ Divorced
4/ Widow

Total Monthly Income (in Sudanese Pounds)

1/ 3,000 – 100,000
2/ 100,001- 200,000
3/ 200,001- 300,000
4/ 300,001 - 400,000
5/ 400,001 - 500,000
6/ More than 500,000

Labour/business sector

1/ Agriculture
2/ Education
3/ Health
4/Communications
5/ Banking and Financial services
6/ other (Please mention) ---------

State

1/ Khartoum
2/ Red Sea
3/ Nile River
4/ Others (Please mention) ------

Employment status

1/ Employed
2/ Unemployed
3/ Retired

Health Takaful status

1/ Insured
2/ Not Insured

Section Two: Main Questionnaire Questions

Please indicate to what extent do agree with the following statements using the following scale: (Strongly disagree (A) – Disagree (B) – Neutral (C) – agree (D) – Strongly agree (E))

Attitude

No.	Item	A	B	C	D	E
1	Having Health Takaful is crucial for an individual.					
2	Having Health- Takaful is crucial for a family.					
3	Health Takaful provides better treatment opportunities for individuals.					
4	Health Takaful provides treatment opportunities for emergency health situations (for example, accidents).					
5	Health Takaful covers the cost of most of the health problems I face.					
6	I feel safe/protected knowing I have Health Takaful coverage					
7	I benefit from health services covered by Health Takaful					

Behavioural Intention

No.	**Item**	A	B	C	D	E
1	I make sure to have Health Takaful					
2	I advise others to get Health Takaful					
3	I intend to purchase a Health Takaful scheme soon					
4	Obtaining Health Takaful is important in achieving my financial goals					
5	I am willing to bear the costs related to obtaining Health Takaful					
6	I am convinced that Health Takaful will benefit me in the long run					

Subjective norms

No.	**Item**	A	B	C	D	E
1	I think I should have Health Takaful like my family.					
2	I think I should have Health Takaful like my friends					

3	Most people important to me think that Health Takaful is useful.					
4	Most of the important people in my life have Health Takaful.					
5	My friends always advise me on the importance of participating in a Health Takaful program.					
6	My family thinks I should get Health Takaful.					
7	My family supports my decision to get Health Takaful.					
8	I believe that Health Takaful has become a societal requirement.					
9	I believe that having Health Takaful provides peace of mind.					
10	I discuss with my friends and get their opinions before purchasing to any Health Takaful program.					

Perceived Behavioural Control

No.	**Item**	A	B	C	D	E
1	I am comfortable with the idea of purchasing a Health Takaful program.					
2	I have the knowledge/understanding necessary to choose a Health Takaful program wisely.					
3	I know how to find information about different Health Takaful options.					
4	I am aware of the requirements for purchasing Health Takaful programs.					
5	I can overcome the obstacles or difficulties I may face in purchasing Health Takaful.					
6	I feel relieved that I can control my decision to enroll in Health Takaful.					

Awareness

No.	**Item**	A	B	C	D	E
1	I am aware of the different Health Takaful policies.					
2	I am familiar with how Health Takaful premiums are calculated.					
3	I am aware of the coverage provided by Health Takaful programs.					
4	I am aware of the advantages of having Health Takaful.					
5	I know how to choose the level of protection that suits me.					
6	I know the potential consequences of not having Health Takaful.					

Affordability

No.	Item	A	B	C	D	E
1	I compare different Health Takaful plans to determine which plan suits me.					
2	I can choose Health Takaful because I have the required financial resources.					
3	I have cut back on spending on necessities like food/clothes over the past 12 months to pay for Health Takaful.					
4	The prices of Health Takaful policies are affordable.					
5	I am satisfied with the coverage I get for the premium I pay.					

Health Micro-Takaful Adoption

Please read the following definition before answering.

Health Micro-Takaful

Health Micro-Takaful is a type of Health Takaful designed to provide medical coverage and healthcare services for low-income individuals. Its funding is based on contributions from participating individuals, who pay a fixed annual subscription at a nominal rate. These funds are then used to cover medical treatment costs and healthcare services as needed. It differs from traditional Health Takaful in terms of the annual subscription fee and the scope of services provided. Additionally, there are no age or income level requirements for enrolment in this Takaful.

Health Micro-Takaful Adoption

No.	Item	A	B	C	D	E
1	The idea of Health Micro-Takaful is easy to understand.					
2	I think Health Micro-Takaful fits my lifestyle.					
3	I'm considering getting Health Micro-Takaful for myself if available.					
4	I'm considering getting a Health Micro-Takaful for my family if available.					
5	I think Health Micro-Takaful is a good idea.					
6	I believe that having Health Micro-Takaful reduces financial stress on individuals.					
7	I think Health Micro-Takaful is beneficial because I will save money by not paying high Health Takaful premiums.					
8	Health Micro-Takaful is a practical solution, especially for low-income families.					
9	I like to participate in Health Micro-Takaful because what I pay contributes to the service and development of society.					

APPENDIX C

INTERVIEW QUESTIONS – ARABIC

أسئلة المقابلة

المحور الأول: المعلومات الديموغرافية

1. فضلا، هل يمكن أن تعرف بنفسك؟
2. كم عدد سنوات خبرتك في هذا المجال؟
3. هل لديك أي نوع من التأمين حالياً؟

المحور الثاني: المعرفة حول التأمين الأصغر والتأمين الصحي المجتمعي

1. هل سمعت من قبل عن التأمين الأصغر في السودان؟ إذا كانت الإجابة نعم، ماهي الطريقة التي تعرفت بها عليه؟
2. برأيك، ما أهمية التأمين الأصغر للأفراد ذوي الدخل المحدود في السودان؟ حسب خبرتك ، ما هي التحديات المتوقعة التي تواجه تطبيقه في السودان؟ هل يمكنك ذكر أمثلة ؟
3. برأيك، ما هي التدابير التي يمكن اتخاذها لضمان بقاء التأمين الأصغر في متناول الأسر ذات الدخل المحدود في السودان؟

المحور الثالث: التحديات والمعوقات

1. من وجهة نظرك، ما هي المعوقات تمنع تطبيق التأمين الأصغر في السودان؟
2. هل تواجهون مشاكل في توعية الناس أو قبولهم لفكرة التأمين الأصغر؟ حسب خبرتك، ما هي الاستراتيجيات التي يمكن أن تساعد في تحسين التوعية؟
3. من خلال عملك، ما هي التحديات التنظيمية التي واجهتها فيما يتعلق بالتأمين بشكل عام في السودان؟ هل يمكنك ذكر أمثلة لهذه التحديات؟ كيف أثرت على تطبيق التأمين؟

المحور الرابع: الفرص لتبني التأمين الأصغر

1. برأيك، كيف يمكن توعية الناس بفوائد التأمين الأصغر؟
2. من وجهة نظرك، ما هي العوامل التي يمكن أن تشجع على تبني التأمين الأصغر في السودان؟

المحور الخامس: تطوير نموذج التأمين الصحي الأصغر

1. حسب خبرتك، ما هي العوامل الرئيسية التي يجب أخذها في الاعتبار عند تصميم نموذج للتأمين الصحي الأصغر في السودان؟
2. هل لديكم آراء أو اقتراحات إضافية لتصميم نموذج يلبي احتياجات التأمين الصحي في السودان؟

APPENDIX D

INTERVIEW QUESTIONS - ENGLISH

Interview Questions

Section one: Demographic information

1. Please introduce yourself
2. How many years of experience do you have in this field?
3. Do you currently have any type of insurance?

Section two: Knowledge about Micro-Takaful

1. What regulatory challenges have you faced regarding Takaful in general in Sudan? Can you provide examples of these challenges? How have they affected the implementation of Takaful?
2. Have you ever heard of Micro-Takaful in Sudan? If yes, how did you come to know about it?
3. In your opinion, what is the importance of Micro-Takaful for low-income individuals in Sudan? What are the anticipated challenges in implementing it in Sudan? Can you provide examples?
4. What measures can be taken to ensure that Micro-Takaful remains accessible to low-income households in Sudan based on your experience?

Section Three: Challenges and Obstacles

1. Do you see any obstacles preventing the implementation of Micro-Takaful in Sudan? If yes, what are they?
2. In your opinion, are there any challenges in raising awareness or gaining public acceptance of the concept of Micro-Takaful? What strategies could help improve awareness?
3. Based on your experience, what factors could encourage the adoption of Health Micro-Takaful in Sudan?

Section Four: Opportunities for Adopting Health Micro- Takaful

1. In your opinion, how can people be made aware of the benefits of Micro-Takaful?

2. In your opinion, what are the factors that can encourage the adoption of Micro-Takaful in Sudan?

Section Five: Developing Health Micro-Takaful Model

1. Based on your experience, what key factors should be considered when designing a Health Micro-Takaful model in Sudan?
2. Do you have any additional opinions or suggestions for designing a model that meets Health Takaful needs in Sudan?

APPENDIX E

LIST OF EXPERTS FOR INSTRUMENTS VALIDATION

1. Aisha Hassan Abdallah -Prof-IIUM
2. Alsadiq Musa – Prof - MMU
3. Areej Abbas Abubaker – Lecturer - Khartoum University-Sudan
4. Erfan Abdeldaim Mohamed - Assistant Professor-IIUM
5. Faisal Abdelaziz Farah - Professor and Expert in Comparative Law / Lawyer / Independent Legal Consultant / Certified International Arbitrator / Financial and Banking Products Consultant in Banks and Financial Markets- Sudan
6. Imaan Osman Mukhtar- Assistant Professor-Al Madinah University
7. Ismail Hussein Amzat- Associate Professor- IIUM
8. Magda Ismail– Associate Professor – INCEIF University
9. Samar Mamoon Abdelhamid- Assistant Professor- Al-Neelain University-Sudan
10. Wan Rusli bin Wan Ahmed -Assistant Professor -IIUM