THE ROLES OF CYBERSECURITY ON BENEFITS IN ISLAMIC FINANCE

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DECLARATION

I declare that this thesis entitled " The Roles Of Cybersecurity On Benefits In Islamic Finance " is the result of my own research except as cited in the references. The thesis has not been accepted for any degree and is not concurrently submitted in the candidature of any other degree.

Signature : 

Name : MUHAMMAD SHAZMI BIN ABDUL HAMID

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APPROVAL

I hereby declare that I have checked this report entitled “The Roles Of Cybersecurity On Benefits In Islamic Finance”, and in my opinion, this thesis fulfils the partial requirement to be awarded the degree of Bachelor Of Technology Management (Technology Innovation)

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Date 20 January 2024

DEDICATION

To my beloved parents, family, my supervisor and also friends

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"In the name of Allah, the Merciful, the Most Beneficent"

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ABSTRACT

This research examines the diverse roles that cybersecurity has played in forming and strengthening various facets of Islamic finance. In accordance with Islamic values, it clarifies how strong cybersecurity measures support the security architecture and guarantee the secrecy and integrity of financial transactions. The study also looks at cybersecurity's critical role in supporting ongoing digitalization of Islamic assets and enabling Shariah-compliant banking procedures. In the study, researcher has used quantitative method where researcher has carried out research's survey, questionnaire, population and sample, as well as pilot testing. A quantitative method is employed in the process of gathering data. Stakeholders in the Islamic finance sector receive surveys. The methods used to gather data on gender, age, status, occupation, monthly income, and awareness of cybersecurity in Islamic finance as well as familiarity with Islamic financing. 246 respondents out of a sample of 384 respondents have been gathered. There are 142 responses, most of them are between the ages of 17 and 25. Out of 246 responders, 144 are single, which is a higher percentage than the other status. Out of all the responders, 128 are still students, making up the majority of their occupation. No monthly income was reported by 124 respondents. 228 respondents are aware of cybersecurity in Islamic finance, and all 246 respondents have experience in the field. For the location, this study has done in Melaka. Statistical techniques such as regression analysis and correlation were used to study the relationships between the functions of cybersecurity and the advantages in Islamic banking. The study's findings demonstrate the benefits of cybersecurity for the Islamic finance sector. Cybersecurity plays crucial roles in the following areas: digitization, smart contracts, Shariah banking, and security. The research also highlights how important it is to support progress and growth in the Islamic financial industry through stakeholder involvement, legal compliance, and the creation of a strong company culture. The study's findings offer helpful guidance to the Islamic financial sector on how to leverage cybersecurity to enhance its operational efficacy, competitive advantage, and environmental performance.

Key words

Cybersecurity, Islamic, Finance, Security, Digitalization, Shariah, Transaction

ABSTRAK

Penyelidikan ini mengkaji pelbagai peranan yang dimainkan oleh keselamatan siber dalam membentuk dan mengukuhkan pelbagai aspek kewangan Islam. Selaras dengan nilai Islam, ia menjelaskan bagaimana langkah keselamatan siber yang kukuh menyokong seni bina keselamatan dan menjamin kerahsiaan dan integriti transaksi kewangan. Kajian itu juga melihat peranan kritikal keselamatan siber dalam menyokong pendigitalan berterusan aset Islam dan membolehkan prosedur perbankan patuh Syariah. Dalam kajian ini, pengkaji telah menggunakan kaedah kuantitatif di mana pengkaji telah menjalankan tinjauan kajian, soal selidik, populasi dan sampel, serta ujian rintis. Kaedah kuantitatif digunakan dalam proses mengumpul data. Pihak berkepentingan dalam sektor kewangan Islam menerima tinjauan. Kaedah yang digunakan untuk mengumpul data mengenai jantina, umur, status, pekerjaan, pendapatan bulanan, dan kesedaran keselamatan siber dalam kewangan Islam serta kebiasaan dengan pembiayaan Islam. 246 responden daripada sampel 384 responden telah dikumpulkan. Terdapat 142 respons, kebanyakannya berumur antara 17 dan 25. Daripada 246 responden, 144 adalah bujang, iaitu peratusan yang lebih tinggi daripada status yang lain. Daripada semua responden, 128 masih pelajar, yang merupakan sebahagian besar pekerjaan mereka. Tiada pendapatan bulanan dilaporkan oleh 124 responden. 228 responden mengetahui tentang keselamatan siber dalam kewangan Islam, dan kesemua 246 responden mempunyai pengalaman dalam bidang tersebut. Bagi lokasi kajian ini telah dilakukan di Melaka. Teknik statistik seperti analisis regresi dan korelasi digunakan untuk mengkaji hubungan antara fungsi keselamatan siber dan kelebihan dalam perbankan Islam. Penemuan kajian menunjukkan manfaat keselamatan siber untuk sektor kewangan Islam. Keselamatan siber memainkan peranan penting dalam bidang berikut: pendigitalan, kontrak pintar, perbankan Syariah dan keselamatan. Penyelidikan itu juga menyerlahkan betapa pentingnya menyokong kemajuan dan pertumbuhan dalam industri kewangan Islam melalui penglibatan pihak berkepentingan, pematuhan undang-undang, dan penciptaan budaya syarikat yang kukuh. Penemuan kajian ini menawarkan panduan berguna kepada sektor kewangan Islam tentang cara memanfaatkan keselamatan siber untuk meningkatkan keberkesanan operasi, kelebihan daya saing dan prestasi alam sekitar.

Kata Kunci

Keselamatan Siber, Islam, Kewangan, Keselamatan, Pendigitalan, Shariah, Urus Niaga

CHAPTER 1

INTRODUCTION

1.1 Background of Study

While innovation and online banking may make things more convenient for customers, they may also create new and increased vulnerabilities. We raise the possibility of cross-channel attacks by giving criminals more access points. Vulnerabilities in cybersecurity are the primary source of financial crime. Whether we refer to it as fraud, smuggling, terrorism, or something else entirely, banks must confront and find a solution to this worldwide issue (Hussain et al., 2019).

The continuous problem of managing risk in financial institutions has an impact on many parts of the world, including Malaysia. According to a recent report by Kenanga Research (Kenanga), the financial sector's cyber capabilities are being pushed to the limit by the emergence of digital banking, the growing acceptance of remote work, and the growing usage of multiple devices and apps by customers and other third parties, even though digitalization in financial institutions has greatly benefited consumers (Usmani, 2021). Additionally, these sectors are revealing new security vulnerabilities that require level-specific precautions (Alshater et al., 2022). According to data from the Commercial Crime Investigation Department of the Royal Malaysia Police, over 25,000 internet fraud crimes in 2022 cost Malaysians over RM850 million.

Financial institutions should anticipate a more difficult operating environment in the future as advances like artificial intelligence (AI) and cloud services proliferate and increase cybersecurity threats in the face of growing client expectations for more security and safety. The lack of skilled workers in the cybersecurity industry and the legal difficulties arising from working across borders only make the situation worse. Therefore, in order to handle the seamless world of cyberspace, cross-organizational and cross-border cooperation is needed. Coordinated surveillance and evaluation are essential for successful risk reduction as well as for the capture and conviction of offenders (Rabbani, 2020). The restoration of money lost in fraudulent transactions is one of the main concerns for clients. Better and more robust rules and legislation that require prompt returns are required.

1.2 Cybersecurity

Cybersecurity referred to as set of technologies, processes, or approaches used to stop cyberattacks or lessen their effects. Cybersecurity strives to safeguard systems, apps, computing devices, sensitive data, and financial assets of people and organizations from basic and bothersome computer viruses to complex and expensive ransomware assaults, and all points in between. There are numerous hazards, some more serious than others, if some firms have poor cybersecurity (Sarker et al, 2020). These risks include malware that wipes out the entire system, hackers that access the system and change data, attackers that use someone computer to launch attacks on other people, and hackers that steal credit card details and use them to make illicit transactions. Even with the greatest safety measures, there is no guarantee that any of these things won't happen, but there are things that can do to lessen the likelihood. Even a few years ago, there were different cyber threats than there are today. Organizations require defense against the tools and tactics used by cybercriminals today and in the future, as the cyber threat landscape is always changing (Rahman et al., 2020)

1.3 Islamic Finance

The Islamic finance sector in Malaysia has grown over the past decades to become a part of a vibrant and competitive market that works in tandem with the traditional financial system to support economic growth. Despite being in its early stages of development and being confined to one country, the Islamic financial system has seen considerable international growth with the expansion of Islamic financial institutions that have shareholders from different nations (Hussain, Shahmoradi and Turk, 2016). In light of the Islamic Finance Guidelines released by the Central Bank of Malaysia, the application and mechanics of Islamic finance are reviewed. (Zin, Ishak, Kadir and Latif, 2011). This system has its own benefits and value additions that would make it the best option for addressing particular investment needs and interests. It is clear that Malaysia has a solid basis and well-thought-out plans for the further growth of the Islamic banking sector in Malaysia. The secret to maintaining financial stability is, in fact, a strong and effective

regulatory framework and system of oversight for Islamic financial institutions (Nor, Mohamad and Yaacob, 2016).

1.4 Research Questions

The following question will be made up and will be answered following the end of this research:

1. What is the extent of the impacts of roles of cybersecurity on benefits in Islamic finance?

2. What are the strengths between the roles of cybersecurity variables on benefits in Islamic finance?

3. Which one is the most important variable of the role of cybersecurity on benefits in Islamic finance?

1.5 Research Objectives

The study aim is to explore the roles of cybersecurity on benefits in Islamic finance. In these sense, the main objective of the study is:

1. To determine how much do the impacts of roles of cybersecurity on benefits in Islamic finance.

2. To examine the strengths between the roles of cybersecurity variables on benefits in Islamic finance.

3. To confirm the most important variable of the role of cybersecurity on benefits in Islamic finance.

1.6 Problem Statements

Based on expectation and issues facing by Islamic finance in the country, the researcher found that innovation for Islamic finance must be in accordance with Shariah law. Shariah principles have established a number of guidelines for handling various and

novel situations (Alamad, 2017). Hence, a number of additional pertinent concepts are also available when discussing the development of new and innovative financial products that suit people's needs in this context. For example, *istihsan*, *maslahah mursalah*, raf' al-haraj, and daruriyat (Darwis, 2019). These ideas or rules apply to financial engineering. The idea of *ijtihad* should exist in order to defend the fundamental tenets of the Shariah. These ideas offer thorough guidelines for handling problems that generally come up in complicated scenarios when applying Shari'ah law to unusual setting (Fauzi, 2015).

Islamic finance faces challenge in technological sophistication. Financial are growing more complex and competitive as more advanced technologies are introduced in the 21st century. Due to rival banks using more advanced and refined Islamic banking practices, Islamic financial institutions are constantly in danger of being displaced (Farooq and Miah, 2022). Therefore, Islamic financial institutions must adopt technology if they want to take advantage of the numerous opportunities provided by technological advancements, as well as to face challenges and competition brought about by these innovations and the entry of the largest conventional banks into the Islamic sector (Sanyinna and Omar, 2017).

Islamic finance also faces problem in technological infrastructure. Financial institutions' potential customer's are the cornerstone of their commercial success, thus any changes to the mechanics of financial transactions must take account of the advantages of the customer (Arshad, Yusoff and Tahir, 2016). If a country's internet service is not available in most regions, then what is the benefit of financial institutions using technology in their dealings in that country? Therefore, it is imperative that all relevant parties put forth significant effort to persuade telecom companies to build the necessary infrastructure before the financial institutions can begin using modern technologies in their dealings (Mohsin Butt and Aftab, 2013).

In this research, researcher can determine the benefits of cybersecurity for Islamic financial organizations using statistical analysis which researcher using quantitative research. Users of Islamic finance participated in surveys to learn more about the industry's current cybersecurity methods, issues, and attitudes. Researchers anticipate that the outcomes will validate the cybersecurity framework's responsibilities through hypothetical

situations and correlation analysis, showcasing its efficacy in tackling the particular advantages of Islamic financing.

1.7 Significant of Study

The study on the role of cybersecurity to benefits in Islamic finance is very important since it clarifies the possible uses of cybersecurity technology, process and approach in thn conservative. But as technology has advanced, the necessity for innovation in the sector to adapt to the shifting environment has grown. Because it can shed light on possible cybersecurity applications in the Islamic finance sector, this study on the role of cybersecurity to benefits in Islamic finance is important. The study can assist regulators, policymakers, and industry participants in comprehending the advantages of cybersecurity technology and e Islamic finance sector. Example of cybersecurity technology is distributed ledger technology, sometimes referred to as blockchain technology, is a decentralised platform that enables safe and transparent transactions without the use of third parties. The global Islamic finance market is increase, and it is expanding quickly. It is founded on Shariah law, which forbids *riba, gharar, and maysir*.

With a concentration on tangible assets and real economy activities, the industry has historically beeprocess, and in creating a framework for its incorporation into the Islamic financial sector.

1.8 Scope of Study

The study has a few scope that may influence its findings either directly or indirectly. Firstly, data collection will be limited to individuals who are involved around Islamic financing. It is due to their supports give to the type of Islamic finance that ensure the sector survived. Secondly, the research location selected is the outskirt of Melaka. Therefore, data samples and analysis done will not reflect the whole population of Melaka and the result should no be considered for generalization purpose. Maybe more study can be continued at other areas of the state foe better representation of the findings. Thirdly, most of the respondents may need to checked on their understanding and skill through

cybersecurity, in particular their ability to use Islamic finance. In line with this, the area also must have internet lines to ensure the real online process can be adopted Islamic finance in the sector. Due to these factors, the study may encounter difficulty to ensure smooth research process which may affect the time planned.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter study the roles, benefits, and applications of cybersecurity technology and process in Islamic finance. In the review, the possibilities for improving Islamic financial transactions' transparency, effectiveness, and Shariah compliance are discussed. The literature review offers insights into the junction of cybersecurity and Islamic finance and provides a thorough overview of the body of prior research. It clarifies the possibilities and opportunities prospects for implementing cybersecurity technology to raise the level of openness, effectiveness, and Shariah compliance in Islamic financial transactions.

2.2 Security

Cybersecurity is important because it enhance data security across all categories from loss and theft. Sensitive information like financial statements, personal information, data associated with intellectual property, and information systems used by the government and business sectors are examples of this. Islamic finance sector can becomes an easy target for cybercriminals because if they lacks the ability to protect themselves against data breach operations without a cybersecurity program. Modern technologies like artifical intelligent (AI) and blockchain can be used as cybersecurity tool by Islamic finance institutions to facilitate safe and transparent transactions. These technologies ensure that financial transactions adhere to Sharia standards and lower the possibility of fraud by providing immutable ledgers.

2.2.1 Decentralization

In Islamic finance, cybersecurity technology can be provide a decentralized system. Islamic financial institutions can build a decentralized network where transactions can be

carried out and recorded securely without the need for the third party to utilizing blockchain technology (Caldarelli & Ellul, 2021). In a decentralized network, transactions are checked by a network of nodes dispersed throughout the network as opposed to being managed by a central authority or intermediary. The transactions are made more accountable, trustable, and secure as a result. By preventing any one organization or person from controlling the network or meddling with the transactions, decentralization may also help in lowering the risk of fraud, corruption, and manipulation (Jensen et al., 2021).

2.2.2 Transparency

Cybersecurity can help in the transparency of Islamic financing. Cybersecurity technology can functions as a public ledger, which means that transaction data is shared and made available to all network users. Anyone may monitor and confirm transactions to ensures that the information is shared among several people and prevents any one entity from having exclusive control over it. Transactions are hard to change or tamper with once they are stored on the platform like blockchain (Stephen & Alex, 2018). Participants can check the transaction history and follow the money movement to make sure the money is safe and secure. The fact that cybersecurity technology enables a transparent mechanism for transaction recording is one of its fundamental characteristics (Wu et al., 2019).

2.2.3 Traceability

With cybersecurity, transactions can be recorded using tools like blockchain, a decentralized and transparent system. It is impossible to modify or remove any data that has been put to the since every transaction on it is confirmed by many parties and stored on multiple nodes. Blockchain is a fantastic tool for traceability because of Its transparency and security aspects. Anyone with access to the participants can then follow the path of assets or money from their origin to their destination (Khalid & Askar, 2021). Traceability is important in the Islamic finance to makes it possible to watch over transactions to make sure they follow moral guidelines and don't entail illegal activity. For instance, it can be utilized to confirm that money used in transaction is halal and does not originate from illegal sources like interest-based or gambling activities (Aysan & Bergigui, 2021).

2.2.4 Distributed Ledgers

One of the benefits of cybersecurity is the ability to create a distributed ledger system. A distributed ledger is a decentralized digital database that is kept up by a network of computers, called nodes. Each node in a distributed ledger participates in the validation and verification of transactions and possesses a copy of the database (Natarajan et al. 2017). The ledger is more immune to cyberattacks due to its distributed nature. Using a distributed ledger system in Islamic finance can help to improve transparency and lower the risk of fraud. This is so that all parties with a transaction can see the platform records of all transactions. As a result, all financial transactions are recorded in a transparent and auditable manner, which can promote confidence between the parties (Deshpande et al., 2017).

2.2.5 Permissioned Network

A permissioned network, commonly referred to as a private network, is a sort of private network that limits access and participation to a certain group of members. Contrary to public network, which are accessible to everyone, permissioned network call for participants to have authorization or special access rights in order to join and engage with the network. Only those with the proper permissions are allowed to join the network thanks to tight access control methods implemented by permissioned network (Helliar et al., 2021). The importance of privacy in the network cannot be overstated. It's possible for participants in network to demand confidentiality for transaction information or business information (Liu et al., 2019).

2.3 Digitalization

Islamic asset digitalization is the process of converting conventional Islamic financial assets, such as land, commodities, sukuk (Islamic bonds), and other financial instruments, into digital form using modern technology. This digital transition enables the depiction, ownership, trading, and management of Islamic assets in a digital format (Almunawar, 2022). Cybersecurity are important to digitalization of Islamic assets for

them to be securely and transparently traded on Decentralized Exchanges (DEXs). Distributed Ledger Technology (DLT), smart contracts, and other digital technologies can be used to protect Islamic assets digital. The benefit is that it can boost asset management effectiveness and cut down on the price of creating and selling these assets (Islam et al, 2022).

2.3.1 Sukuk

Islamic finance uses sukuk, also known as Islamic bonds, which are financial products that adhere to Islamic standards. Sukuk are constructed in accordance with Shariah law, which forbids the charge or payment of interest (riba). This is in contrast to traditional bonds, which include borrowing and lending at interest (Ibrahim, 2015). Digitalization of sukuk seek to improve issuance, trading, and management of sukuk by utilising cybersecurity technology to increase safety, transparency, and accessibility. They have the authority to specify the sukuk's terms and conditions, including profit-sharing structures, maturity dates, and redemption rights. Direct issuance of digital sukuk on the digital platform enables transactions to happen more safely. (Kunhibava et al., 2021).

2.3.2 Zakat

Zakat mean giving a certain percentage of one's wealth or assets to help those in need while purging one's wealth is what it entails (Alshater et al., 2021). For eligible Muslims who satisfy certain requirements, such as having wealth above a particular threshold (nisab) and possessing it for a lunar year, zakat is required (Ahmed et al., 2016). An online tool known as a digital Zakat platform allows Muslims to calculate, monitor, and pay their Zakat requirements. This platform should also be able to keep track of users Zakat payments over time and receive reminders for impending payments via the platform. Users also should have easy access to a safe online payment system on the platform like online banking, credit/debit card transactions, and mobile payments (Utami et al, 2020).

2.3.3 Wakaf (Charity)

In Islamic law, a person who dedicates a property, asset, or wealth for a particular charity or religious purpose is said to be making a wakaf, also known as an charity (Baqutayan et al., 2018). Muslims can create, manage, and disburse Wakaf money online using a digital wakaf platform. Users should be able to create a wakaf online and choose its intended use via the platform. Options like education, healthcare, eradicating poverty, and community development can fall within this category (Laili et al., 2023). The portal should offer resources for managing the wakaf, such as tools for keeping track of donations, controlling spending, and producing reports. By doing this, you may help ensure that the wakaf fund is handled perfectly.

2.3.4 Gold Investment

People can purchase and sell gold online thanks to cybersecurity in digital platforms. Through these platforms, investors can open an account, deposit money, and then use that money to buy digital gold units. The investor's gold is normally kept in safe vaults on their behalf (Aloui et al., 2021). Islamic investments Digitalization on gold digital platforms describes the application of digital technologies to the financing, trading, and management of Shariah-compliant gold investments. Digital platforms can offer a more effective and secure indicates to invest in gold, as well as new options for investors to access the gold market. Gold is viewed as a valuable asset in Islamic finance that can be used as a store of value, a medium of exchange, and a unit of account. (Shahzad et al., 2019).

2.3.5 Takaful (Insurance)

Takaful is Islamic insurance that follows the principles of Shariah, which forbid interest (riba), ambiguity (gharar), and gambling (maysir). While upholding moral and Islamic standards, takaful offers insurance coverage to both people and corporations (Nassir et al., 2021). The term digital takaful refers to the application of technology to the provision of takaful, an Islamic insurance product based on the concepts of risk-sharing

and reciprocity. Customers that use digital takaful can buy takaful items online, manage their policies digitally, and submit claims through digital means (Husin, 2019). Takaful Malaysia Online, Etiqa Online Takaful, and PruBSN are just a few of the digital takaful platforms that have surfaced in Malaysia (Manaf, 2019).

2.4 Shariah Banking

Islamic banking, sometimes referred to as shariah-compliant banking, is the provision of banking and financial services in accordance with the tenets and regulations of Shariah law as outlined in the Quran and the teachings of the Prophet Muhammad (peace be upon him). The goal of shariah-compliant banking is to offer financial services that are consistent with Islam's moral and ethical principles (Ahmed, 2014). Islamic banks generally create Shariah boards or committees made up of competent Islamic experts to ensure compliance with the law. They guarantee that the institution's operations are in line with Islamic principles and ethics and offer recommendations regarding the legitimacy and compliance of certain transactions (Lacasss et al., 2017). Cybersecurity technology can automate Shariah-compliant procedures, make transactions transparent and auditable.

2.4.1 Riba (Usury)

Riba or usury is categorically forbidden in Islamic banking since it is regarded as unfair and exploitative. Based on the fairness, equity, and justice tenets of Islamic finance, riba is prohibited. Cybersecurity platform can offers a more effective and secure means to perform financial transactions without the need for intermediaries, which can help alleviate the riba problem. This can lower transaction costs and guarantee that the parties involved split profits and losses more evenly (Fasa et al., 2019). By creating cybersecurity that decentralized the Zakat digital platform, it can help prevent riba in Islamic banking (Rabbani et al., 2021). This should encourage fair and simple financial transactions, in line with the equal participation emphasized in Islamic finance (Cahayani et al., 2023).

2.4.2 Mudarabah (Partnership)

A mudarabah is a partnership agreement in which one party provides the capital and the other party offers the knowledge and management. The capital supplier bears the partnership's losses, while the parties divide the partnership's earnings in accordance with a pre-agreed ratio. Bloclchain can be used as cybersecurity tool to automate the implementation of Mudarabah agreements. Blockchain allow for automatic profit sharing and allocation based on predetermined percentages. By eliminating the need for intermediaries, this technology makes guarantee that profit distributions are done correctly and openly. Platforms built on the blockchain can keep track of the capital investments made by partners and compute profit shares based on agreed-upon ratios (Rejeb, 2021).

2.4.3 Masyir (Gambling)

Maysir, which is also known as gambling are not permitted in Islam since deemed to be incompatible with sound financial practices (Mihajat, 2016). Islamic finance, on the other hand, promotes transactions and investments based on actual economic activity, production, and risk-sharing. The consensus mechanisms used by cybersecurity , such as Proof of Stake and Proof of Authority, include several participants that validate transactions. By decreasing reliance on a single central authority, this decentralized validation procedure reduces the hazards associated with gharar. Multi-participant consensus contributes to the accuracy and fairness of transactions. Blockchain makes it possible to allowing them to be split up into virtual tokens that represent different percentages of ownership (Fuadi et al., 2020).

2.4.4 Screening

Islamic banks use a strict screening procedure to determine whether possible investments are compliant to Islamic value. The screening of Islamic investments can be made more transparent, effective, and dependable by utilizing cybersecurity technology. By offering a decentralized and auditable platform for assessing investment options and guaranteeing adherence to Shariah standards, it increases the trust and confidence of

stakeholders (Billah, 2019). Blockchain networks can let multiple parties, such as Islamic banks, Shariah scholars, regulators, and investors, share investment-related data in a secure and effective manner. Better collaboration and information sharing are made possible during the screening process thanks to this network of shared data (Nor et al., 2021).

2.4.5 Murabaha (Cost Plus Financing)

Murabaha or cost plus financing is a specific kind of sale-based finance arrangement. In Islamic banking, the bank buys an asset that the customer requests and then sells it to the customer for a higher price that includes a profit margin. Over a predetermined period, the customer makes installment payments. (Muhammad Shujaat 2021). Asset ownership can be tracked and verified due to cybersecurity distributed and unchangeable nature. Both the bank and the consumer may see the ownership history and chain of custody of the underlying assets through blockchain-based asset registries. The legitimacy and traceability of assets are guaranteed throughout the murabaha arrangement. Payments for murabaha transactions can be carried out in real-time using blockchain-based platforms or digital currencies (Yusoff et al., 2023).

2.5 Smart Contract

Smart contracts is known as a self-executing blockchain-encoded digital contract. It is a computer programmed that automatically carries out and upholds an agreement's terms without the aid of middlemen or centralized control. Cybersecurity platforms like Ethereum are used to build smart contracts because they offer the required infrastructure for their creation and execution. Automated execution of contractual obligations is provided by smart contracts. The contract is automatically enforced once the predetermined conditions stated in it are satisfied. With this automation, manual intervention is no longer necessary, and the possibility of prejudice or mistakes made by humans is minimized (Al-Sakran et al., 2021). Smart contracts can be programmed to include terms and circumstances that are compliant with Shariah, guaranteeing that financial transactions follow Islamic principles. (Rahim et al., 2018).

2.5.1 Coordination Payment

Coordination is the Typically, a coordination payment is a monetary transaction intended to help several stakeholders in a system or network collaborate or coordinate with one another (Yasini & Yasini, 2019). It is possible to create smart contracts that adhere to the tenets of Islamic finance. They can, for example, automate and enforce contracts without requiring the payment of interest. Sharia-compliant terms can be specified via the code inside a smart contract, guaranteeing clarity and minimizing uncertainty in financial transactions. Coordination payments within smart contracts in Islamic finance can be set up to support profit and loss sharing arrangements. A smart contract might, for instance, allocate gains or losses among participants according to preset percentages (Zain et al., 2019).

2.5.2 Conditional Payment

Smart contracts have the potential to significantly contribute to conditional payments in Islamic finance by automating the payment process (Tahiri Jouti, 2019). Smart contracts can be configured to include particular requirements that must be satisfied before a payment is carried out. These requirements may be determined by Sharia law, a contract, or any other factors pertinent to the transaction. If the predefined requirements are met, the smart contract will only release the payment (Shi et al., 2018). Oracles are dependable outside data sources that smart contracts can use to check and confirm the fulfilment of criteria. If the condition has been satisfied, the smart contract can check the oracle's data to determine whether the payment should be made (Weber & Staples, 2022).

2.5.3 Auditing

Enhanced auditing in Islamic finance refers to the implementation of rigorous auditing practises and procedures. It entails carrying out exhaustive and meticulous audits that extend beyond conventional financial auditing to take into account the unique demands and considerations of Islamic financing. Smart contracts can be used to improve auditing procedures in Islamic finance by giving them immutability, automation, and

transparency. Smart contracts have the ability to automatically gather and combine data from many sources, including ledgers, financial systems, and transaction records. By removing the need for manual data collection, this streamlines the auditing process and lowers the possibility of cybercrime (Busari & Amimu, 2022)

2.5.4 Notification

Notification is an email, message, icon, or other indicator that shows up when an application requests that you pay attention. Notifications occur whether or not you are using an application and serve as a means of informing you when anything new has happened so you don't miss anything that might be important. When a smart contract is executed or a predetermined condition is satisfied, notifications can be utilized to notify the appropriate parties (Corno et. al.). This facilitates communication in real time and informs parties involved of the contract's development. Notifications regarding the state of transactions pertaining to the smart contract are available to participants. This guarantees openness and facilitates user tracking of the transfer of assets or the performance of contractual duties.

2.5.5 Microfinance

Microfinance is a type of financial service that offers low-income people and small businesses access to small loans, savings accounts, insurance, and other essential financial services when they generally do not have access to standard banking services (Cull & Morduch 2018). Smart contracts can help in facilitating and enhancing microfinance operations. The loan disbursement procedure can be automated using smart contracts. The smart contract can automatically release the cash to the borrower's account when the borrower's eligibility and loan application have been validated. This is done based on predetermined criteria such the authorized loan amount and terms. Beside, smart contracts provide the ability to automate the payback process and on-time payments (Jayasheela & Geetha, 2021).

2.6 Benefits In Islamic Finance

Cybersecurity technology has the potential to benefits many aspects in Islamic finance by bringing transparency, efficiency, and improved adherence to Shariah rules. By offering a visible and unchangeable transaction log, cybersecurity can make it easier to follow Shariah laws. Shariah scholars and regulatory organizations can readily audit and verify all financial transactions recorded on the cybersecurity to ensure compliance with Islamic law (Mohamed & Ali, 2018). Also in Islamic finance, cybersecurity technology can enables faster, more effective, and secure payment methods. Islamic financial institutions can achieve nearly instantaneous settlement, lower transaction costs, and increased security by utilizing blockchain-based payment systems, such as stable coins or digital currencies, which is especially important for cross-border transactions (Alaeddin et al., 2021).

2.6.1 Privacy

With the help of cybersecurity, users won't have to expose their true identities when interacting with the network; they can use pseudonyms or cryptographic identifiers instead. This contributes to safeguarding the confidentiality of people conducting financial transactions within the Islamic finance ecosystem. Advanced cryptography methods are used by cybersecurity technology to protect data and transactions. Information authenticity and confidentiality are guaranteed using encryption and digital signatures (Nazim et al., 2021). Financial data, personal information, and transactional data can all be encrypted to make sure that only authorized individuals with the right decryption keys can access and read the data.

2.6.2 Scammer

Because cybersecurity transactions are immutable, they cannot be changed or tampered with after they are recorded there. Due to this feature, it is very difficult for fraud to go unnoticed or for records to be fabricated. The possibility of fraudulent practices is decreased because every transaction and its specifics are permanently recorded and auditable (Radwan et al., 2020). Because of the checks and balances created by this transparency, it is more difficult for corrupt practices to go undetected. Transactions may

be verified and validated by all parties, which lowers the possibility of fraud and unscrupulous behavior. Islamic finance institutions may create a more secure and transparent system with cybersecurity technology, lowering the chances of fraud and corruption (Laldin & Djafri, 2019).

2.6.3 Convenience

Cybersecurity offers almost immediate transaction settlement. Traditional methods frequently require several intermediaries and go through a number of manual steps, which causes delays in settlement. Due to the decentralized nature of cybersecurity technology, transactions may be instantly verified and recorded, which shortens settlement times and associated costs. Cybersecurity technology has the potential to advance financial inclusion by giving those with limited access to financial services (O'Shields, 2017). Through blockchain-based platforms, people with little access to conventional banking infrastructure can engage in Islamic finance, enabling quicker and less expensive transactions for those who were previously unbanked or underbanked (Reilly et al, 2019).

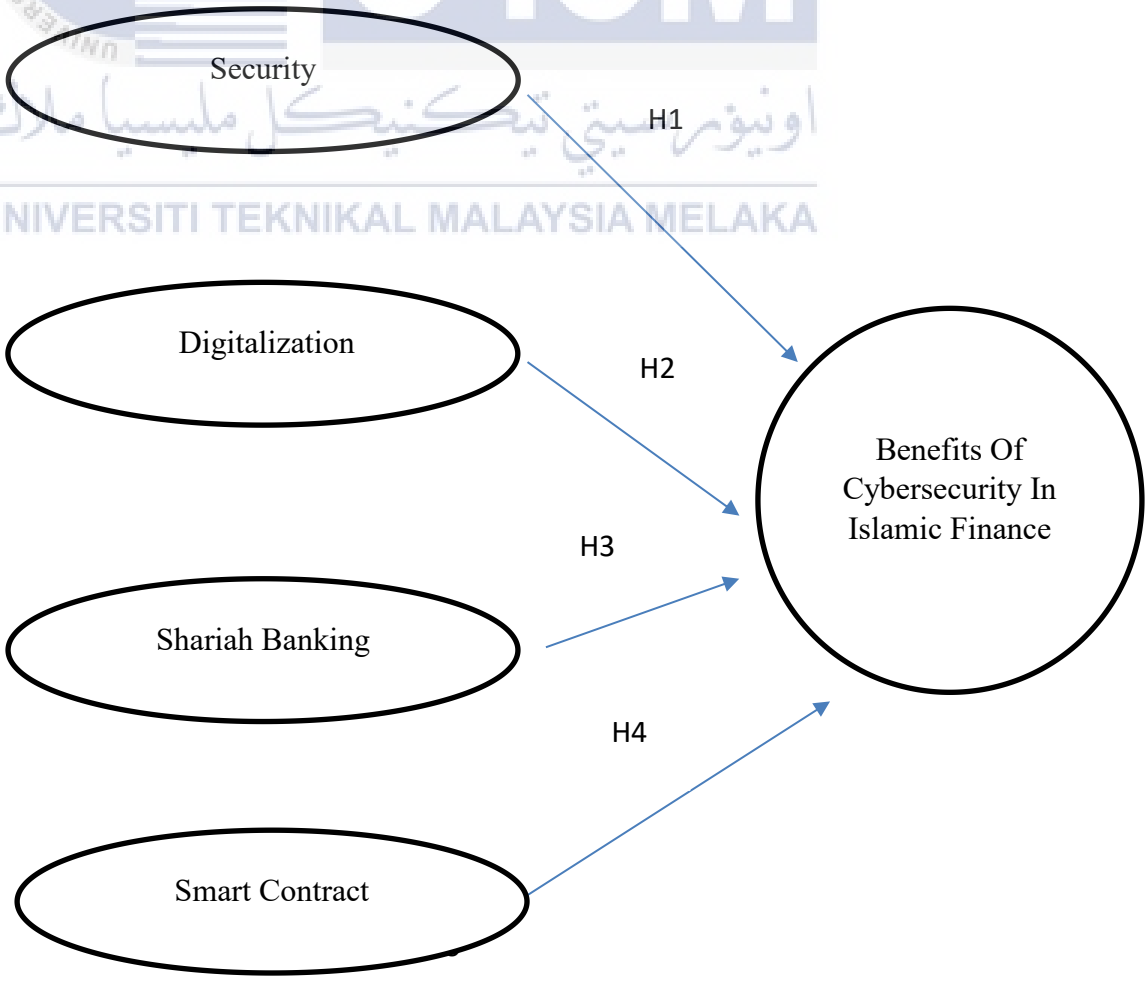
2.6.4 Shariah Compliance

Shariah compliance describes the application of Shariah, or Islamic law, in numerous facets of financial and commercial transactions. It is especially pertinent in the context of Islamic finance, where financial transactions and goods must adhere to Shariah regulations in order to be approved (halal) from an Islamic viewpoint. The goal of shariah compliance, which consists of a variety of rules and criteria derived from Islamic teachings, is to assure moral and legal behaviour in financial transactions (Kabuye, 2018). Shariah compliance is a continual process that necessitates constant observation and assessment of financial services, deals, and acts. Islamic scholars are essential in offering counsel and certifying financial goods and services as Shariah compliant (Aliyu et al., 2018).

2.6.5 International

Compared to conventional banking systems, cybersecurity provides faster and more secure cross-border payments. Islamic financial institutions can settle transactions directly between parties without the use of numerous intermediaries or correspondent banks by utilizing cryptocurrencies or blockchain-based stable coins. International transactions become quicker and more effective as a result of the elimination of delays brought on by conventional cross-border payment methods, such as manual processing and currency conversion. Blockchain-based technologies have the potential to drastically speed up the international transaction settling process (Hoffman et al., 2018). Due to the use of numerous middlemen and manual procedures, traditional cross-border transactions may take several days or even weeks to execute.

2.7 Research Framework



2.8 Research Hypothesis

Security

H0: There are no relationship between security and benefits in Islamic finance.

H1: There are significant relationship between security and benefits in Islamic finance.

Digitalization

H0: There are no relationship between digitalization and benefits in Islamic finance.

H1: There are significant relationship between Islamic assets digitalization and benefits in Islamic finance.

Shariah Banking

H0: There are no relationship between Shariah banking and benefits in Islamic finance.

H1: There are significant relationship between Shariah banking and benefits in Islamic finance.

Smart Contract Execution

H0: There are no relationship between smart contract and benefits in Islamic finance.

H1: There are significant relationship between smart contract and benefits in Islamic finance.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

This chapter provides an overview of the research methodology used to examine how cybersecurity contributes to Islamic finance's benefits. A strong research technique is essential for producing accurate and trustworthy results, ensuring the validity and reliability of the study findings. This study uses a systematic approach to gather and analyze data in a rigorous manner, allowing researcher to make valid inferences and add to the body of knowledge on the topic. The goal of this research is to look into the use of cybersecurity technology in improving the benefits of Islamic financing. This study intends to provide insights into how cybersecurity can increase transparency, efficiency, and trust in Islamic financial transactions and goods by investigating its application in Islamic finance.

3.2 Research Design

This research design to overarching framework or arrangement of a research study that describes how the study's goals or objectives will be achieved. It acts as a manual for performing the study and directs the choice of relevant methodologies, data collection techniques, and analysis approaches. A well-designed research study makes sure that the information gathered is accurate, valid, and useful for addressing the research objectives. In addition to ensuring that the study is carried out in a rigorous and trustworthy manner, a well-developed research design offers an organized and methodical framework for doing research. It supports researchers in planning work, coming to wise judgements, and producing reliable and significant findings.

3.2.1 Quantitative Research

This research will employ quantitative research design to collect and analyze numerical data. It focuses on using statistical analysis and objective measures to generate quantitative insights. Utilizing statistical methods and software, quantitative data is analyzed. While inferential statistics, such as regression analysis or hypothesis testing, explore correlations, make predictions, or test hypotheses, descriptive statistics, such as mean, median, or standard deviation, summaries the data. In quantitative research, a representative sample of the target population is chosen in order to generalize the results to a broader population. To make sure the sample is representative, probability sampling techniques like stratified sampling or random sampling are frequently used. This study uses standardized data gathering and statistical analysis to reduce researcher bias. It seeks to generalize research results to a larger population and bases its assertions on statistical data.

3.3 Research Location

Melaka, usually known as Malacca, is a thriving city on Peninsular Malaysia's west coast. Melaka, as a historical city, receives a large number of tourists each year, and researching the effects of tourism on employment, commercial prospects, and local traditions might help to plan and manage sustainable tourism. Furthermore, Melaka's role as a Malaysian Islamic finance centre opens up opportunities for study on Islamic banking, Islamic capital markets, and ethical financial practises. Investigating the deployment and impact of cybersecurity technology in Melaka Islamic finance institutions can give light on the potential benefits and problems of this emerging technology in the context of Islamic finance.

3.4 Time Horizon

The weekend hours of 3:00 PM to 6:00 PM are designated for researcher research study in Bukit Beruang and Fakulti Pengurusan Teknologi Dan Teknoushawanan (FPTT) in Melaka. This window of time enables data collection to occur when respondents are

most likely to be accessible and able to take part in the study activities. The researcher can accommodate participants who might have employment or other responsibilities throughout the week by scheduling the research activities for the weekends. A feasible timeframe for data collection, taking into account participant availability and convenience, is from 3:00 to 6:00 PM.

3.5 Research Strategy

The general plan or approach that researchers use to perform their research study is commonly referred to as the research strategy. It describes the broad procedures, methods, and strategies that will be used to achieve the study objectives or answer the research questions. The research strategy directs the selection and execution of various research methods and data collection procedures. The research objectives, research questions, nature of the research challenge, available resources, and the researcher's expertise all influence the choice of a research approach. It is critical to integrate the research strategy chosen with the research objectives and to analyse the strengths and limits of each approach.

3.5.1 Survey

A survey is a research technique used to collect data and information from a group of people, also referred to as respondents or participants. It entails the distribution of a series of inquiries, either in paper or electronic form, to gather information regarding people's beliefs, actions, attitudes, preferences, or traits. Surveys are carried out with a specific goal and set of research objectives in mind. The goal is to investigate the subject of the research, gauge attitudes or opinions, comprehend behaviors, or collect demographic data. The survey design and analysis are aided by a clear definition of the aim and objectives. Surveys should abide by ethical standards to respect the rights, privacy, and secrecy of respondents. The survey's objective, the voluntary nature of participation, and any possible risks or advantages should all be explained to participants in order to acquire their informed permission.

3.5.2 Questionnaire

A questionnaire is a research tool used to obtain information from participants or individuals. It comprises of a series of well-structured questions intended to elicit detailed answers pertinent to the research's topic (Bhat, 2023). Online surveys and paper forms have both been used to administer questionnaires for this study. For this study, a Likert-scale questionnaire was used. Each question includes a statement or item that exemplifies the objectives that the study is trying to measure. It must be comprehensible, and relevant to researcher study goals. Likert-scale questions offer a number of possible answers along a scale. A five-point Likert scale measuring from 1 to 5 is used. 1 = Strongly Agree, 2 = Agree, 3 = Neutral, 4 = Disagree, and 5 = Strongly Disagree are all acceptable responses.

3.5.3 Population And Sample

In this research, there are total of 100,000 populations of Islamic finance consumers in Melaka and a sample of 384 people will be chosen from the Melaka population was determined due to the used of Krejcie and Morgan Table. Depending on the accessibility and availability of people with the necessary knowledge in cybersecurity technology and Islamic finance, the sample method may need to be adjusted.. Though the sample size of 384 participants would be sufficient for a reliability analysis, it might not be entirely representative of the community. The sampling main goals are to guarantee that the sample accurately depicts the population's characteristics in order to produce trustworthy and accurate results.. A larger and more representative sample would be ideal for the upcoming major study to ensure generalizability and more reliable results. The study process will be conducted with complete adherence to ethical considerations. Before collecting data, participants' privacy and confidentiality will be respected, and informed consent will be acquired. To protect the rights and wellbeing of the participants, the research will adhere to ethical standards and legislation.

3.6 Research Method

Research method in this research using specific approaches, strategies, techniques, and tools to collect data and conduct research. This systematic method is used to compile data, analyze information, and either examine certain phenomena or provide research topics. It gives researchers a framework for their work, instructing them on how to gather, analyze, and interpret data. Research methodologies make ensuring that the process of conducting research is organized, rigorous, and trustworthy.

3.6.1 Normality Test

Normality tests are used in statistics to assess whether a set of data is well-modeled by a normal distribution and to estimate the likelihood that a random variable underlying the data set will follow a normal distribution. To ascertain if sample data was taken from a regularly distributed population (within a certain tolerance), a normality test is utilized. A regularly distributed sample population is needed for a number of statistical tests, including the Student's t-test and the one-way and two-way ANOVA.

3.6.2 Pilot Testing

For pilot test, researcher use 20 of Islamic finance consumers from sample of 384 as collected data. The collected data will undergo statistical analysis after the data collection phase is over. To summaries and describe the data, descriptive statistics like frequencies, means, and standard deviations will be used. Researcher will use inferential statistical methods like regression analysis and correlation analysis to look for patterns and evaluate theories about how cybersecurity technology fits within Islamic finance. For data analysis, statistical tools like SPSS or Excel will be employed. The statistical analysis's findings will be interpreted in with regard to the objectives and topics of the research. Tables, charts, and graphs will be used to display the data in order to increase understanding and comprehension. There will also be a discussion of the research limitations, mentioning potential resources of bias or mistake that could have an impact on how generalizable the results are.

3.6.3 Reliability

In this research, Internal Consistency Reliability were used by researcher. Internal Consistency Reliability determines the amount to which items within a measurement instrument or scale consistently measure the same construct. It is commonly measured using statistical approaches such as Cronbach's alpha, which measures the degree of interdependence between the components. The degree to which the values that comprise the scale measure the same attribute is known as reliability analysis. Additionally, the Cronbach's alpha coefficient is the most often used reliability metric. On a scale, it represents the average correlation between every value. Stated differently, the Cronbach's alpha coefficient has a value between 0 and 1, where a larger number denotes greater dependability. Finally, the scale has good internal validity and reliability; the Cronbach's alpha coefficient should be more than 0.70.

3.6.4 Correlation

Correlation known as statistical measure shows how much two or more variables fluctuate in connection to one another. When two variables rise or decrease simultaneously, there is a positive correlation; when there is a negative correlation, one variable increases as the other falls. A statistical indicator of how well one variable predicts changes in another's value is called a correlation coefficient. There is frequently a propensity to assume that a change in one variable causes a change in another when the volatility of one variable reliably predicts a similar fluctuation in another. Correlation does not, however, indicate causality. The correlation coefficient is used to quantify correlation. Compute the correlation coefficient in SPSS is a pretty simple process. We should be familiar with the fundamentals of correlation before using SPSS to calculate the correlation. It is imperative that the correlation coefficient remains within the range of -1 to 1.

3.6.5 Multiple Regression Analysis

In this study, multiple regression analysis is a statistical approach used to represent the relationship between a dependent variable and one or more independent variables. It seeks to comprehend how changes in the independent variables are related to changes in the dependent variable. The primary purpose of multiple regression is to estimate the

parameters of a regression equation that best fits the observed data. Linear regression analysis allows researchers to investigate the degree and direction of the relationship between the dependent variable and the independent variables. It predicts the value of the dependent variable given the values of the independent variables.

3.6.5.1 R-Square

R-squared, commonly known as the coefficient of determination, is a statistical metric that analyses the proportion of a dependent variable's variation that can be explained by the independent variables in a regression model. It represents the model's quality of fit and the amount to which the independent variables account for the variation in the dependent variable. R-squared values vary from 0 to 1, with higher values suggesting a better model-to-data fit.

- R-squared equals 0: None of the variability in the dependent variable is explained by the independent factors.
- R-squared equals 1: All of the variability in the dependent variable is explained by the independent variables, and the model accurately predicts the observed data.

3.6.5.2 F-Value

The F-value, also known as the F-statistic, is a statistical metric used in ANOVA and regression analysis to examine the overall significance of a model or the joint importance of a set of variables. It is calculated by dividing the mean squares of groups or variables by the mean squares of groups or variables. The F-value is often used in regression analysis to test the overall significance of the regression model, which determines whether the independent variables as a group have a statistically significant effect on the dependent variable. It contrasts the variation explained by the regression model (explained sum of squares) with the variation that is unexplained (residual sum of squares).

The significance of an F-value is evaluated by comparing it to the critical value of the F-distribution at a specified level of significance (e.g., 0.05 or 0.01). If the estimated F-

value exceeds the critical value, the regression model has a statistically significant overall effect. In ANOVA, the F-value is also used to test for mean equality across several groups or levels of a categorical variable. It contrasts variety between groups with variation within groups.

A higher F-value in regression analysis and ANOVA shows greater evidence against the null hypothesis of no meaningful impact or difference. To establish conclusive judgements regarding the statistical significance of the model or group differences, the F-value must be interpreted in conjunction with its associated degrees of freedom and p-value.

3.6.5.3 T-Value

The t-statistic, commonly known as the T-value, is a statistical metric used to quantify the statistical significance of individual coefficients or variables in a regression model. It is used to test the null hypothesis that the coefficient is equal to zero by measuring the estimated coefficient to its standard error. The T-value in regression analysis is determined by dividing the estimated coefficient by its standard error.

The t-value is coupled with a matching p-value, which represents the likelihood of witnessing a t-value that is as extreme or more extreme than the computed value, providing the null hypothesis is true. The p-value is used to determine the coefficient's statistical significance.

If the absolute value of the t-value is large and the related p-value is little (usually less than 0.05 or 0.01), it shows that the coefficient is statistically significantly different from zero. This implies that the variable has a significant influence on the dependent variable in the regression model.

In contrast, a small t-value and a large p-value indicate that the coefficient is not statistically significant different from zero. This suggests that the variable may not have a significant impact on the model's dependent variable.

3.6.5.4 B-Value

After the evaluation of the F-value and R2, it is important to evaluate the regression beta coefficients. The beta coefficients can be negative or positive, and have a t-value and significance of the t-value associated with each. The beta coefficient is the degree of change in the outcome variable for every 1-unit of change in the predictor variable. The t-test assesses whether the beta coefficient is significantly different from zero. If the beta coefficient is not statistically significant, the variable does not significantly predict the outcome. If the beta coefficient is significant, examine the sign of the beta. If the beta coefficient is positive, the interpretation is that for every 1-unit increase in the predictor variable, the outcome variable will increase by the beta coefficient value. If the beta coefficient is negative, the interpretation is that for every 1-unit increase in the predictor variable, the outcome variable will decrease by the beta coefficient value.

3.6.4.5 Regression Equation

Regression equation is the measurement of relationship between dependent and independent variables as it depicts how dependent variables will change when one or more independent variables change due to factors. Therefore, the formula for calculation is Y = a + bX + E, where Y is the dependent variable, X is the independent variable, a is the intercept, b is the slope, and E is the residual.

Regression equation is using a statistical tool to predict the dependent variable with the help of one or more independent variables. While running a regression analysis, the main purpose of the researcher is to find out the relationship between the dependent and independent variables. One or multiple independent variables are chosen, which can help predict the dependent variable to predict the dependent variable.

CHAPTER 4

RESULT AND DISCUSSION

4.1 Introduction

In this chapter, data obtained from 246 respondents will be analyzed to elaborate the results of the study by using IBM SPSS Statistics 27. It is divided into several subsections including Descriptive Statistics, Reliability Analysis, Pearson Correlation Analysis, and Multiple Regression Analysis. Then, the findings of the study will be summarized at the last section.

4.2 Descriptive Statistics

Table 1 outlines the respondent's demographic profile in detail.

Table 1: Demographic Profile Of The Respondents

Demographic Variables	*Categories*	*Frequency*	*Percentage*
Gender	Female	100	40.7
	Male	146	59.3
Age	17 - 25	142	57.7
	26 - 35	36	14.6
	36 - 45	28	11.4
	46 - 55	24	9.8
	56 and higher	16	6.5
Status	Engaged	16	6.5
	Married	78	31.7
	Single	144	58.5
	Single father	8	3.3
Occupation	Full time worker	86	35.0
	Not working	6	2.4
	Part time worker	18	7.3
	Retired	8	3.3
	Student	128	52.0
Monthly income	No monthly income	124	50.4
	RM1000 and lower	26	10.6
	RM1001 - RM2000	64	26.0
	RM2001- RM3000	30	12.2
	RM3001 and higher	2	.8
Experience with Islamic finance	Yes	246	100

Do you aware of cybersecurity in Islamic finance	No	18	7.3
	Yes	228	92.7

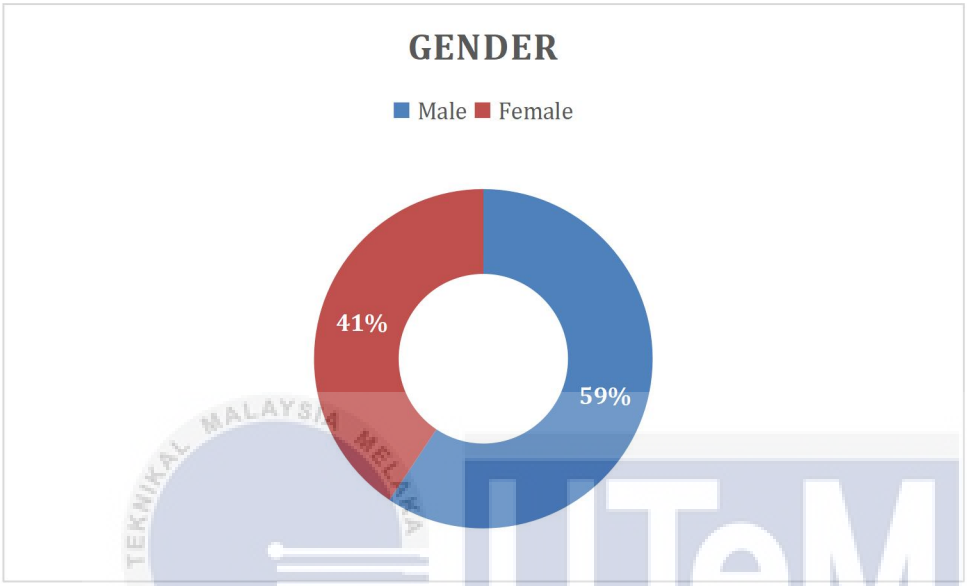


Figure 1: Respondent's Gender

Figure 1 show most respondents are "Male" with 146 respondents (59.3%), follow up by "Female" with 100 respondents (40.7%).

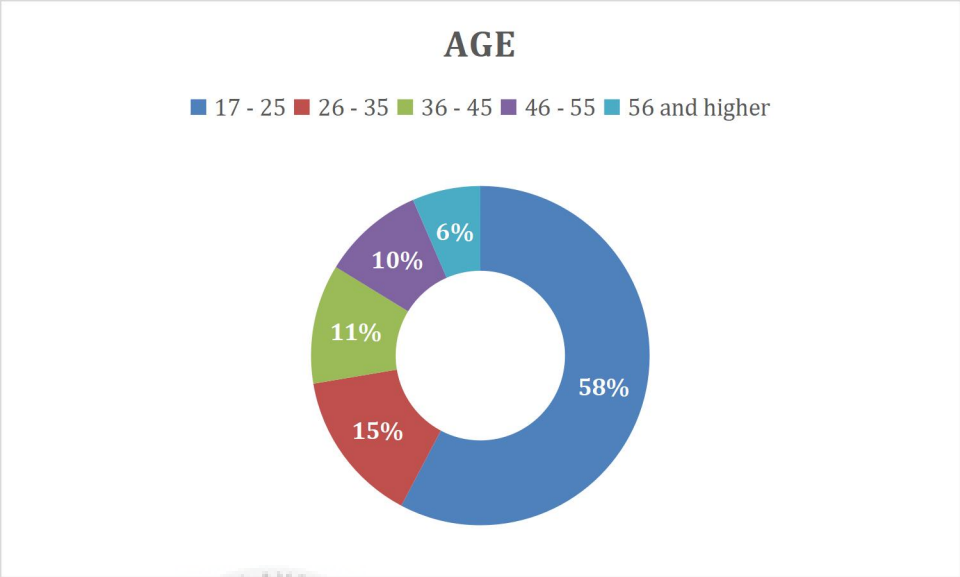


Figure 2: Respondent's Age

Figure 2 show most respondents are age "17 – 25" with 142 respondents (57.7%), far leaving the second place which age "26 – 35" with 36 respondents (14.6%). Next, age "36 – 45" came with 28 respondents (11.4%), followed by age "46 – 55" has 24 respondents (9.8%). And the rest are age "56 and higher" with 16 respondents (6.5%).

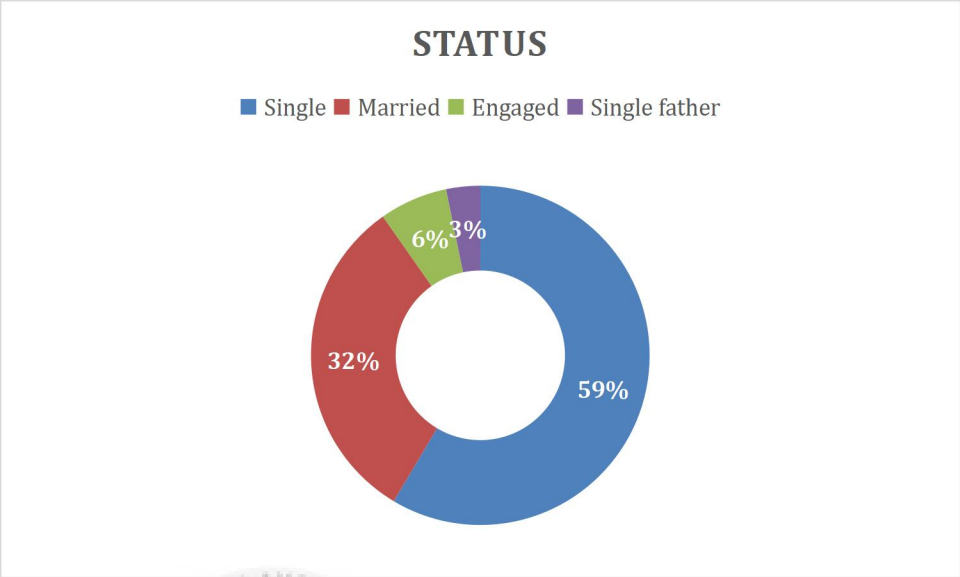


Figure 3: Respondent's Status

In Figure 3, 144 respondents (58.5%) stated they were "single," while 78 respondents (31.7%) said they were "Married." These respondents represented a large proportion of participants. In addition, 16 respondents (6.5%) declared themselves to be "Engaged," whereas only 8 respondents (3.3%) classified into the category of "Single father."

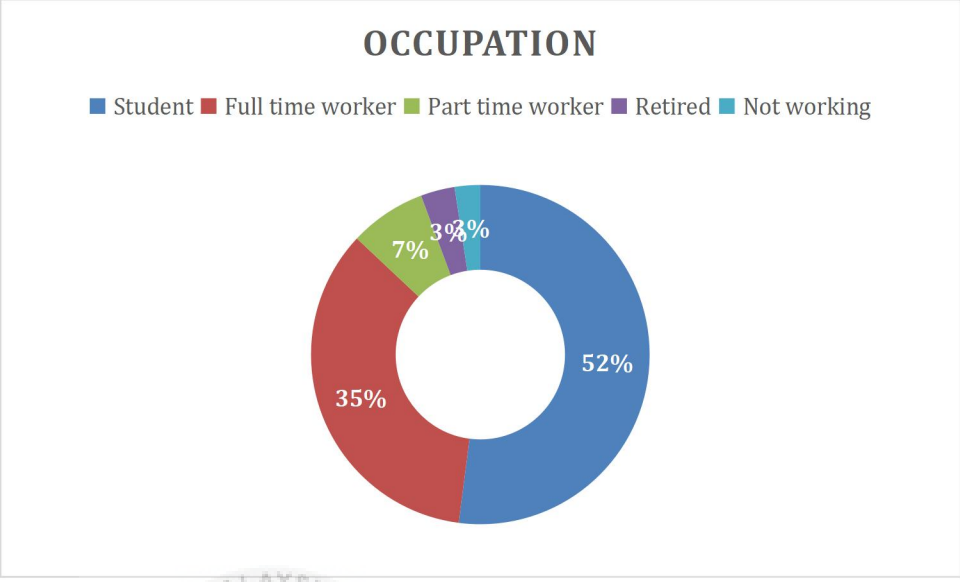


Figure 4: Respondent's Occupation

According to Figure 4, the majority of participants go to the group of "Students," which includes 128 respondents (52%). "Full-time workers" come in second with 86 respondents (35%). Furthermore, 18 respondents (7.3%) fall under the category of "Part-time workers," 8 respondents (3.3%) are classified as "Retired," and 6 respondents (2.4%) are classified as "Not working."

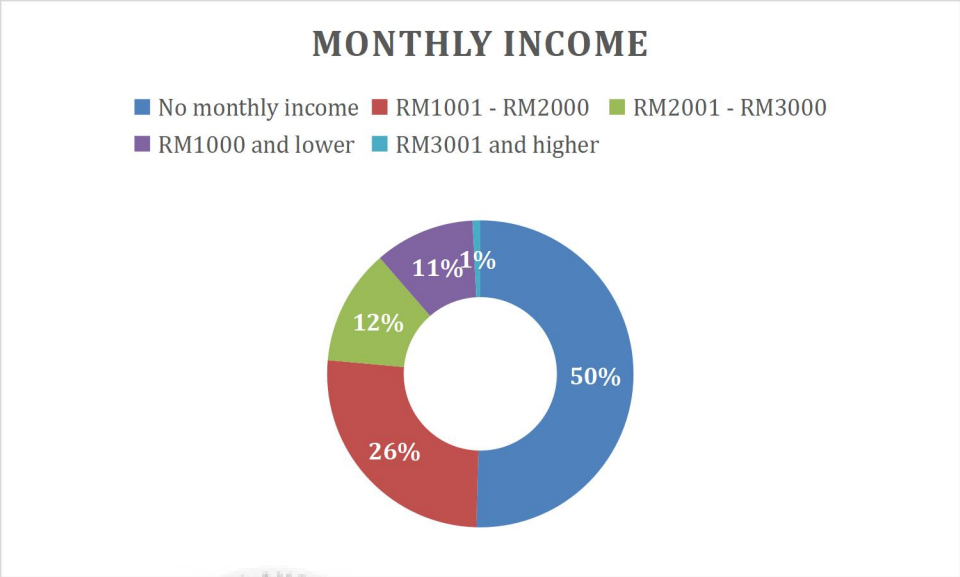


Figure 5: Respondent's Monthly Income

Figure 5 shows that 124 respondents, or 50.4% of the total, indicated that they had "No Monthly Income." With 64 respondents (26%) coming in second, "RM1001 – RM2000," is the second most popular income range. There are 30 respondents (12.2%) in the third category, which is based on earnings between "RM2001 – RM3000," and 26 respondents (10.6%) in the fourth category, which is based on incomes between "RM1001 and lower." Only 2 respondents (0.8%) falls into the group "RM3001 and higher," which is the least represented.

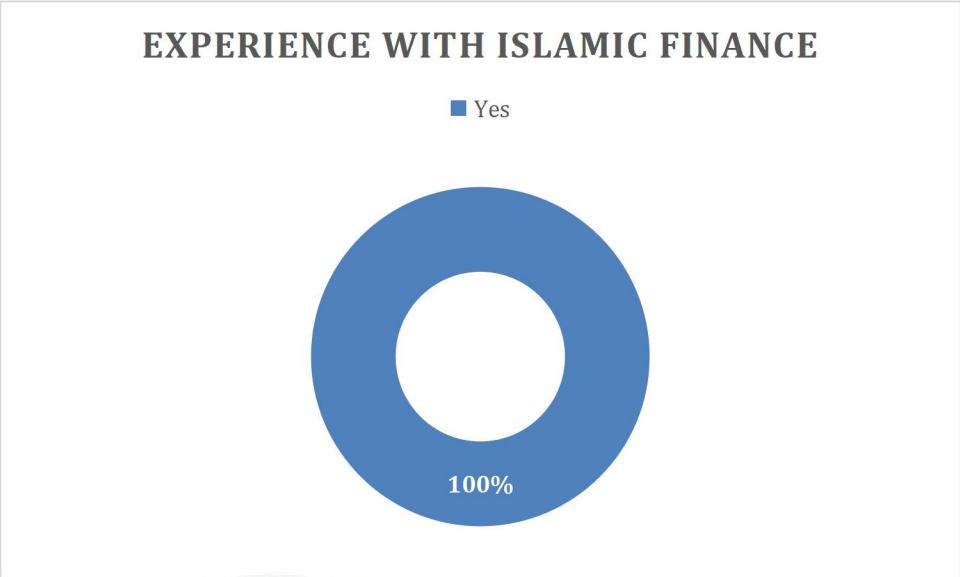


Figure 6: Respondent's Experience With Islamic Finance

Figure 6 express all 246 respondents stated "Yes", they have experience with Islamic finance.

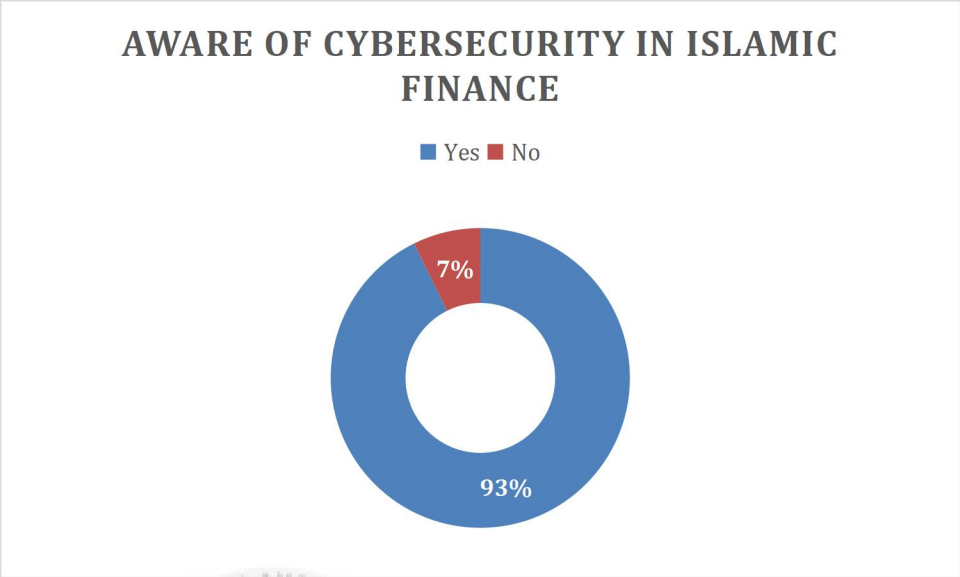


Figure 7: Respondent's Awareness Of Cybersecurity In Islamic Finance

In figure 7, the majority of respondents are aware of cybersecurity in Islamic finance with 228 respondents (92.7%), and only 18 respondents (3.7%) not aware of it.

4.3 Normality Test

Table 2 indicates the result demonstrated the Skewness and Kurtosis each items for testing normality distribution

Table 2: Measures Of Skewness And Kurtosis

Items	*Skewness*		*Kurtosis*	
	Statistics	Std. Error	Statistics	Std. Error
Decentralization	-.395	.155	.215	.309
Transparency	-.692	.155	.522	.309
Traceability	-.864	.155	.270	.309
Distributed ledger	-.668	.155	-.057	.309
Permissioned network	-.815	.155	-.193	.309
Sukuk (Bond)	-.298	.155	.238	.309
Zakat	-.779	.155	.024	.309
Wakaf (Donation)	-.746	.155	.380	.309

Gold investment	-.591	.155	.384	.309
Takaful (Insurance)	-.677	.155	.163	.309
Riba (Usury)	-.351	.155	.340	.309
Mudarabah contract	-.871	.155	.937	.309
Masyir (Gambling)	-.794	.155	.311	.309
Screening	-.446	.155	-.168	.309
Murabaha contract	-.971	.155	.214	.309
Coordinated payment	-.336	.155	.499	.309
Conditional payment	-.957	.155	.284	.309
Auditing	-.769	.155	.754	.309
Notification	-.497	.155	-.222	.309
Microfinance	-.946	.155	.182	.309
Privacy	-.739	.155	.627	.309
Scammer	-.962	.155	.562	.309
Convenience	-.914	.155	.645	.309
Shariah compliance	-.655	.155	-.191	.309
International	-.988	.155	.970	.309

In table 2, Skewness of all items shows negatively skewed, which also known as left-skewed distribution. The majority of Skewness are ranged between -1 and -0.5. This mean that the data are slightly skewed. Except for “Decentralization”, “Sukuk (Bond)”, “Riba (Usury) “, “Screening”, “Coordinated payment”, and “Notification” where the Skewness are ranged between -0.5 and 0.5. This mean the data are nearly symmetrical. For Kurtosis, all items has Kurtosis less than 3, it is said to be Playkurtic, which means it tends to produce fewer and less extreme outliers than the normal distribution.

4.4 Reliability Analysis

A 12-item survey has been developed by a researcher to measure the roles of cybersecurity on benefits in Islamic finance. There were seven questions about demographics and twenty-five questions using a 5-point Likert scale from "strongly disagree" to "strongly agree."

4.4.1 Pilot Test

Table 3 shows that cronbach's alpha was performed on a pilot test of 20 Islamic finance users to determine whether the questions in this questionnaire all consistently measure the

same latent variable (sense of security) so that a Likert scale can be established (Rahman, 2018).

Table 3: Cronbach's Alpha Coefficients For Pilot Test

Variables	*Number of Items*	*Cronbach's Alpha*
Security	5	.903
Islamic Assets Digitalization	5	.865
Shariah Compliance	5	.868
Smart Contract	5	.855
Benefits In Islamic Finance	5	.906

In table 3, coefficient alpha for pilot test was .903 for "Security", .865 for "Islamic Assets Digitalization", .868 for "Sharia Banking", .855 for "Smart Contract", and .906 for "Benefits In Islamic Finance". These result suggested that the reliability of variables exceeds the suggested cut-point off 0.7 and indicating scale reliability.

4.4.2 Data Collected

Table 4 illustrate that cronbach's alpha was performed on sample of 384 respondents to determine if the scale is reliable. From total of 384 respondents, only 246 respondents has submit the survey completely, where 114 respondents not submit the survey and 24 respondents not complete the survey. So, the coefficient alpha was run on 246 respondents.

Table 4: Cronbach's Alpha Coefficients For Collected Data

Variables	*Number of Items*	*Cronbach's Alpha*
Security	5	.793
Digitalization	5	.762
Shariah Banking	5	.767
Smart Contract	5	.785
Benefits in Islamic Finance	5	.798

The data collection is presented in Table 4 with the following coefficient alpha values, "Security" (.793), "Digitalization" (.762), "Shariah Banking" (.767), "Smart Contract" (.785), and "Benefits In Islamic Finance" (.798). By exceeding the 0.70 threshold, these results show that the variables exhibit acceptable reliability.

4.5 Correlation Analysis

4.5.1 Pearson Correlation

Table 5 potray the correlation of relationship between variables.

Table 5: Pearson Correlation Coefficient For Variables

	Security	*Digitalization*	*Shariah Banking*	*Smart Contract*	*Benefits In Islamic Finance*
Security	1	.869**	.825**	.842**	.770**
Digitalization	.869**	1	.908**	.894**	.865**
Shariah Banking	.825**	.908**	1	.865**	.821**
Smart Contract	.842**	.894**	.865**	1	.812**
Benefits In Islamic Finance	.770**	.865**	.821**	.812**	1

**. Correlation is significant at the 0.01 level (2-tailed)

Table 5 was performed correlation coefficient to evaluate that there strong positive relationship between “Security” and “Benefits In Islamic Finance", [r = .770, p <.001] and N = 246. There strong positive relationship between “Digitalization” and “Benefits In Islamic Finance”, [r = .865, p <.001], and N = 246. There strong positive relationship between “Shariah Banking” and “Benefits In Islamic Finance”, [r = .821, p <.001] and N = 246. There strong positive relationship between “Smart Contract” and “Benefits In Islamic Finance”, [r = .812, p <.001] and N = 246.

4.6 Regression Analysis

4.6.1 R-Square

Table 6 express statistical measure that shows how much of the variance in a dependent variable can be accounted for by an independent variable.

Table 6: Coefficient Of Determination

R	*R-Square*	*Adjusted R-Square*	*Std. Error*
.871	.759	.755	.25651

Based on table 6, the value of R = .871 showing strong positive relationship between variables. R^2 = .759 indicate that high correlation of independent variables being

significant to dependent variable. In this case 75.9% can be explained. For Adjusted R^2 = .755 where the number are smaller than R^2 but not so much different showing the model will be more accurate.

4.6.2 F-Value

Table 7 was analyszing of variance (ANOVA)

Table 7: ANOVA

Model	*Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*
Regression	49.986	4	12.497	189.930	<.001
Residual	15.857	241	.066		
Total	65.843	245			

Table 7 analyze that the result of regression where independent variable statistically significantly predict the dependent variable, [F (4,241) = 92.995, p <.001]

4.6.3 Regression Coefficients

Table 8 determine if there is significant difference between the means of two groups and how they related.

Table 8: Regression Coefficients

H	*Hypothesis*	*B-Value*	*T-Value*	*Sig.*	*Collinearity*	
					Tolerance	VIF
H1	There are significant relationship between security and benefits in Islamic finance	.014	.209	.835	.221	4.524
H2	There are significant relationship between digitalization and benefits in Islamic finance	.633	6.157	<.001	.112	8.900
H3	There are significant relationship between Shariah banking and benefits in Islamic finance	.170	1.945	.053	.159	6.285
H4	There are significant relationship between smart contract and benefits in Islamic finance	.155	1.937	.054	.172	5.804

Table 8 discuss that H1 has positive but not significant relationship where β= .014, [t = .209, p = .835], Tolerance = .221 and VIF = 4.524. H2 has positive and significant

relationship where β = .581, [t = 6.157, p <.001], Tolerance = .112 and VIF = 8.900. H3 has positive but not significant relationship where β = .154, [t = 1.945, p = .053], Tolerance = 1.59 and VIF = 6.285. H4 also has positive but not significant relationship where β = .148, [t = 1.937, p = .054], Tolerance = .172 and VIF = 5.804.

4.6.4 Hypothesis Result

Table 9 explain the results for hypothesis if they're significant or not.

Table 9: Result Of Hypothesis

H	*Hypothesis*	*Decisions*
H1	There are significant relationship between security and benefits in Islamic finance	Not significant
H2	There are significant relationship between digitalization and benefits in Islamic finance	Significant
H3	There are significant relationship between Shariah banking with benefits in Islamic finance	Significant
H4	There are significant relationship between smart contract and benefits in Islamic finance	Significant

Table 9 shows that only one hypothesis is not significant which is H1. For H2, H3 and H4, the result is significant.

4.6.5 Regression Equation

Benefits In Islamic Finance = 0.168 + (0.14*Security) + (0.633*Digitalization) + (0.170*Shariah banking) + (0.155*Smart contract)

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter summarizes and investigate the study findings from the previous chapter, which included descriptive and reliability analysis. Moreover, potential reasons and justifications will be provided to support the hypothesis. This chapter also discusses research implications, research limitation, and provide recommendations for future studies. Finally, the overall conclusion will be presented at the last section of this chapter.

5.2 Conclusion Of Research Objectives

5.2.1 To determine how much do the impacts of cybersecurity on benefits in Islamic finance

In research conducted, researcher find that cybersecurity have high impacts on benefits in Islamic finance . This is because in Table 6 in chapter 4, R^2 are equal to .759 indicate that high correlation of independent variables being significant to dependent variable. Secure communication channels and encryption are examples of cybersecurity methods that assist protect sensitive financial data. Ensuring the privacy of consumer data and financial transactions is important in Islamic finance to maintain its emphasis on privacy (Khan et al., 2023). Cybersecurity keeps prohibited modifications to data at a minimum, protecting the integrity of financial transactions. This is especially crucial in Islamic finance, as keeping to Sharia rules requires that financial records be accurate and unaltered.

5.2.2 To examine the strengths between the roles of cybersecurity on benefits in Islamic finance

After doing the research, the researcher came to the conclusion that the roles of cybersecurity have strong correlation relationship with benefits in Islamic finance. This is

because in Table 5 in chapter 4, correlation coefficient was performed and evaluate that there strong positive relationship between independent variables and dependent variable which each correlation shows strong positive relationship with value higher than .70. The goal of the study is to give a comprehensive grasp of the benefits that come with cybersecurity roles in Islamic finance. This will enable organizations looking to capitalize on these advantages to achieve better operational and security results (Osman et al., 2020).

5.2.3 To confirm the most important variable of the role of cybersecurity on benefits in Islamic finance.

In this study, researcher found that the most important variable of the role of on benefits in Islamic finance are digitalization. This because in Table 8 in chapter 4, digitalization shows the highest B-Value with .633. Digitalization of Islamic assets is converting conventional financial instruments into digital forms while abiding by Sharia law. This covers digital Islamic banking products, digital Islamic bonds (sukuk), and other financial assets that adhere to Sharia law. Transactions become more transparent and efficient as a result of digitalization (Chong, 2021). The implementation of smart contracts and cybersecurity technology can enable automated and impenetrable transactions, hence mitigating errors and augmenting transparency in the realm of Islamic finance.

5.3 Conclusion Of Research Hypothesis

5.3.1 Relationship between security and benefits in Islamic finance

H1: There are significant relationship between security and benefits in Islamic finance.

In this research, researcher found H1 has T-value are .209 and P-value are .835. From the hypothesis testing, H1 is rejected. It shows that enhanced security don't have significant relationship with benefits in Islamic finance. The main factor of this because lack of customers trust across financial sectors to protect their personal and financial data (Alhazmi, 2022). The rises number of cybercrime cases in Malaysia makes consumers

becoming increasingly concerned and want the financial industry to handle this issue seriously.

For example, as stated by Teo Nie Ching, Deputy Minister of Communications and Digital, there has been a concerning rise in cyberattacks in the country throughout the previous year. These attacks cover a wide variety of malicious actions, such as ransomware attacks, data breaches, cyber frauds, and cyber espionage projects. Cyber Security Malaysia (CSM) reports that as of February 2023, the nation had logged an outstanding numbers of cases which 4,741 cyber threat cases and 456 fraud cases.

For the reason above, enhanced security does not significantly impact into benefits in Islamic finance.

5.3.2 Relationship between digitalization and benefits in Islamic finance

H2: There are significant relationship between Islamic assets digitalization and benefits in Islamic finance.

In this research, researcher found H2 has T-value are 6.157 P-value are <.001. This result shows positive and significant relationship between digitalization and benefits in Islamic finance, which mean H2 are accepted. This is because Islamic digital assets are now a growing asset class that is beginning to penetrate the Islamic finance market and has drawn interest from numerous investors. According to research by IslamicMarkets.com in 2022 shows Over 57% of Islamic finance professionals predict a significant surge in digitalization within the next three years, while 40% predict slightly growth. The study concluded that more digitalization is necessary for the development of open banking, open finance, and embedded finance, with 88% of Islamic finance professionals questioned indicating that adoption will accelerate as a result of greater digitalization.

Based on hypothesis testing result, H2 is supported which shows that Islamic assets digitalization having significantly positive relationship with benefits in Islamic finance.

5.3.3 Relationship between Shariah banking and benefits in Islamic finance

H3: There are significant relationship between Shariah banking and benefits in Islamic finance

In this research, researcher found that H3 has T-value are 1.945 and P-value are .053. This result shows that Shariah banking has significant impact with benefits in Islamic finance, which result H3 to be accepted.

Malaysia has one of the most advanced banking systems in the world, along with a highly developed financial sector, despite the fact that Islamic banking and finance are still relatively new and rapidly expanding in Malaysia. Malaysia's Islamic banking sector has seen quick changes, and the country's Islamic financial climate has changed significantly as well. The product line now includes a wide range of cutting-edge equipment that use contracts other than Bai Bithaman Ajil (BBA) or Murabahah. A number of innovative Islamic banking instruments, such as residential mortgage-backed securities, commodity-based financing, and investment and equity-linked products based on Musharakah, Mudarabah, and Ijarah, have been created in the last few years (Saiti, 2015).

From the finding above, Shariah compliance banking has a correlated and significant relationship with benefits in Islamic finance.

5.3.4 Relationship between smart contract execution and benefits in Islamic finance

H4: There are significant relationship between smart contract and benefits in Islamic finance

In this research, researcher found that H4 has T-value are 1.937 and P-value are .054. This make H4 accepted in the hypothesis testing.

Businesses may create decentralized models thanks to cybersecurity technology, which also expands their options for conducting business and reaching agreements. Smart contracts are one of the technologies that offer an alternative to the conventional paradigm. With an unwavering focus on avoiding any form of doubt regarding contract settlement,

smart contracts are more akin to Islamic contracts. When Islamic contracts are self-executing digital or smart contracts with "electronically coded" terms of execution, one would observe a substantial reduction in the element of gharar associated with contracts between unknown parties that meet online. Only when the pre-configured requirements are satisfied will the contractual terms come into effect (Antova and Tayachi, 2019). That's why smart contract have significant relationship with benefits in Islamic finance.

5.4 Implications Of Research

5.4.1 Regulatory

Regulatory frameworks are collections of laws, rules, and policies that specify how financial institutions that engage in Islamic financing must behave. This includes, among other regulatory agencies in Malaysia, the Securities Commission Malaysia (SC), Bank Negara Malaysia (BNM), and the country's national bank. In order to guarantee that Islamic financial institutions adhere to cybersecurity and other legal obligations, regulatory organizations frequently require reporting and audits. Frequent evaluations contribute to the preservation of the financial system's integrity (Uddin and Mohiuddin, 2022).

5.4.2 Consumers Confidence

Customer confidence is the assurance, trust, and favorable opinion that people or organizations have about a good or service, or in this case, a financial institution that is involved in Islamic finance. In the world of Islamic finance, a stable and prosperous financial ecosystem depends on consumer confidence. Consumers are reassured by a display of a dedication to ongoing cybersecurity measure improvement. Timely updates, technological progress, and proactive measures for dealing with new risks can contribute an impact in building and maintaining confidence (Ibrahim and Mohd Sapian, 2023)

5.4.3 Collaboration

Financial institutions can work together inside the sector to share insights, best practices, and threat intelligence. This includes Islamic banks and other businesses in Malaysia. Working together can improve cybersecurity posture overall by utilizing

resources and expertise that are shared. Working together across several industries, including technology, government, and finance, is crucial for tackling challenging cybersecurity issues. More thorough cybersecurity plans in Malaysia may result from promoting cooperation between Islamic finance institutions and pertinent governmental organizations (Abd. Wahab et al., 2023).

5.5 Limitation Of Study

This study is not exempted from any limitations, and it is not a section for undermining the results, in fact, it shows this study aware of the limitations.

First, the sample selection only focus only in Islamic finance user in one of Malaysian states in Melaka. Consequently, the findings of this study are limited to only Islamic finance users in Melaka and do not represent the entire population of Islamic finance users.

Moreover, In the study, out of the approximately 384 surveys given out, only 246 are complete and contain responses, indicating a methodological restriction caused by incomplete and non-response questionnaires. If those who did not reply or gave insufficient information differ consistently from those who participated completely, this restriction may cause bias. Because the opinions and perspectives of non-respondents are not sufficiently represented in the study, it could have an effect on the findings' generalizability and validity.

And finally, researcher also facing limitation of time. One scheduling barrier is the requirement to only conduct surveys on weekends because of time constraints for both the researcher and respondents. Due to its potential to exclude the viewpoints of those who are unavailable or exhibit varying patterns of availability on weekends, this constraint may have an impact on the sample's representativeness. It might also take longer to gather data overall, which could have an impact on how timely the study is completed.

5.6 Recommendations For Future Research

Future research can expand the sample selection to other Malaysian states. This enable the researchers to obtain more responses and be able to further examine the roles of cybersecurity on benefits in Islamic finance in a bigger context with the consideration of different sample size of Islamic finance users and industries.

Moreover, future study may also use qualitative data collection methods by having interviews with experts to obtain in-depth understanding on the related research topic. Researchers may also conduct both quantitative and qualitative data collection methods, it allows the researchers to receive different perspectives and be able to compare the data collected. The researcher can also design the questionnaire items with a combination of open-ended questions and rating-scale questions. This enables the researchers to have a more in-depth understanding compared to only scale type questionnaires.

Lastly, further studies can include other potential roles of cybersecurity such as risk management, integrity, supply chain security, innovation support and availability. This allows the researchers to further examine how other roles of cybersecurity could influence the benefits of Islamic finance.

5.7 Summary

This research aims to analyze the roles of cybersecurity toward the benefits in Islamic finance. The findings in this research could be used to have more comprehensive understanding on how Islamic finance industries can improve their cybersecurity to protect their customers personal and financial data.

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APPENDIX

A: Questionnaire

THE ROLES OF CYBERSECURITY ON BENEFITS IN ISLAMIC FINANCE

I am a final year student from the Faculty of Technology Management and Technopreneurship (FPTT) at the Universiti Teknikal Malaysia Melaka (UTeM) conducting a survey about the roles of cybersecurity on benefits in Islamic finance.This questionnaire takes only a few minutes to complete. I hope that all of you can cooperate in helping to answer the questions that have been prepared. All information obtained in this review will be kept confidential and used for academic learning sessions only. Thank you for your time and your cooperation is greatly appreciated.

Referred by:
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PART A: DEMOGRAPHICS

Gender :

Male [ ]

Female [ ]

Age:

17 – 25 [ ]

26 – 35 [ ]

36 – 45 [ ]

46 – 55 [ ]

55 and higher [ ]

Status:

Single [ ]

Married [ ]

Engaged [ ]

Single father [ ]

Occupation:

Full time worker [ ]

Part time worker [ ]

Student [ ]

Retired [ ]

Not working [ ]

Monthly Income:

RM1000 and lower [ ]

RM1001 – RM2000 [ ]

RM2001 – RM3000 [ ]

RM3001 and higher [ ]

No monthly income [ ]

Experience with Islamic finance

Yes [ ]

No [ ]

Do you aware of cybersecurity in Islamic finance?

Yes [ ]

No [ ]

PART B: ROLES OF SECURITY

This section measures the independent variables of the research. Using a 5-point Likert scale, please mark the box with which you agree or disagree with the statement.

1. Strongly Disagree
2. Disagree
3. Somewhat Agree
4. Agree
5. Strongly Agree

Security:

	1	2	3	4	5
Decentralization of data can enhance customer trust					
Transparency can improve customer financial transaction					
Traceability can preventing fraud					
Distributed ledger (transaction validity) can help customer economically					

Safe access (with permission) to network is preferred						

Digitalization:

	1	2	3	4	5
Sukuk (Bond) can reflect customer level of sincerity					
Zakat can be accordance with Islamic principles					
The management of Wakaf (donation) should be simplified					
The risks of gold investments can be reduced					
Takaful (insurance) services can be more reliable					

Shariah Banking:

	1	2	3	4	5
Riba can be avoided					
Mudarabah contract can build confidence in partnership					
Masyir (gambling) can be prohibited					
Screening of investments are align with religious values					
Murabaha contract can strengthen budgetery					

Smart Contract:

	1	2	3	4	5
Income payment will be fairly coordinated					
Conditional (contingent) payment will be uphold					

Account auditing will be more manageable					
Customer receive notification of their cash flow					
Microfinance outcomes is promising					

PART C: BENEFITS IN ISLAMIC FINANCE

This section measures the dependent variable of the research. Using a 5-point Likert scale, please mark the box with which you agree or disagree with the statement.

1. Strongly Disagree
2. Disagree
3. Somewhat Agree
4. Agree
5. Strongly Agree

Benefits of cybersecurity in Islamic finance:

	1	2	3	4	5
Privacy can be protected					
Scam activities can be avoided					
Transaction process can be more convenience					
The Shariah compliance is guaranteed					
International transaction can be more secured					

B: Gantt Chart

Gantt Chart of Final Year Project (FYP) 2

WEEK/ ACTIVITIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Constructing the survey									MID SEMESTER BREAK							
Distribute the survey online																
Data Collection																
Data Analysis																
First Draft Submission																
Chapter 3 and 4 Correction																
Report finalization																
Final Presentation																
Submission of FYP 2																

C: Krejcie And Morgan Table

N	*S*	*N*	*S*	*N*	*S*
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

Note.—*N* is population size. *S* is sample size.

Source: Krejcie & Morgan, 1970