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# EXPLORING CUSTOMER LOYALTY DRIVERS IN INDONESIAN ISLAMIC BANK AFTER CYBERSECURITY BREACHES USING SEM APPROACH

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## ABSTRACT

This study explores the factors influencing customer loyalty at Bank Syariah Indonesia (BSI) after cyberattacks, using the Expectation Confirmation Theory (ECT) as the theoretical framework. A quantitative approach with Partial Least Squares-Structural Equation Modeling (PLS-SEM) is applied, analyzing data from 225 customers affected by service disruptions, ATM use, and Mobile Banking. The findings indicate that customer loyalty is significantly affected by service quality, religiosity, and customer trust. Furthermore, customer trust after a cyberattack is significantly influenced by service quality and religiosity. The Compliance, Assurance, Reliability, Tangibles, Empathy, and Responsiveness (CARTER) model is used to measure service quality, emphasizing both technical and ethical aspects. The results highlight the importance of successful crisis management, clear communication, improved security, and compensating customers in retaining and potentially growing the customer base post-attack. This research underscores the significance of the CARTER model in evaluating service quality and the role of religiosity in fostering customer loyalty. The study emphasizes that Islamic banks should integrate technical and ethical aspects of service to minimize negative impacts and maintain customer loyalty.

*Keywords: Customer loyalty, Cyber-attack, Expectation confirmation theory (ECT), Islamic banks, PLS-SEM, CARTER model, Service quality.*
**JEL classification: G21; M31; K42; D83; C38**.

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## I. INTRODUCTION

Islamic banking in Indonesia has shown impressive performance across different indicators, surpassing conventional banking. Islamic banking assets increased by 15.63% in 2022, a notable rise compared to the 9.50% growth in conventional banking in the same year (OJK, 2022). This substantial increase in assets highlights the potential of the Islamic financial industry to support the Indonesian economy. In 2022, Islamic banking accounted for 7.31% of the overall banking industry in Indonesia (Bank Indonesia, 2023). Islamic banking is well-positioned to support financial system stability and encourage sustainable economic growth due to its current momentum (Ikhwan & Riani, 2023).

Baank Syariah Indonesia (BSI) is the most prominent Islamic bank in Indonesia's Islamic banking sector. BSI is the merger of three leading Islamic banks: PT Bank BRI Syariah Tbk, PT Bank Syariah Mandiri, and PT Bank BNI Syariah. BSI strives to become a leading Islamic bank in Indonesia and provide Islamic financial choices. BSI is expected to be competitive internationally, act as a new catalyst for the country's economic development, and contribute to the long-term welfare of society and the environment. Ibrahim & Indra (2021) state that the Islamic banking's impact on inclusive growth in Indonesia is significant. BSI is the top choice for customers looking for financial services that adhere to Sharia principles, as it is the largest bank in the industry.

BSI underwent significant service disruptions stemming from a cyber-attack on 8 May 2023, significantly affecting its functioning and public image. The interruption, widely reported in the news, led BSI to stop offering some services such as mobile banking and ATM usage, making customers unable to make transactions. The occurrence impacted both customers and garnered broad public interest, resulting in diverse emotional and economic reactions to this cyber-attack (CNBC, 2023).

Cyber disruptions present significant risks to financial institutions, especially banks. A study by Hogan et al. (2023) finds that cyberattacks can interrupt online banking services, cause problems to customers, suppress stock prices, and undermine public trust in the banking industry. Moreover, financial institutions may also face regulatory penalties and significant financial damages due to the attack (Tosun, 2021).

Despite the significant service disruption caused by a cyberattack in May 2023, BSI saw a surprising increase in its customer base, reaching 19.65 million by December 2023, a 10.53% growth from the previous year (Aprilia, 2024). This unexpected trend suggests unique patterns in customer behaviour following such incidents, warranting further investigation. Understanding the factors contributing to customer loyalty at Bank Syariah Indonesia post-cyber attack is crucial to assessing its resilience. Expectation Confirmation Theory (ECT) provides a useful framework to explain this phenomenon. According to ECT, customer loyalty is shaped by how well the service experience aligns with their initial expectations. In BSI's case, many customers may have remained loyal despite the technical difficulties because their expectations of the bank's commitment to Sharia principles and ethical standards outweigh the temporary disruption. Critical factors like religiosity and trust in BSI's adherence to Islamic banking

values likely play a significant role in maintaining customer loyalty, even in the face of operational setbacks.

Therefore, understanding the impact of cyberattacks, which lead to service disruptions, on customer perceptions and loyalty at Bank Syariah Indonesia is critical. Investigating the factors influencing customer loyalty after service interruptions at BSI is vital for expanding knowledge in this area. This study is expected to provide valuable insights for readers, serve as a foundation for future academic studies, and offer practical guidance for banks in strengthening customer loyalty amidst growing global uncertainty.

## II. LITERATURE REVIEW

### 2.1. Expectation Confirmation Theory (ECT)

This study utilizes ECT as its main theoretical framework. Developed by Richard L. Oliver in 1977 and 1980, ECT is a cognitive theory that underpins the relationship between expectations, perceived performance, belief confirmation, and satisfaction in post-purchase or post-adoption contexts. Researchers have widely used ECT to assess consumer satisfaction and behavioural intentions (Oliver, 2014; Aurier & Guintcheva, 2014). It is commonly applied to study customer satisfaction and repurchase decisions after a product is purchased (Ashfaq et al., 2019). Recent studies continue to demonstrate the relevance of ECT. For instance, Alsokkar et al. (2024) propose a trust-based expectation confirmation model, offering improved insights through an indexed approach. Additionally, ECT has been used to analyze how review quality and ratings influence online review engagement (Lee & Kim, 2020) and how expectation confirmation, combined with brand awareness and flow theory, affect satisfaction in mobile shopping apps (Rahi et al., 2025). These applications highlight ECT's broad relevance in understanding consumer behaviour.

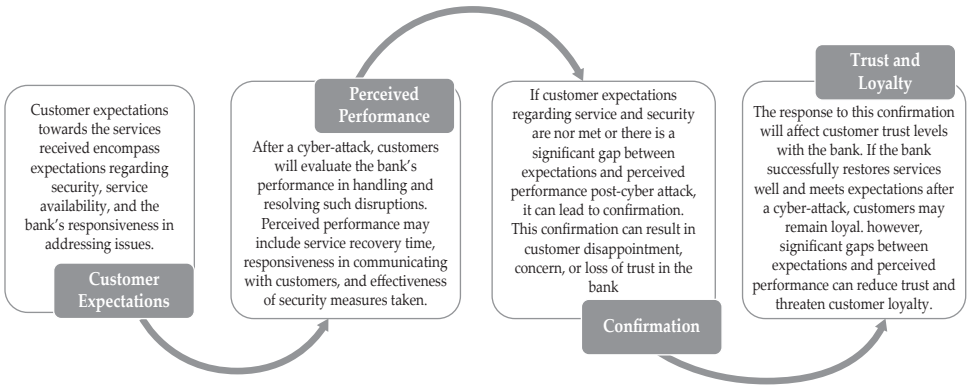


**Figure 1.**
**Integrating the Expectation Confirmation Theory (ECT) with Cyber Attack Loyalty among Indonesian Sharia Banks**

In this study, service quality, satisfaction, religiosity, and customer loyalty are examined through the lens of ECT. ECT, chosen as the theoretical framework, facilitates a comprehensive analysis of how customers' initial expectations regarding Islamic banking services influence their perceptions of bank performance. This theory also elucidates how the disconfirmation of these expectations affects trust and, ultimately, customer loyalty. Specifically, this study identifies religiosity as a critical factor impacting customer loyalty in Islamic banking. By integrating these variables within the ECT framework, the research aims to enhance the theoretical understanding of the interrelationships between these factors in Islamic finance.

### 2.2. Loyalty

Loyalty generally refers to an organization's commitment, dedication, and support towards specific values, goals, or groups that have earned its trust and allegiance. In business and marketing, loyalty often signifies the relationship between customers, brands, or companies (Alrubaiee & Al-Nazer, 2010). Customer loyalty is crucial in the financial sector, particularly in Islamic banking. It encompasses satisfaction, commitment, and continued engagement with institutions that offer Sharia-compliant products and services. As Hasan et al. (2021) note, customer loyalty in Islamic banking is influenced by the quality of products and services, ethical factors, and adherence to Islamic values. Loyalty in Islamic banking extends beyond the traditional customer-institution relationship, reflecting customers' commitment to Islamic principles and trust in Sharia-compliant institutions.

Asnawi et al. (2020) emphasize that customer satisfaction, especially in transparency, fairness, and compliance with Sharia principles, is pivotal in fostering loyalty in Islamic banking. Meanwhile, Tabrani et al. (2018) argue that understanding customer loyalty requires looking beyond conventional aspects like product quality and service efficiency. They highlight that trust and integrity in customer relationships are essential for building loyalty. Furthermore, Wijaya et al. (2022) propose that customer loyalty in Islamic banking also represents a commitment to Islamic moral and ethical values, linking financial satisfaction to a broader ethical commitment based on Sharia principles.

### 2.3. Trust and Its Relationship with Loyalty

Trust is a fundamental psychological concept essential to both interpersonal relationships and business transactions, and is characterized by the willingness to depend on a credible and benevolent partner (Doney & Cannon, 1997). In the banking sector, trust arises from vulnerability, risk, and reliance on a service provider's future actions (Ennew & Sekhon, 2007), whereas in Islamic banking, it is rooted in adherence to Sharia principles that assure capability, integrity, and benevolence (Tabrani et al., 2018; Yuen et al., 2018). Consequently, trust underpins customer loyalty and satisfaction, reinforced by service quality aligned with Sharia values (Sangeetha & Mahalingam, 2011), and transparent compliance across all operational facets (Maslihatin & Riduwan, 2020).

Previous studies have highlighted that trust significantly influences customer choices mediated by satisfaction and perceived value (Fauzi & Suryani, 2019;

Kashif et al., 2015; Abror et al., 2022). Empirical findings confirm that trust positively affects loyalty (Darmawan, 2018), underscoring the importance of trust-building strategies (Agyei et al., 2020). In the face of cyber disruptions, trust in a bank's capacity to manage security risks is paramount, reinforcing loyalty and engagement. Accordingly, we propose the following hypotheses:
***Hypothesis 1:*** *Trust positively influences customer loyalty post-cyber attack*

### 2.4. Service Quality and Its Relationship with Trust and Loyalty

Service quality is a cornerstone of marketing and business administration and is defined by Gronross (1988), as the outcome of interactions between service providers and customers. In the Islamic banking context, service quality merges technical competence with ethical standards and Sharia compliance (Riyadi, 2019), supporting long-term customer retention by addressing religious and practical needs (Kontot et al., 2016). High-quality services have been shown to attract new customers, retain existing ones (Rahman, 2004), and expand market share (Dick, 2007), underscoring their strategic importance for organizational success (Li et al., 2021).

The Compliance, Assurance, Reliability, Tangibles, Empathy, and Responsiveness (CARTER) model by Othman & Owen (2001) provides a structured framework for evaluating service quality in Islamic banking (Lone et al., 2017; Mulazid et al., 2020), emphasizing Sharia principles and unique Islamic values. Prior research also links service quality to elevated customer loyalty (Haron et al., 2020; Zafar et al., 2012; Al Hakim & Maamari, 2017; Riduwan et al., 2022), particularly vital during cyberattacks when customers look to banks for security assurance.

Moreover, service quality elements such as honesty, empathy, and clear communication are critical for reinforcing trust (Yuen et al. 2018), especially within an Islamic framework where adherence to Sharia principles can bolster perceptions of integrity (Mansori,Vaz & Mohd Ismail, 2014; Ismail & Sheriff, 2016). Drawing on these findings, this study proposes two hypotheses to explore the impact of service quality on loyalty and trust post-cyberattack in Indonesian Islamic banks:
***Hypothesis 2:*** *Service Quality positively influences customer trust post-cyber attack*
***Hypothesis 3:*** *Service Quality positively influences customer loyalty post-cyber attack*

### 2.5. Religiosity and Its Relationship with Trust and Loyalty

Religiosity represents an individual's commitment to religious beliefs and practices, encompassing both intrinsic devotion and socially influenced expressions of faith (Allport & Ross, 1967). In the Islamic banking context, religiosity underpins the preference for Sharia-compliant products such as interest-free financing and halal investments, reinforcing consumer adherence to Sharia principles (Junaidi et al., 2022; Wahyoedi et al., 2021). These preferences guide customers to opt for and maintain relationships with Islamic banks, emphasizing religious devotion as a vital factor in financial decision making (Abror et al., 2022). Strong faith also motivates individuals to avoid conventional banking in favor of Islamic alternatives (Mansori, Safari, & Mohd Ismail, 2020), making it essential for Islamic

financial institutions to recognize and address diverse levels of religiosity (Abror et al., 2020). Such institutions strengthen their engagement and trust by aligning marketing strategies with religious values, offering Sharia-compliant services, and upholding ethical standards rooted in Islamic principles.

In the event of a cyberattack, religiosity can be pivotal for sustaining loyalty, as devout customers are more inclined to remain committed to banks that demonstrate compliance with Sharia and risk management aligned with religious guidelines (Junaidi et al. 2022; Wahyoedi et al. 2021). Moreover, belief in a bank's adherence to Sharia-based principles bolsters trust, even when cybersecurity is challenged, as customers perceive the institution's ethical and protective measures to be reinforced by religious obligations (Abror et al., 2020, 2022). Building on these insights, we posit the following hypothesis:

***Hypothesis 4:*** *Religiosity positively influences customer trust post-cyber attack*

***Hypothesis 5:*** *Religiosity positively influences customer loyalty post-cyber attack*

**2.6. Previous Study**

Cyber service disruptions present a significant risk to financial institutions, especially banks, because they can lead to severe consequences. Numerous research has emphasized notable effects of cyberattacks on financial institutions, especially regarding service interruptions, customer confidence, and financial security. Hogan et al. (2023) point out that these attacks can potentially interrupt online banking services, cause inconvenience to customers, impact stock prices negatively, and reduce public trust in the banking system. Financial institutions can also incur regulatory sanctions and significant financial losses due to added risks posed by cyberattacks (Tosun, 2021). Demirgüç-Kunt et al. (2020) state that cyberattacks can result in significant financial losses and have the potential to disrupt financial stability if not effectively managed.

Kopp et al. (2017) find that cyberattacks targeting financial institutions can lead to significant operational disturbances and diminish trust in the banking industry among customers. Furthermore, Bouveret (2018) study reveals that the expenses related to recovering from cyberattacks and the damage to reputation are frequently more significant than the actual monetary losses suffered. Another research conducted by Kamiya et al. (2021) discovers that customer distrust caused by cyberattacks can lead to reduced customer loyalty and adversely affect the overall profitability of financial institutions.

Cyber-attacks are a global issue, with the banking sector frequently targeted through tactics like blind phishing and spear phishing (Tn & Shailendra Kulkarni, 2023). Boungou (2023), notes that cyberattacks in the U.S. reduce bank performance, as seen in decreased Return on Assets (ROA), affecting intermediation, deposits, and lending. In Qatar, banks like Qatar National Bank (QNB) and Doha Bank are enhancing cybersecurity through structured plans. Al-Dosari et al. (2024) highlight the vital role of cybersecurity in Qatar's economic sustainability, identifying challenges in implementing AI-driven cybersecurity within financial institutions.

In conclusion, various studies consistently show that cyberattacks negatively affect financial institutions, harming banks' reputations. This highlights the need for creative and efficient security measures to safeguard financial institutions

against increasingly intricate and harmful dangers. An in-depth comprehension of cybersecurity risks and solutions is essential for ensuring proper protection for the financial sector.

More research is needed on cyberattacks in the Islamic banking sector, as the current research is inadequate. Most existing case studies and academic writings focus on financial institutions and the banking industry. However, there remain to be more resources discussing cyberattacks aimed at Islamic banks, especially in developing countries. More research is needed on how Islamic banking, adhering to Shariah principles and unique product structures, could be vulnerable and responsive to cyber threats.

Indonesia is selected for this study due to its large Muslim population and rapidly expanding Islamic banking sector. Data from the Financial Services Authority (OJK) shows that Islamic banking assets in Indonesia have been consistently growing. However, the increasing reliance on technology in banking raises the risk of cyberattacks. Thus, examining the effects of cyberattacks on Indonesia's Islamic banking sector is crucial to addressing research gaps and developing security protocols for the industry. This study is expected to provide valuable insights for regulators, practitioners, and scholars to develop strategies and optimal approaches to improve resilience.

## III. RESEARCH METHOD

### 3.1. Sampling and Sample

This study samples customers of Bank Syariah Indonesia (BSI) who directly experienced service disruptions due to cyberattacks, actively use BSI services, and have access to ATMs and Mobile Banking. It gathers information from 225 participants from various provinces in Indonesia. The use of 225 respondents is based on the guideline of Partial Least Squares- Structural Equation Modeling (PLS-SEM), which recommends a minimum sample size of 10 times the number of indicators in a complex model (Barclay et al., 1995; Hair et al., 2011). In this study, there are 20 indicators, so the recommended minimum sample size is 200 respondents. By selecting 225 respondents, this study meets the minimum sample size requirement. Initially, the participants were asked several screening questions to confirm they met the requirements. Afterward, the surveys were sent out via an internet-based platform, and participants were asked to provide personal details before responding to the survey's questions or statements. Next, the participants completed all of the provided questions or statements.

### 3.2. Model Development

Building on the theoretical foundations and prior empirical evidence, Figure 2 delineates the conceptual framework that underpins this study. In this model, service quality and religiosity are defined as exogenous latent variables that influence trust, which serves as an intervening (mediating) latent construct. The interplay between these factors converges with loyalty, which is an endogenous outcome central to this research. Service quality reflects the full range of Sharia-compliant banking practices, encompassing compliance, assurance, and tangible

service delivery, while religiosity represents customer dedication to Islamic values and principles. By positing a mediating role for trust, the framework suggests that not only do high-quality services enhance customers' perception of a bank's competence and integrity but congruence with religious expectations also fortifies the sense of ethical alignment. This dual reinforcement of trust paves the way for a stronger customer loyalty.

This conceptual model is particularly crucial for Bank Syariah Indonesia (BSI) given its ongoing digital transformation. Although the adoption of new technologies creates pathways for service innovation and market growth, it also heightens cyber-related vulnerabilities, which may erode customer confidence and retention. Consequently, understanding how service quality, religiosity, and trust jointly sustain loyalty during periods of technological disruption is strategically important. As illustrated in Figure 2, investigating these interrelationships provides clarity on the pathways that lead to deeper customer engagement, and highlights the importance of robust Sharia compliance, ethical financial practices, and proactive trust-building initiatives. Maintaining resilience in a rapidly digitizing landscape requires simultaneously delivering superior services, upholding religious principles, and fortifying trust in Islamic banking institutions.

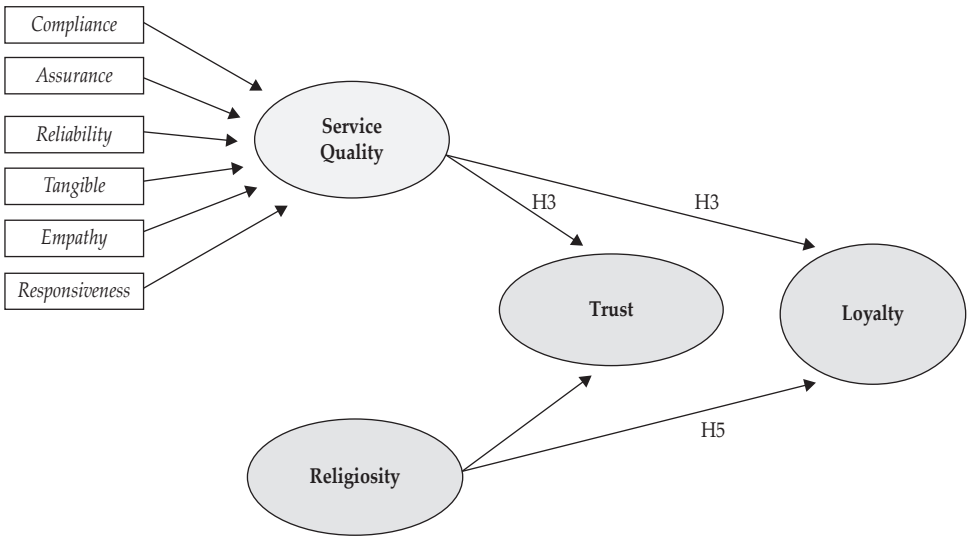


**Figure 2.**
**Model Development**

### 3.2.1. Research Instrument

This study investigates the factors influencing customer loyalty at Bank Syariah Indonesia (BSI) following cyberattacks by examining the causal relationships between several latent variables, as illustrated in Figure 2. Using latent variables indicates the necessity of manifest variables that represent the measurement of each latent variable. In this study, the measurement of each latent variable is based on its underlying concept, followed by identifying relevant manifest variables,

which have been drawn from previous studies. These manifest indicators are then utilized in a questionnaire, which serves as the data collection tool for this research (see Table 1). This approach ensures precise measurement and analysis of the variables related to customer loyalty.

**Table 1.**
**The Items of Questionnaire**

| Variable | Indicator | Source |
|---|---|---|
| **Service Quality (CARTER Model)** Compliance | Bank Syariah Indonesia (BSI) always adheres to Sharia principles in its operations, even after the cyberattack.<br>BSI provides clear and transparent information about Sharia products and services.<br>BSI demonstrates consistent commitment to Sharia compliance post-cyberattack. (C) | (Riyadi, 2019; Tabash et al., 2019) |
| Assurance | BSI prioritizes transparency and accountability in its operations, including after the cyberattack.<br>BSI assures that its Sharia services continue to prioritize justice and integrity after the cyberattack.<br>I feel that BSI's explanations regarding customer protection and fund security are quite adequate. (A) | Othman & Owen, 2001; Ramadani & Sanusi, 2018) |
| Reliability | BSI operates consistently and reliably, even amid a cyberattack.<br>In my experience, the services provided by BSI continue to run smoothly and reliably despite disruptions.<br>I feel that BSI provides adequate information regarding service schedule changes or potential disruptions. (R) | (Othman & Owen, 2001; Qureshi et al., 2012; Ashraf, 2014; Janahi & Al Mubarak, 2017). |
| Tangible | The physical facilities of BSI give a professional and well-maintained impression.<br>The customer service area and waiting rooms at BSI maintain a representative atmosphere despite the cyberattack.<br>BSI pays special attention to physical and technological aspects to enhance their service quality after the cyberattack. (T) | Othman & Owen, 2001; Fauzi & Suryani, 2019; Qureshi et al., 2012) |
| Empathy | I feel that the employees of Bank Syariah Indonesia pay attention to my needs and concerns.<br>The employees of Bank Syariah Indonesia provide good responses to my needs and requests.<br>I feel that the employees of Bank Syariah Indonesia are willing to help and provide solutions when I encounter problems or difficulties. (E) | (Othman & Owen, 2001; Qureshi et al., 2012) |
| Responsibility | The staff at Bank Syariah Indonesia are always available and ready to assist when needed, especially after a cyberattack.<br>Communication between Bank Syariah Indonesia and customers is effective and responsive.<br>The information provided by Bank Syariah Indonesia is always transparent and easily understood by customers. (R) | (Al Qureshi et al., 2012; Fauzi & Suryani, 2019) |

**Table 1.**
**The Items of Questionnaire (Continued)**

| Variable | Indicator | Source |
|---|---|---|
| **Religiosity** | My understanding of the prohibition of riba influences my decision to use banking services from Bank Syariah Indonesia. (RG1)<br>My understanding of religious values influences my preference for financial institutions, especially Bank Syariah Indonesia. (RG2)<br>I am committed to adhering to the principles of my religion in every financial transaction I undertake. (RG3)<br>Sharia principles, including the prohibition of maysir (gambling), gharar (uncertainty), and riba, are key factors in choosing Bank Syariah Indonesia as my preferred financial institution. (RG4) | (Junaidi et al., 2022; Wahyoedi et al., 2021; Abror et al., 2022; Mansori et al., 2020; Abror et al., 2020). |
| **Trust** | I am confident that Bank Syariah Indonesia (BSI) adheres to Sharia principles in all its services, even after a cyberattack. (T1)<br>I believe that Bank Syariah Indonesia (BSI) safeguards customer funds with integrity. (T2)<br>I trust that Bank Syariah Indonesia (BSI) always provides honest and transparent information to its customers. (T3)<br>I believe that Bank Syariah Indonesia (BSI) maintains the confidentiality of customer information well. (T4) | (Agyei et al., 2020; Darmawan 2018; Abror et al., 2022; Haron et al., 2020; Maslihatin & Riduwan, 2020) |
| **Loyalty** | I tend to choose Bank Syariah Indonesia as my primary option for financial transactions. (L1)<br>I intend to continue using products and services from Bank Syariah Indonesia in the future. (L2)<br>I am willing to recommend Bank Syariah Indonesia to my friends, family, or business associates. (L3)<br>Despite other banking options available, I prefer using products and services from Bank Syariah Indonesia. (L4)<br>I feel proud to be a customer of Bank Syariah Indonesia. (L5)<br>I have a long-term commitment to continue using products and services from Bank Syariah Indonesia. (L6) | (Hasan et al., 2021; Asnawi et al., 2020; Tabrani et al., 2018; Wijaya et al., 2022; Fianto et al., 2020) |

### 3.3. Analytical Approach

This study takes a quantitative approach to explore how cyberattacks affect customer loyalty. Using a deductive approach, hypotheses are developed based on established theories. The partial least square-structural equation modeling (PLS-SEM) method is chosen because it allows for assessing hidden factors, such as post-cyberattack customer loyalty. Henseler et al. (2014) highlight PLS-SEM as valuable for analyzing various factors in complex datasets. PLS-SEM is selected for its widespread use in analyzing intricate models, particularly endorsed in Islamic economics and finance (Sarstedt et al. 2021; Ascarya & Tekdogan, 2022). Hair et al. (2019) also assert that PLS-SEM effectively handles issues related to sample size, model fit, and distribution assumptions.

In evaluating the measurement model, this study assesses convergent validity, indicator collinearity, statistical significance, and other relevant indicator weights (Hair et al., 2019). To interpret the results, this study adheres to specific guidelines: Cronbach's Alpha should exceed 0.70 (Hair et al., 2017) or at least 0.6 (Hair et al., 2014) for internal consistency reliability, while Composite Reliability (CR) and rho_A should surpass 0.70 (Hair et al., 2017). Convergent validity is evaluated through Average Variance Extracted (AVE), which is expected to exceed 0.50 (Henseler et al., 2009; Chin, 1998; Hair et al., 2019), and Loading Factors of indicators should be above 0.7 (Hair et al., 2017). This rigorous approach ensures the analysis results' validity, reliability, and trustworthiness.

## IV. RESULTS AND DISCUSSION

### 4.1. Descriptive Statistics

This research uses purposive sampling to select Bank Syariah Indonesia's (BSI) customers who experienced service interruptions due to cyber-attacks. Table 2 presents the demographic profile of the respondents: 52% female, 48% male, with most aged 18-25 (70.22%) and holding a bachelor's degree (62.22%). Most are from Java (43.11%) or Sumatra (40%), and 81.33% have used BSI services for 2-3 years. Respondents' occupations include students (54.22%), lecturers, and private employees. These demographics provide context for analyzing customer loyalty during cyber disruptions.

**Table 2.**
**Demographic Respondent**

| Demographic Variables | N | % |
|---|---|---|
| **Gender** | | |
| Female | 117 | 52.00 |
| Male | 108 | 48.00 |
| **Age** | | |
| 18-25 Years Old | 158 | 70.22 |
| 26-35 Years Old | 44 | 19.56 |
| 36-55 Years Old | 23 | 10.22 |
| **Education** | | |
| Bachelor Degree | 140 | 62.22 |
| Master/Doctoral Degree | 65 | 28.89 |
| High School | 20 | 8.89 |
| **Location** | | |
| Sumatera | 90 | 40.00 |
| Java | 97 | 43.11 |
| Kalimantan | 18 | 8.00 |
| Sulawesi | 9 | 4.00 |
| Nusa Tenggara and Papua | 11 | 4.89 |
| **Duration of Use** | | |
| 1-2 years | 42 | 18.67 |
| 2-3 years | 183 | 81.33 |

**Table 2.**
**Demographic Respondent (Continued)**

| Demographic Variables | N | % |
|---|---|---|
| **Job** | | |
| Student | 122 | 54.22 |
| Lecturer | 51 | 22.67 |
| Private Employees | 20 | 8.89 |
| Civil Servant | 9 | 4.00 |
| Enterpreneur | 8 | 3.56 |
| Others | 15 | 6.67 |

### 4.2. PLS-SEM Estimation Results

The findings of the SEM analysis, as shown in the path model (see Figure 3), suggest a strong alignment between the data and the proposed model. In the depiction of the path model, every arrow connecting two variables represents a pathway that shows the direction and intensity of their correlation. This structural framework allows for a thorough understanding and visualization of how the variables in the research context are interconnected and explained.

The results of this examination reveal how the variables studied interact, offering a better understanding of the extent and characteristics of these interactions as supported by the data gathered. The path coefficients determine the strength of the relationships between variables, providing a quantitative measure of one variable's impact on another and enhancing our comprehension of the dynamics within the research framework.

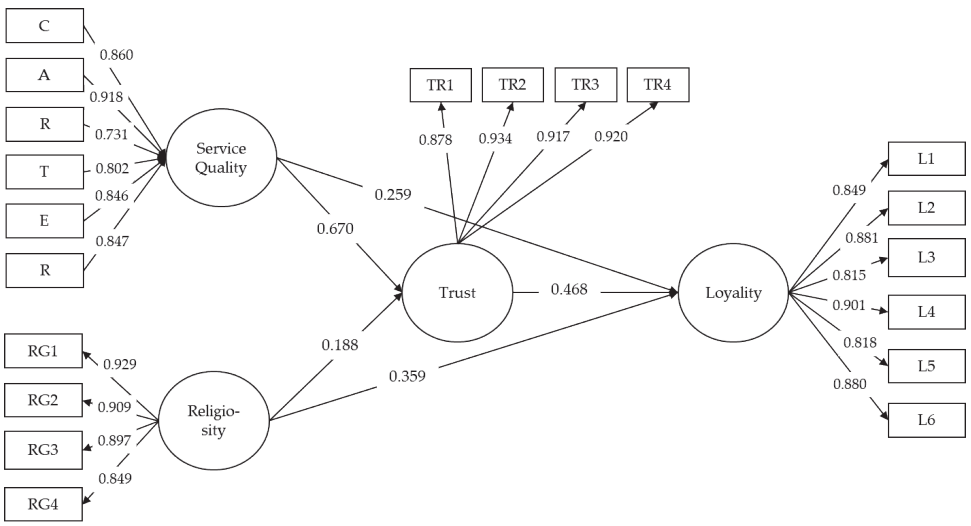


**Figure 3.**
**PLS-SEM Final Result Diagram**

### 4.2.1. Measurement Model Evaluation Results

Convergent and discriminant validity are critical components of construct validity in SEM. Convergent validity confirms that indicators accurately represent the underlying concepts they are designed to measure. The Average Variance Extracted (AVE) and the Loading Factor are main indicators used to assess convergent validity. An AVE value above 0.5 indicates that the latent construct captures more than half of the variance in the indicators, demonstrating strong convergent validity. Additionally, each item's loading factor should exceed 0.5, reflecting a strong relationship between the indicators and their respective constructs, confirming convergent validity (Henseler et al., 2009; Chin, 1998; Hair et al., 2019).

Discriminant validity, conversely, ensures that concepts or measures that are supposed to be distinct are genuinely different. Two methods for assessing discriminant validity are cross-loading and square roots of AVE. To establish discriminant validity, an indicator should load higher on its construct than on any other. Additionally, according to the Fornell-Larcker criterion, the square root of each construct's AVE must exceed its correlations with other constructs, ensuring that constructs are more strongly related to their indicators than others.

Reliability testing assesses the measurement instrument's internal consistency through Composite Reliability (CR) and Cronbach's Alpha. A composite reliability value higher than 0.7 shows sufficient internal consistency, indicating that the indicators accurately assess the underlying construct. In the same way, a Cronbach's alpha value higher than 0.7 is deemed satisfactory, showing that the scale is reliable among various items (Hair et al., 2017). Hair et al. (2014) state that meeting these reliability and validity thresholds demonstrates the strength of the measurement model.

**Table 3.**
**Convergent and Discriminant Validity**

| Items | Loadings | AVE | Alpha | CR | rho_A |
|---|---|---|---|---|---|
| **Service Quality (CARTER Model)** | | 0.715 | 0.920 | 0.938 | 0.924 |
| Compliance | (0.860) | | | | |
| Assurance | (0.918) | | | | |
| Reliability | (0.731) | | | | |
| Tangible | (0.802) | | | | |
| Empathy | (0.846) | | | | |
| Responsibility | (0.847) | | | | |
| **Religiosity** | | 0.804 | 0. 918 | 0.942 | 0.925 |
| RG1 | (0.929) | | | | |
| RG2 | (0.909) | | | | |
| RG3 | (0.897) | | | | |
| RG4 | (0.849) | | | | |
| **Trust** | | 0.833 | 0.933 | 0.952 | 0.934 |
| TR1 | (0.878) | | | | |
| TR2 | (0.934) | | | | |
| TR3 | (0.917) | | | | |
| TR4 | (0.920) | | | | |

**Table 3.**
**Convergent and Discriminant Validity (Continued)**

| Items | Loadings | AVE | Alpha | CR | rho_A |
|---|---|---|---|---|---|
| **Loyalty** | | 0.736 | 0.928 | 0.944 | 0.930 |
| L1 | (0.849) | | | | |
| L2 | (0.881) | | | | |
| L3 | (0.815) | | | | |
| L4 | (0.901) | | | | |
| L5 | (0.818) | | | | |
| L6 | (0.880) | | | | |

Table 3 shows the validity and reliability test results for the constructs. Factor loadings indicate strong item-construct associations for Service Quality (0.715), Religiosity (0.804), Trust (0.833), and Loyalty (0.736), confirming good validity. AVE values above 0.5 for all constructs confirm convergent validity. Cronbach's Alpha values for Religiosity (0.918), Trust (0.933), and Loyalty (0.928) indicate strong internal consistency, further supported by high Composite Reliability (CR) values. Rho_A values for all constructs further reinforce measurement reliability, confirming the robustness of the study's variables.

**Table 4.**
**Cross Loading**

| Item | Service Quality | Loyalty | Religiosity | Trust |
|---|---|---|---|---|
| C | 0.860 | 0.619 | 0.569 | 0.670 |
| A | 0.918 | 0.641 | 0.481 | 0.737 |
| R | 0.731 | 0.531 | 0.342 | 0.553 |
| T | 0.802 | 0.554 | 0.485 | 0.608 |
| E | 0.846 | 0.618 | 0.490 | 0.687 |
| R | 0.847 | 0.565 | 0.541 | 0.678 |
| L1 | 0.626 | 0.849 | 0.527 | 0.682 |
| L2 | 0.658 | 0.881 | 0.571 | 0.700 |
| L3 | 0.549 | 0.815 | 0.409 | 0.557 |
| L4 | 0.573 | 0.901 | 0.432 | 0.644 |
| L5 | 0.582 | 0.818 | 0.556 | 0.618 |
| L6 | 0.569 | 0.880 | 0.514 | 0.665 |
| RG1 | 0.535 | 0.543 | 0.929 | 0.556 |
| RG2 | 0.495 | 0.541 | 0.909 | 0.518 |
| RG3 | 0.509 | 0.489 | 0.897 | 0.542 |
| RG4 | 0.521 | 0.544 | 0.849 | 0.516 |
| TR1 | 0.714 | 0.662 | 0.526 | 0.878 |
| TR2 | 0.701 | 0.699 | 0.590 | 0.934 |
| TR3 | 0.727 | 0.670 | 0.498 | 0.917 |
| TR4 | 0.665 | 0.703 | 0.532 | 0.920 |

Assessing the measurement model in PLS-SEM also includes examining discriminant validity, which evaluates the extent to which a construct is truly distinct from other constructs (Hair et al., 2017). According to Henseler et al. (2015), three key criteria are used to evaluate discriminant validity: Fornell-Larcker criterion, Cross-Loadings, and Heterotrait-Monotrait Ratio (HTMT). The Fornell-Larcker criterion is assessed by comparing the square root of the AVE of each construct with the correlations between constructs; the AVE's square root should be greater than the correlation with other latent variables. Cross-loadings require that each indicator's factor loading on its designated construct be higher than on any other construct, with a cut-off value 0.70. The HTMT measures the similarity between latent variables, assuming discriminant validity when the HTMT value is below 1, ideally less than 0.90 (Hair et al., 2014; Henseler et al., 2015). Based on the measurement result, both the Fornell-Larcker and cross-loading criteria are met, as the cross-loadings for each indicator are higher than the loadings on other constructs and exceed the 0.70 thresholds (see Table 4 and Table 5). Additionally, the HTMT values between latent variables are below 0.90 (see Table 6). These results confirm that the constructs meet the requirements for discriminant validity.

**Table 5.**
**Fornell- Larcker Criterion**

| | Loyalty | Religiosity | Service Quality | Trust |
|---|---|---|---|---|
| Loyalty | 0.858 | | | |
| **Religiosity** | 0.619 | **0.896** | | |
| **Service Quality** | 0.723 | 0.597 | **0.846** | |
| **Trust** | 0.779 | 0.596 | 0.811 | **0.913** |

**Table 6.**
**Heterotrait-Monotrait Ratio (HTMT)**

| | Loyalty | Religiosity | Service Quality |
|---|---|---|---|
| **Religiosity** | 0.640 | | |
| **Service Quality** | 0.753 | 0.624 | |
| **Trust** | 0.821 | 0.649 | 0.842 |

### 4.2.2. Structural Model Evaluation Results

According to Table 7, the PLS-SEM passes the multicollinearity test because the VIF values are less than 5. A VIF value below 5 indicates an acceptable level of collinearity, meaning the predictors are not excessively correlated and can be considered reliable for further analysis (Hair et al., 2010).

**Table 7.**
**Multicollinearity Test**

| Items | VIF | Items | VIF | Items | VIF |
|---|---|---|---|---|---|
| Compliance | (2.922) | **RG1** | (3.320) | **TR4** | (3.233) |
| Assurance | (3.225) | **RG2** | (2.980) | **L1** | (3.074) |
| Reliability | (2.918) | **RG3** | (2.918) | **L2** | (3.470) |
| **Tangible** | (2.710) | **RG4** | (2.610) | **L3** | (2.181) |
| **Empathy** | (3.624) | **TR1** | (2.468) | **L4** | (3.146) |
| **Responsibilit** | (3.375) | **TR2** | (3.899) | **L5** | (2.480) |
| | | **TR3** | (3.133) | **L6** | (3.193) |

The goodness of fit from the structural model results for the Loyalty and Trust equations are shown in Table 8. The R-Square value for Loyalty is 0.656, indicating that the predictor variables account for 65.6% of its variation, while the Adjusted R-Square is 0.650. For Trust, the R-Square value is 0.697, with an Adjusted R-Square of 0.694. The $Q^2$ value of 0.511 for Loyalty indicates that the model predicts over 50% of the unseen variation, demonstrating adequate predictive power, while the $Q^2$ value of 0.628 for Trust reflects good predictive relevance. The model fits well, supported by a low SRMR value of 0.048 and a Chi-Square value of 396.921. The NFI value of 0.877 further confirms the model's good fit.

**Table 8.**
**Structural Model Goodness of Fit**

| | R-Square | R-Square Adjusted | Q-Square | SRMR | Chi-Square | NFI |
|---|---|---|---|---|---|---|
| Loyalty | 0.656 | 0.650 | 0.511 | 0.048 | 396.921 | 0.877 |
| Trust | 0.697 | 0.694 | 0.628 | | | |

Table 9 presents the F-Square values indicating the effect size of predictor variables on Loyalty and Trust. The values for religiosity (0.055 for Loyalty and 0.081 for Trust) suggest a small effect size, showing minimal impact on customer loyalty and trust (Cohen, 2013). For service quality, the F-Square value of 0.043 for Loyalty indicates negligible influence, while 0.942 for Trust signifies a very large effect size, underscoring its importance in building customer trust. The F-Square value of 0.201 for Loyalty regarding trust indicates a medium effect size, suggesting that trust significantly impacts customer loyalty. Overall, these results highlight the crucial role of service quality in fostering trust and enhancing loyalty.

**Table 9.**
**Cohen F-Square (Effect Size)**

| | Loyalty | Trust |
|---|---|---|
| **Religiosity** | 0.055 | 0.081 |
| **Service Quality** | 0.043 | 0.942 |
| **Trust** | 0.201 | |

### 4.2.3. Hypothesis Testing

The study's results validate the proposed hypotheses, aligning with research expectations. The analysis shows that service quality positively and significantly impacts the loyalty of Bank Syariah Indonesia's customers following a cyber-attack, with a P-value below 5%. This finding supports the hypothesis that improved service quality fosters customer loyalty. Customer religiosity significantly influences their loyalty to the bank, with a P-value below 5%, supporting the hypothesis that religiosity determines customer loyalty. Customer trust in the bank is found to be a highly significant factor affecting loyalty, with a P-value below 5%. This strongly supports the hypothesis that trust is crucial in maintaining customer loyalty.

The study also identifies that service quality significantly strengthens customer trust post cyber-attack, with a P-value below 5%, emphasizing the critical role of high-quality service in enhancing customer trust. Finally, religiosity is found to have a significant effect on customer trust after a cyber-attack, with a P-value below 5%, supporting the hypothesis that religiosity enhances trust. These findings underscore the importance of service quality and religiosity in shaping customer loyalty and trust, particularly in the aftermath of a cyber-attack. The significant relationships between these variables highlight their interdependence and their pivotal role in maintaining robust customer relations in challenging circumstances.

**Table 10.**
**Hypothesis Testing**

| Item | Path C | Mean | stdev | T-stat | prob | Remark |
|---|---|---|---|---|---|---|
| Service Quality → Loyalty | 0.259 | 0.266 | 0.082 | 3.161 | 0.002 | Supported |
| Religiosity → Loyalty | 0.359 | 0.337 | 0.102 | 3.520 | 0.000 | Supported |
| Trust → Loyalty | 0.468 | 0.464 | 0.100 | 4.679 | 0.000 | Supported |
| Service Quality → Trust | 0.670 | 0.675 | 0.046 | 14.417 | 0.000 | Supported |
| Religiosity → Trust | 0.188 | 0.187 | 0.075 | 2.505 | 0.012 | Supported |

**Notes**: *P-value<0,05(signicant); >0,05= not significant

### 4.3. Robustnesst Test

The robustness of the PLS-SEM estimation method, based on the least-squares approach, has been widely discussed. Sarstedt et al. (2020) emphasize that assessing robustness involves addressing non-linear effects, endogeneity, and unobserved heterogeneity. Non-linear effects arise when relationships between variables deviate from linearity, while endogeneity occurs when predictor variables correlate with error terms, potentially leading to biased estimates. Unobserved heterogeneity reflects hidden group differences within data, which may distort the findings if not properly addressed.

Path models typically assume linear relationships; however, non-linear patterns may exist empirically. Hair et al. (2019) note that statistically significant partial regressions signal possible non-linear effects. To account for this, this study applies polynomial modeling by incorporating quadratic effects, as per Yusfiarto et al. (2022). The results indicate no significant quadratic effects across all paths ($p > 0.05$), confirming the validity of the linear relationships hypothesized in the model (Sarstedt et al., 2020). Thus, the linear effects are both valid and robust. According

to this approach, the estimation results indicate that the quadratic effects for all paths are not statistically significant, with all p-values exceeding 0.05 (see Table 11). This suggests no evidence of non-linear relationships between the variables, supporting the hypothesis that the relationships are linear and validating the linear model used in the study (Sarstedt et al., 2020).

**Table 11.**
**Assessment of Nonlinear Effects**

| Item | Path C | Mean | stdev | T-stat | prob |
|---|---|---|---|---|---|
| Service Quality → Loyalty | 0.259 | 0.266 | 0.082 | 3.161 | 0.002 |
| Religiosity → Loyalty | 0.359 | 0.337 | 0.102 | 3.520 | 0.000 |
| Trust → Loyalty | 0.468 | 0.464 | 0.100 | 4.679 | 0.000 |
| Service Quality → Trust | 0.670 | 0.675 | 0.046 | 14.417 | 0.000 |
| Quadratic Effect SQ → L | 0.052 | 0.037 | 0.068 | 0.768 | 0.442 |
| Quadratic Effect R → L | 0.083 | 0.070 | 0.056 | 1.437 | 0.141 |
| Quadratic Effect T → L | 0.018 | -0.008 | 0.060 | 0.295 | 0.768 |
| Quadratic Effect SQ → T | 0.024 | -0.021 | 0.068 | 0.347 | 0.728 |
| Quadratic Effect R → T | 0.002 | -0.003 | 0.041 | 0.044 | 0.965 |

PLS-SEM assumes that data comes from a homogeneous population (Jedidi et al., 1997), but populations are rarely homogeneous. Ignoring potential heterogeneity can compromise the validity of results (Becker et al., 2013; Rigdon et al., 2011). This study applies the Finite Mixture Partial Least Squares (FIMIX-PLS) method to detect unobserved heterogeneity (Sarstedt et al., 2020). FIMIX-PLS, grounded in finite mixture models, posits that the population consists of different group density functions, enabling researchers to uncover hidden segments within the data that conventional methods may overlook.

**Table 12.**
**Assessment of Unobserved Heterogeneity**

| Criteria | Number of Segments | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| AIC (Akaike's information criterion) | 807.63 | 650.92 | 613.59 | 581.39 | 509.04 |
| AIC3 (modified AIC with Factor 3) | 814.63 | 665.92 | 636.59 | 612.39 | 573.04 |
| AIC4 (modified AIC with Factor 4) | 821.63 | 680.92 | 659.59 | 643.39 | 637.04 |
| BIC (Bayesian information criterion) | 831.54 | 702.16 | 692.17 | 687.29 | 727.67 |
| CAIC (consistent AIC) | 838.54 | 717.16 | 715.17 | 718.29 | 791.67 |
| HQ (Hannan-Quinn criterion) | 817.28 | 671.60 | 645.31 | 624.13 | 597.28 |
| MDL5 (minimum description length with factor 5) | 983.19 | 1027.12 | 1190.45 | 1358.89 | 2114.19 |
| LnL (LogLikelihood) | -396.81 | -310.46 | -283.80 | -259.70 | -190.52 |
| EN (normed entropy statistic) | na | 0.85 | 0.62 | 0.79 | 0.76 |
| NFI (non-fuzzy index) | na | 0.88 | 0.63 | 0.77 | 0.71 |
| NEC (normalized entropy criterion) | na | 33.11 | 84.55 | 48.40 | 55.08 |

This study uses one to five segments to test for unobserved heterogeneity (Sarstedt et al., 2020). However, the analysis of fit indices for these models shows ambiguous results, as no clear criteria for segment selection emerged (Sarstedt et al., 2020). This lack of convergence suggests challenges in determining the optimal number of segments and indicates that unobserved heterogeneity may be a minor issue. The data do not strongly support the existence of distinct underlying subpopulations.

Endogeneity in PLS-SEM arises when a predictor construct correlates with the error term of a dependent construct, leading to biased estimates and potentially misleading conclusions (Bascle, 2008). To address this, Hult et al. (2018) recommend using the Gaussian copula approach by Park & Gupta (2012), which effectively controls for endogeneity in PLS-SEM models.

The endogeneity test results in Table 13 show that none of the Gaussian copulas for Service Quality, Religiosity, and Trust are statistically significant, with p-values all greater than 0.05. These findings suggest that endogeneity is not a concern, reinforcing the robustness and validity of the structural model. The lack of significant copulas confirms that the predictor constructs are not correlated with the error terms, supporting the study's reliability and aligning with Hult et al. (2018) recommendations for addressing endogeneity in PLS-SEM.

**Table 13.**
**Assessment of Endogeneity Test using the Gaussian Copula (GC) Approach**

| Test | Original sample | Sample mean | Standard deviation | T-statistics | P-values |
|---|---|---|---|---|---|
| GC (Service Quality) -> Loyalty | 0.203 | 0.242 | 0.175 | 1.162 | 0.245 |
| GC (Service Quality) -> Trust | -0.146 | -0.15 | 0.149 | 0.981 | 0.327 |
| GC (Religiousity) -> Loyalty | 0.102 | 0.087 | 0.075 | 1.355 | 0.175 |
| GC (Religiousity) -> Trust | 0.086 | 0.08 | 0.062 | 1.382 | 0.167 |
| GC (Trust) -> Loyalty | -0.033 | -0.038 | 0.089 | 0.369 | 0.712 |

### 4.4. Discussion

This research applies Expectation Confirmation Theory (ECT) as the primary theoretical framework to explore factors influencing customer loyalty at Bank Syariah Indonesia (BSI) following a cyberattack. The theory of Consumer Expectations, Perceived Performance, Disconfirmation of Beliefs, and Satisfaction (Oliver, 1977, 1980) has been widely used in various marketing and consumer behavior contexts, including predicting repurchase intentions (Dabholkar et al., 2000). The findings emphasize vital factors influencing customer loyalty after the cyberattack on BSI. Hypothesis testing reveals that service quality, religiosity, and customer trust significantly impact loyalty. Additionally, customer trust is strongly affected by service quality and religiosity in the aftermath of the cyberattack. These results highlight the importance of maintaining high service quality, fostering trust, and reinforcing religiosity to boost customer loyalty during difficult times.

The hypothesis testing also shows that service quality substantially affects customer loyalty, indicating that customers who perceive BSI's service as high-

quality are more likely to remain loyal despite significant service disruptions. This aligns with previous studies emphasizing service quality as a critical factor for retaining customer loyalty in banking. In the context of Islamic banking, service quality includes both technical and ethical aspects and adherence to Islamic values, which are essential for loyalty. Research by Tabash et al. (2019) underscores the necessity of incorporating Sharia principles in service delivery to sustain loyalty in Islamic financial institutions. Similarly, Kontot et al. (2016) note that customer perceptions of service quality greatly influence satisfaction and loyalty. This study supports the applicability of the CARTER model—Compliance, Assurance, Reliability, Tangibles, Empathy, and Responsiveness—introduced by Othman & Owen (2001) as a relevant framework for measuring service quality in Islamic banking.

High service quality is crucial in enhancing customer loyalty, particularly within the Islamic banking sector (Hasan et al., 2021; Kartika et al., 2020). When customers perceive that their bank meets their financial needs and aligns with their religious beliefs, they are likelier to remain loyal. Asnawi et al. (2020) also find that loyalty depends heavily on service quality, which includes transparency, fairness, and adherence to Sharia principles. Boungou (2023) notes that cyberattacks can negatively impact a bank's performance, but these effects can be mitigated by maintaining service quality during such events. This highlights the importance of investing in cybersecurity and training employees to respond effectively to security breaches. For BSI, the recent cyberattack challenged customer trust and loyalty, but the bank's ability to uphold service quality helped preserve loyalty. This research shows that maintaining high-quality service can reduce the negative impacts of disruptions and retain customer loyalty.

Additionally, customer loyalty is strongly influenced by religiosity. In Islamic banking, religiosity is a key factor in loyalty decisions, as it reflects customers' confidence in the bank's adherence to Sharia principles. Research finds that highly religious customers will likely remain loyal to Islamic banks that uphold these principles, even during challenges like cyberattacks (Junaidi et al., 2022; Yusfiarto et al., 2023). During crises like the recent BSI cyberattack, Islamic banks that maintain a solid commitment to Sharia principles and excellent service can retain customer loyalty, as Alam et al. (2012) note, who emphasize the importance of religious principles in fostering loyalty during difficult times.

The level of trust heavily influences customer loyalty to the bank. Trust plays a critical role in the relationship between a bank and its customers, especially in the aftermath of significant events like cyberattacks. Customers with firm trust in the bank are more likely to remain loyal because they believe in its ability to handle challenges and maintain high-quality services. This study finds that trust is shaped by factors such as Sharia compliance, service quality, and transparency in managing security incidents. These findings align with the research of Tabrani et al. (2018), which highlights trust as a crucial element in Islamic banking. Similarly, Basrowi et al. (2023) emphasize that Sharia adherence and the conduct of Islamic bank staff are crucial to fostering trust among customers. Maintaining trust through adherence to Sharia principles and transparent responses to cyberattacks is essential for Islamic banks. In this context, trust moderates the positive effects of service quality and religiosity on customer loyalty.

Moreover, service quality significantly impacts customer trust, especially after a cyberattack. High-quality service can restore and even enhance customer trust following disruptions. Bank Syariah Indonesia's (BSI) efforts to ensure service quality after a cyberattack are essential in maintaining customer trust. Research indicates that excellent service not only rebuilds trust but can also strengthen it (Fauzi & Suryani, 2019). BSI has maintained customer loyalty by improving communication transparency, strengthening system security, and proactively addressing customer concerns (Tabrani et al., 2018). These strategies are vital for restoring customer confidence after the cyberattack (Yuen et al., 2018). In combining service excellence with clear communication, BSI enhances its competitiveness and reinforces its commitment to Sharia principles, increasing the perceived value of its services (Hidayat et al., 2015; Kashif et al., 2015).

Additionally, religiosity significantly influences customer trust after a cyberattack. Customers' strong belief in BSI's adherence to Sharia principles mitigates the negative effects of the attack. Religiosity reassures customers that BSI will uphold ethical standards when facing challenges, thereby rebuilding trust (Yusfiarto et al., 2023). This suggests that during crises, customer trust is influenced by both technical factors and the bank's commitment to religious values (Tegambwage & Kasoga, 2023). Islamic banks that address cyberattack challenges by integrating religiosity, service quality, and ethical responsibility can restore and strengthen long-term customer trust (Basrowi et al., 2023).

## V. CONCLUSION AND RECOMMENDATION

### 5.1. Conclusion

This research utilizes ECT to examine the factors that impact customer loyalty at Bank Syariah Indonesia (BSI) after experiencing a cyberattack. ECT has shown its relevancy in many marketing and consumer behavior situations by focusing on the connection between expectations, perceived performance, belief disconfirmation, and satisfaction. This study shows that customer loyalty is significantly impacted by service quality, religiosity, and customer trust. Moreover, service quality and religiosity greatly influence customer trust after a cyberattack. These discoveries offer a deep understanding of customer loyalty dynamics when dealing with significant service interruptions like cyberattacks.

This research's main finding confirms ECT's applications in Islamic banking and cyberattack settings, along with the significance of the CARTER model in assessing service quality, covering technical and ethical factors. Additionally, this research highlights the significance of faith and confidence in establishing and sustaining customer loyalty following major disturbances. It shows that even with significant disruptions, excellent service can lessen unfavorable effects and maintain customer loyalty. These results are consistent with previous research that states service quality is crucial in retaining customer loyalty within the banking sector.

One exciting discovery of this research is that despite the severe cyberattack on BSI, the customer base stayed the same or grew by the end of 2023. This indicates a particular interaction in how customers react to cyberattacks in Islamic banking. Several reasons help maintain stability and promote growth. BSI's proactive

crisis management, transparent communication, increased security measures, and customer compensation helped regain trust and keep customer loyalty. In addition, assistance from a community deeply connected to Sharia beliefs could have offered further resilience during the emergency. Customers' confidence in BSI's commitment to Sharia principles probably provided reassurance that the bank would uphold these values in times of trouble.

The study highlights the crucial need for Islamic banks to focus on quality service and incorporate religious beliefs to strengthen resilience against cyberattack threats. In times of crisis, it is crucial to uphold top service standards, including technical expertise and ethical conduct, as described in the CARTER model, to retain customer satisfaction and loyalty. This method meets customer expectations and builds trust by consistently dedicating itself to Sharia principles, which are essential to the bank's identity and customer base.

### 5.2. Recommendation

The study suggests that practitioners should take proactive steps by consistently improving service quality using customer feedback and strictly following ethical standards. Effective crisis response strategies must be implemented, guaranteeing quick, honest interaction with clients to address worries and maintain confidence. In the meantime, regulators should concentrate on enforcing strict cybersecurity rules designed for Islamic banking, requiring regular audits and facilitating collaboration among banks, cybersecurity experts, and regulatory bodies to enhance the overall resilience of the banking sector by promoting the sharing of best practices and threat intelligence.

Furthermore, the research presents possibilities for additional studies on the influence of religious elements and service excellence in the crisis response setting within Islamic banking. Future studies should further advance tailored recovery techniques for Islamic financial institutions in the event of cyber intrusions, emphasizing improved communication, transparency, and proactive actions to uphold customer confidence. Moreover, investigating how adopting financial technology (fintech) affects service quality and customer loyalty in the Islamic banking sector could offer valuable insights for banks adjusting to the digitalization era. Comparative analyses of how Islamic and conventional banks deal with cyberattacks and their effects on customer loyalty may provide valuable insights into the banking sector's optimal strategies.

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