THE ROLE OF FINTECH IN PROMOTING ENVIRONMENTALLY AND ECONOMICALLY SUSTAINABLE CONSUMER BEHAVIOR

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SUMMARY

The financial sector has witnessed transformative efficiencies with the rapid advancement of financial technology (Fintech), which has the potential to integrate sustainability into environmental and economic practices. Keeping in view the host of large companies functioning in Saudi Arabia, this study has been undertaken to examine the role of Fintech in promoting sustainable customer behaviour. The research examines the adoption and implementation of Fintech solutions, the conversance with green Fintech practices, and the challenges faced by organizations by conducting structured surveys among senior management. It has been observed that Fintech has been adopted by many companies; however, varying levels of importance have been ascribed to the objectives hovering around its environmental and economic sustainability. In line with such observations, regulatory constraints and lack of awareness have been identified as prominent obstacles. Also, this study is poised to accentuate the potential of Fintech in order to influence consumer behaviour positively, prevailing over the practical challenges in execution. Emphasis has also been placed on the necessity for enhanced regulatory frameworks, increased industry collaboration, and investment in digital literacy to utilize Fintech's potential to stimulate sustainable practices. It is expected that this research work will provide valuable insights to policymakers, industry stakeholders, and academicians and acquaint them with strategic initiatives to align Fintech innovation with sustainability goals.

Key words: *fintech, environmental sustainability, economics, sustainable consumer behaviour, green finance, regulatory frameworks, digital literacy, saudi arabia, technology adoption.*

INTRODUCTION

Recent developments in financial technology (Fintech) have helped to solve many problems in financial services through innovative approaches making it more accessible and efficient. It has also helped to address sustainability concerns globally with its mix of finance and technology. [12] observed a high potential for Fintech to influence customer behaviour towards sustainability significantly. Thus, Fintech plays a critical role in combating persistent challenges related to the environment, climate change and resource exhaustion.

Allahham et al. (2024) [4] showed that Fintech solutions help to achieve eco-friendly incentives. This motivates customers to choose more sustainable solutions. All these lead to overall environmental

performance. Studies [23] showed that Fintech solutions can be strategically adopted to enhance smart city capabilities towards increased sustainability. This leads to resource optimisation and collaborative governance for enhanced environmental sustainability [18].

Financial exclusion due to the scarcity of traditional banking in developing counstries can be overcome by their capabilities of Fintech services. In Mid-Western regions, Fintech services attracted small business investments in renewable energy to achieve sustainability by increasing access to finance for them [14]. Notably, digital transformations pioneered by Fintech can reduce costs and increase efficiencies for green business practices [6].

Fintech promotes customer behaviour for infrastructure development towards green finance. [1] noted that customers adopt Fintech based on their perceptions of the benefits and risks against the convenience and transaction cost reduction due to its use. Consumer awareness of green Fintech advantages promotes the implementation of sustainable practices in many sectors [2].

Kashif et al. (2024) [17] observed that Fintech can produce long-term impact in different sectors to achieve sustainable financing. [7] think that Fintech has the potential to integrate cutting-edge technologies such as Big Data, Artificial Intelligence, and blockchain, coupled with strategic industry collaborations, and thereby, it can accelerate the development of sustainable financial systems that contribute to global sustainability goals [20].
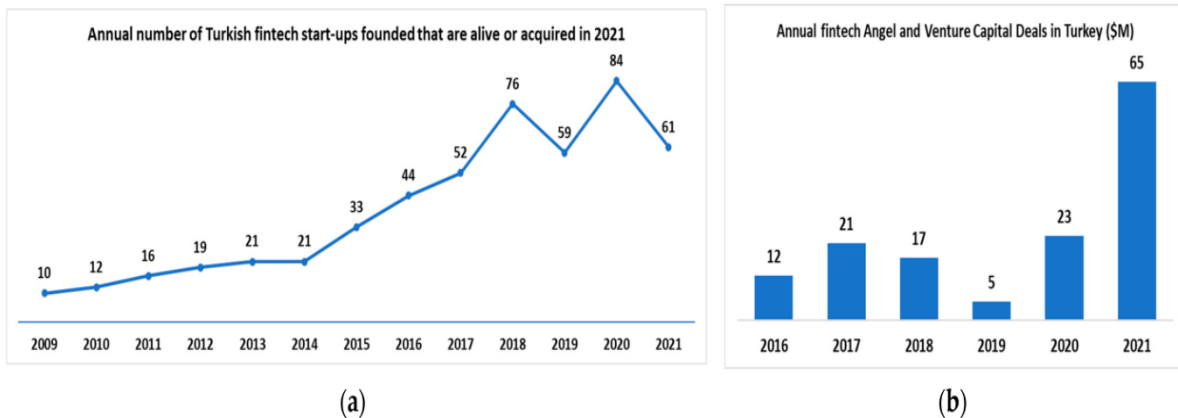

Figure 1. Development of the Fintech sector in Turkey [7]

Given its numerous attributes, Fintech is being extensively used as a tool for promoting sustainable consumer behaviour; however, its implementation faces challenges like regulatory hurdles and cultural barriers in figure 1. According to [2], regulatory frameworks lag behind technological progress. This is a major challenge to the large-scale use of green Fintech in different markets. Innovative alignment of financial incentives for sustainable practices can be obstructed by regulatory structures [12] [5]. Thus, Fintech is unable to use its potential for enhancing sustainability across economies due to the regulatory barriers to the integration of innovation with sustainability protection initiatives of customers [12].

Customer empowerment can increase their financial literacy to leverage Fintech for sustainable practices leading to improved business performance [15].

RESEARCH AIM

Based on the above background, this research aims to examine how Fintech enhances customer sustainable behaviour. The focus is on Fintech's implementation and influence in this respect. Especially, the convergence of Fintech innovation with green finance will be examined in detail in different socio-economic contexts. Its effectiveness enabling factors will also be probed. The desired outcome is the identification of actionable points for policymakers, academic researchers and stakeholders. Further research on designing innovative strategies to maximise the positive outcome of Fintech on sustainable consumer behaviour will be useful.

LITERATURE REVIEW

Technology, finance and environmental sustainability converge when Fintech is linked to sustainable customer behaviour. The global imperatives for economic, social, and environmental sustainability drive research in this area [10] [17]. This section reviews the literature on how Fintech, especially green Fintech, promotes sustainable customer behaviour.

Fintech and Green Finance

According to [12] financial services have become more efficient, and inclusive and provided innovative solutions to difficult problems due to the advent of Fintech. If Fintech becomes green Fintech, financial operations will be streamlined and aligned with incentives for sustainability targets [21] [16]. Sustainability initiatives in smart cities show that intelligent resource deployment towards sustainable infrastructure development and renewable energy projects is possible with Fintech [23]. According to [3] this transformative ability of Fintech helps to ensure transparent and secure transactions to increase citizen's engagement in environmental sustainability [3].

Consumer Behaviour and Green Fintech Adoption

Abdul-Rahim et al. (2022) [1] noted that the perception and behaviour of customers towards Fintech determines its adoption by them and its sustainable outcomes. According to [6] Fintech adoption by customers is driven by convenience and reduction in transaction costs. Organisations are likely to implement sustainable practices with increasing awareness of green Fintech products [2].

Customers are likely to adopt and use green Fintech if they have adequate green orientation and understanding. Customers' intentions on green Fintech engagement with social responsibility and long-term orientation are influenced by performance expectancy, effort expectancy and social influence [19].

Regulatory and Policy Considerations

The potential benefits of green Fintech are often challenged by regulatory frameworks. This prevents its extensive adoption [2]. Overenthusiastic regulations to protect customers and the difficulty of proving the authenticity of green Fintech practices (not greenwashing) are critical regulatory issues [12]. On the other hand, regulatory developments like helping a sandbox environment innovative Fintech solutions supporting sustainable finance in Turkey [7]. [17] stressed the need for global initiatives to harmonise regulatory standards across the countries. This will enable wider adoption of green Fintech and sustainable finance at the global scale.

Financial Literacy and Access to Finance

Siddik et al. (2023) [22] observed that financial literacy empowers companies to improve access to finance through Fintech. It enables these companies to use new opportunities efficiently, reduce environmental impact and thereby enhance their sustainable performance. [13] noted that financial literacy moderates the positive effects of digital transformation [8]. This facilitates their access to finance for improved sustainable performance of companies. On the other side, customers can make informed decisions on their financial transactions and leverage Fintech solutions when they are empowered with financial literacy leading them to sustainable practices [11].

Eco-Friendly Incentives and Sustainable Practices

Fintech plays a multipronged role in incentivizing environment-friendly consumer behaviour. [4] have advocated that eco-friendly incentives via Fintech platforms can motivate consumers to adopt greener practices, as evidenced in China's manufacturing industry, and they also reaffirmed that such incentives mediate improvements in overall environmental performance in addition to enhancing green consumer behaviour. The study [16] demonstrates that advances in mobile payment systems and their integration with green incentives could further promote eco-conscious consumer decisions in figure 2.
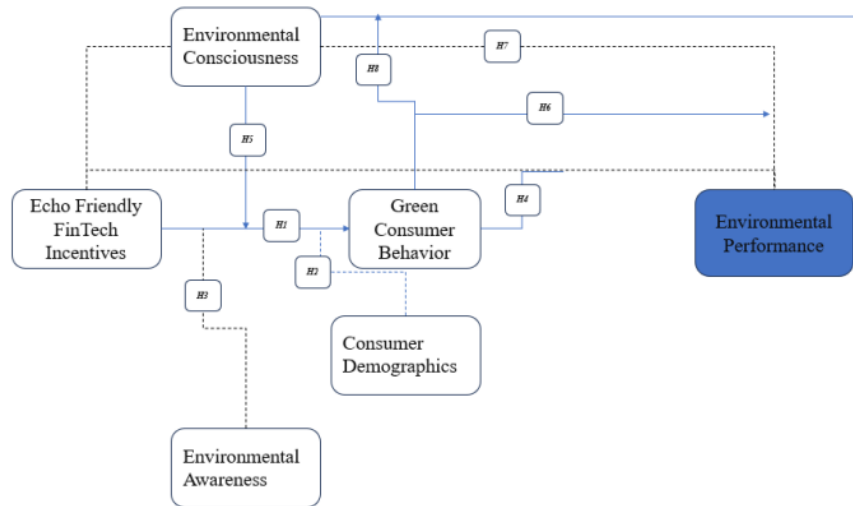
Figure 2. Conceptual Framework [4]

Socio-Economic and Cultural Influences

Consumer attitudes towards sustainable Fintech adoption are greatly influenced by socio-economic context and cultural factors, as evidenced by the study of [9]. This study has also demonstrated that trust, green image and cultural predispositions towards sustainability can influence user satisfaction with Fintech solutions. [5] have stressed that addressing socio-cultural barriers is crucial for maximizing the role of Fintech in promoting sustainability, given that technology plays its part in enhancing the delivery and usage of financial services.

Research Gaps and Future Directions

Even though the existing literature provides a basic understanding of the potential of Fintech in promoting sustainable behaviour, there remain several research gaps that invite due attention. The work of [6] highlighted the need for longitudinal studies to assess temporal changes in consumer attitudes and behaviours towards green Fintech. Furthermore, [17] stressed the role of green financial products in enhancing corporate sustainability, which remains underexplored due to differences in cultural and regulatory environments. Additionally, in-depth policy implications for different market forms, viz. monopoly, competitive, etc., can also be studied with the help of research on reciprocation between Fintech innovations and green finance.

Chueca Vergara and Ferruz Agudo (2021) [12] have vouched for future studies highlighting the need for integrated regulatory frameworks which could harmonize Fintech innovation with consumer protection and sustainability. [22] advocated examining the impact of digital literacy and education on sustainable Fintech adoption in order to ascertain practical implications for strengthening consumer engagement with green Fintech solutions. Understanding the perceptions of different generations to utilize green Fintech for developing inclusive and effective strategies to attain sustainable consumer behaviour is the core theme of a study conducted [19].

In conclusion, it can be safely placed that Fintech and sustainable consumer behavior are strongly interconnected which can give grounds to further academic inquiry and practical exploration, with the potential to influence global sustainability efforts.

METHODOLOGY

The study aims to examine the role of Fintech in promoting sustainable consumer behaviour within the corporate landscape, especially in the context of large Saudi companies. This section outlines the research design, sampling method, data collection process and data analysis techniques employed in order to achieve this objective.

Research Design

This research consists of a quantitative questionnaire survey. The survey collects information on the experiences, perceptions and strategic outlooks of senior officers in large Saudi companies concerning their adoption and impact of Fintech solutions on sustainable consumer behaviour. The survey includes constructs and items within each construct aimed to provide the required data on Fintech adoption, awareness about green Fintech, challenges, benefits and strategies for sustainable consumer engagement. Both closed-ended and scale-based questions are included in the questionnaire for quantitative and qualitative analysis as required.

Sampling and Population

The target population for this study included senior management personnel like CEOs, CFOs, COOs, Directors, and Managers of large Saudi firms as they might possess the knowledge to influence decision-making processes for the adoption of Fintech and sustainability initiatives. A list of the email addresses of senior officers of several Saudi large firms was accessed from various sectors, including finance, manufacturing, technology, and retail to ensure diversity from industry perspectives.

Data Collection Process

The data collection process was aimed to maximise response rates with good data integrity. A trusted platform was used to conduct email surveys. An introductory email outlining the essential details of the project and explaining their role in the study was sent to every participant. To ensure honest and unbiased responses, they were assured of confidentiality and anonymity. Informed consent was obtained from the participants based on these bases.

The data collection was stopped once the target response of 200 was obtained. This sample size was considered adequate for statistical validity for data analysis. Features of the survey prevented duplicate submissions by tracking response progress.

Data Analysis

The survey response data were gathered for rigorous statistical analysis using R software. This software was selected due to its robust capabilities to handle diverse data types and perform complex statistical procedures efficiently.

For the analysis, the data were cleaned for precision and completeness by removing missing values and inconsistencies. Then, the frequencies and the percentages of responses to the items were estimated. This showed the broad trends in responses and common perspectives among the participants.

The above methods ensured obtaining a comprehensive understanding of the role of Fintech in attaining sustainable consumer behaviour with empirical rigour and strategic insights. The results obtained from these methods were discussed and conclusions were drawn to derive implications for academic research, policy formulations, and industry practices.

RESULTS

This section describes the results of the survey and the analysis of responses detailed in the above Methodology section. Specific aspects of the survey results are described in specific sections below. Tables and charts are used to describe the results.

Demographic Information

This sub-section gives insights into the demographic profile of the survey respondents, which highlights the diversity of roles and industries represented in the sample. This data shows a balanced distribution of roles and a variety of industry sectors, which provides a comprehensive perspective on the adoption of Fintech across different organizational contexts shows in table 1.

Table 1. Demographic Information

		Frequency	Percent
Your Role in the Company	CEO	33	16.5
	CFO	31	15.5
	COO	32	16.0
	Director	28	14.0
	Manager	34	17.0
	Other	42	21.0
	Total	200	100.0
Industry Type	Financial Services	42	21.0
	Information Technology	35	17.5
	Manufacturing	47	23.5
	Other	41	20.5
	Retail	35	17.5
	Total	200	100.0

Fintech Adoption

This sub-section explores the level of Fintech adoption and its discerned importance in promoting sustainable practices within the organizations surveyed. The findings indicate that though a significant proportion of companies are either adopting or planning to adopt Fintech solutions, there is varied perception regarding their importance for sustainability in table 2 & Figure 3.

Table 2. Fintech Adoption

|		Frequency	Percent
Does your company currently utilize Fintech solutions?	In Planning Stage	74	37.0
	No	63	31.5
	Yes	63	31.5
	Total	200	100.0
What types of Fintech solutions does your company mainly use?	Blockchain Solutions	49	24.5
	Mobile Payments	39	19.5
	Other	32	16.0
	Peer-to-Peer Lending	43	21.5
	Robo-Advisory Services	37	18.5
	Total	200	100.0
How important are Fintech solutions in promoting sustainable practices within your company?	Very Important	40	20.0
	Important	33	16.5
	Moderately Important	40	20.0
	Slightly Important	39	19.5
	Not Important	48	24.0
	Total	200	100.0
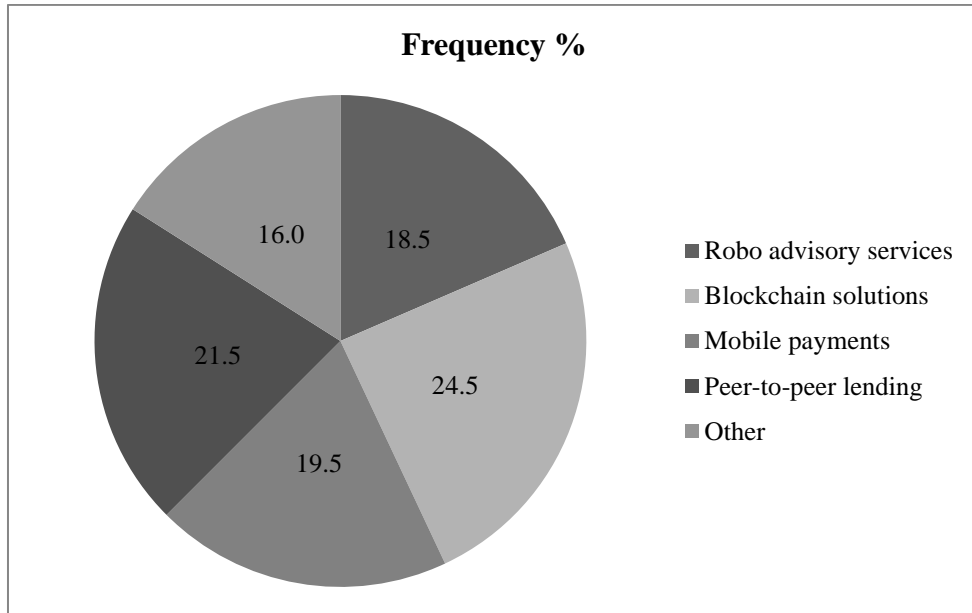
Figure 3. What Types of Fintech Solutions does your Company Mainly Use?

Green Fintech and Sustainability

This subsection investigates the familiarity and implementation of green Fintech solutions, as well as the challenges and benefits experienced by organizations. The data reflects mixed levels of familiarity with and implementation of green Fintech, with notable challenges, viz., cost and regulatory issues shows in table 3.

Table 3. Green Fintech and Sustainability

		Frequency	Percent
How familiar are you with the term "Green Fintech"?	Very Familiar	41	20.5
	Somewhat Familiar	37	18.5
	Neutral	45	22.5
	Unfamiliar	40	20.0
	Very Unfamiliar	37	18.5
	Total	200	100.0
To what extent has your company implemented green Fintech solutions to enhance sustainability goals?	Extensive Implementation	63	31.5
	Moderate Implementation	52	26.0
	Minimal Implementation	44	22.0
	Not Implemented	41	20.5
	Total	200	100.0
What challenges does your company face in adopting green Fintech solutions?	Cost Concerns	46	23.0
	Lack of Awareness or Expertise	38	19.0
	Other	39	19.5
	Regulatory Constraints	36	18.0
	Technological Limitations	41	20.5
	Total	200	100.0
In your opinion, what is the most significant benefit of adopting green Fintech solutions in your company?	Cost Savings	45	22.5
	Enhanced Brand Image	47	23.5
	Improved Resource Efficiency	42	21.0
	Other	34	17.0
	Regulatory Compliance	32	16.0
	Total	200	100.0

Consumer Behaviour and Fintech

This sub-section focuses on how consumer behaviour is being tracked and influenced by Fintech adoption within organizations. These findings are indicative of the fact that the majority of companies are effectively tracking consumer behaviour changes, but varied strategies and impacts are observed in terms of promoting sustainable practices in table 4 & figure 4.

Table 4. Consumer Behaviour and Fintech

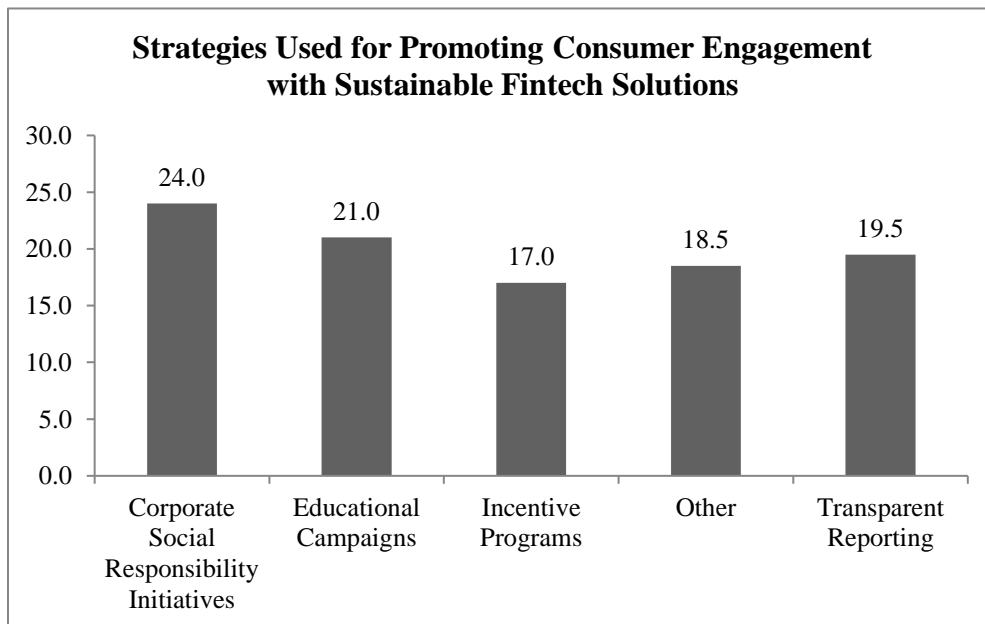|		Frequency	Percent
Does your company track consumer behaviour changes as a result of Fintech adoption?	No	90	45.0
	Yes	110	55.0
	Total	200	100.0
How has the adoption of Fintech solutions influenced consumer behaviour towards sustainability in your company?	Significantly Enhanced	38	19.0
	Moderately Enhanced	33	16.5
	No Change	42	21.0
	Moderately Hindered	43	21.5
	Significantly Hindered	44	22.0
	Total	200	100.0
What strategies does your company mainly employ to promote consumer engagement with sustainable Fintech solutions?	Corporate Social Responsibility Initiatives	48	24.0
	Educational Campaigns	42	21.0
	Incentive Programs	34	17.0
	Other	37	18.5
	Transparent Reporting	39	19.5
	Total	200	100.0

Figure 4. What Strategies does your Company Mainly Employ to Promote Consumer Engagement with Sustainable Fintech Solutions?

Future Directions

This is the final sub-section that depicts insights into additional steps which are deemed fit for enhancing sustainable consumer behaviour through Fintech adoption shows in table 5. The responses highlight a need for enhanced collaboration, regulatory development and educational investments for further integration of Fintech towards sustainability efforts.

Table 5. Future Directions

		Frequency	Percent
What additional steps do you think are necessary to enhance sustainable consumer behaviour through Fintech?	Enhanced Regulatory Frameworks	25	12.5
	Greater Industry Collaboration	51	25.5
	Increased Investment in Digital Literacy	38	19.0
	More Robust Consumer Engagement Strategies	45	22.5
	Other	41	20.5
	Total	200	100.0

DISCUSSION & CONCLUSION

Discussion

This study has been conducted to provide detailed insights into the role of Fintech in promoting sustainable consumer behaviour amongst large Saudi companies while emphasizing both the opportunities and obstacles associated with the adoption of Fintech. The findings described in the above section are discussed using the literature on relevant topics.

Fintech Adoption and Importance

This study showed that many Saudi large firms are already implementing or incorporating Fintech solutions to address their problems. However, there are variations in the perceptions of its importance in enhancing sustainability among the survey participants. This finding is largely supported by the literature. According to Abdul-Rahin et al. (2022), the perceived benefits of convenience and cost reduction drive firms to Fintech implementation. However, incomplete integration with sustainability targets is still a challenge [2]. Variations in perceptions of benefits may be due to the challenges of overcoming organisational readiness to align its strategic priorities to integrate Fintech with sustainability targets.

Green Fintech and Implementation Challenges

The surveyed participants showed varied levels of familiarity with and implementation of green Fintech. This is also reflected in varied perceptions of its importance in sustainability enhancement as was discussed above. The variation ranged from no implementation yet to extensive use of green Fintech to solve sustainability issues. These findings are supported [23]. They noted that the potential of Fintech has not been fully exploited even in digitally transformed smart cities.

This study showed that the realisation of the full potential of green Fintech may be limited by barriers like cost limitations and lack of expertise. According to [12], regulatory frameworks need to align with technological progress for the continuous acceptance of Fintech to support sustainability.

Consumer Behaviour and Sustainable Practices

Only around half of the participant firms monitored their customers for behavioural changes due to Fintech adoption. Low levels of awareness of its importance may be the reason for this hesitation to track the Fintech-adopted customers. Out of those firms which monitored their customers for behavioural changes, some found improvements and others identified barriers. It may be possible to remove these barriers through awareness campaigns and social influences, as noted [19]. awareness campaigns and social influences can change customer attitudes towards sustainable practices. This customer behavioural change can promote the benefits of customer sustainability behaviour.

Strategic and Regulatory Considerations

This study found a need for improved collaboration between regulatory authorities and the industry to strengthen Fintech integration with sustainability. Earlier [7] stressed the need for regulatory improvements and collaboration between sectors to promote innovation in sustainable finance. Such collective efforts from firms of different sectors can help to synchronise standards to foster innovations

in sustainable environments. There is also the need for increased investments in the digital and financial literacy of customers to empower them for greater leverage of Fintech for sustainable practices, as was observed [22]. This study showed the need for an educational orientation to help customers with the required knowledge and skills. This will enable them to convert from mere adoption to informed and optimised Fintech use for enhanced environmental impact.

Future Research Directions

The results point to the scope for some future research. The suggestions are for more longitudinal research [6], to obtain the trends over time, and more studies on green Fintech promoting corporate sustainability in different social, regulatory and cultural environments (Khalif et al., 2024). There is a need for more research on how the convergence of Fintech solutions and green finance is impacted by policies within different market structures. There is also scope to do more work on inclusive strategies using studies involving different generations, ethnicities, races and other socio-economic variables [19]. This can maximise the adoption of Fintech for sustainable behaviour.

Conclusion

From the above findings and discussions, it can be concluded that Fintech can drive sustainable customer behaviour. However, the scope of this is limited by certain challenges. These challenges can be overcome by empowering customers through education to impart the required financial and digital literacy.

There is also a need for strategic integration of Fintech with green finance and regulatory adjustments to promote Fintech for customer sustainable behaviour. Inclusive strategies to increase access to Fintech can promote sustainable behaviour to a large extent.

The above findings provide ample clues to policymakers, industry and research for refinement of their approaches to Fintech solutions for sustainability targets globally.

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