THE EFFECT OF DIGITAL PAYMENTS ON REDUCING FINANCIAL EXCLUSION AND PROMOTING SUSTAINABLE FINANCIAL PRACTICES: AN ANALYSIS ON CONSUMER BEHAVIOUR

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Abstract- **The intersection of digital payments, fintech innovations, and sustainable finance presents a dynamic area of research that explores the evolving role of technology in promoting environmental and economic sustainability. Financial exclusion remains a critical challenge in many economies, particularly among low-income populations, rural communities, and marginalized groups. The rise of digital payment systems has been heralded as a transformative force in improving financial inclusion and fostering sustainable financial behaviours. By integrating insights from behavioural economics, environmental studies, and financial technology, the research identifies key factors driving the adoption of digital payment platforms and their alignment with sustainable practices. The findings reveal that increased accessibility to digital payments fosters financial inclusion and enables consumers to make environmentally conscious purchasing decisions. Moreover, fintech innovations such as green investment platforms and carbon tracking tools enhance consumer awareness of sustainability issues. The study underscores the potential of digital payments and fintech in shaping a greener financial ecosystem by promoting transparency, reducing transaction costs, and incentivizing eco-friendly behaviours. This research highlights the need for collaborative efforts among policymakers, fintech developers, and financial institutions to maximize the environmental and societal benefits of digital finance, contributing to the broader goals of sustainable development.**

Index Terms- **Digital payments, fintech innovations, sustainable finance, consumer behaviour, environmental awareness.**

I. INTRODUCTION

The rapid rise in fintech and digital payments has been developed as an important tool to change global funding and promote financial inclusion. It offers comfort, efficiency and security. These innovations also contribute to environmental compatibility by reducing the reliance on cash, paper and emissions from money logistics. Fintech tools such as green investment, carbon tracking and eco-rewards promote environmentally friendly consumer behaviour. However, barriers such as limited access and lack of consumer awareness in rural areas maximize the possibilities of these systems. It is important to understand how digital payments affect sustainable purchasing decisions and promote environmental awareness. The purpose of this study is to analyse the impact of digital payments on reducing financial exclusions and promoting sustainable fiscal action among consumers. It shows the potential for corporate and political decision-making. The purpose of the research is to fill knowledge gaps and provide insights that can be implemented in order to create a greener financial ecosystem. By promoting behavioural change and technology use, digital payments and fintech can accelerate the transition to a sustainable future. This study contributes to the literature by providing strategies for establishing financial innovation in environmental goals.

II. REVIEW OF LITERATURE

Martynas Rajunčius, Algita Miečinskienė (2024) in their article "Measuring the Impact of Payment Innovations in Sustainable Finance: A Refined Framework for Evaluating ESG, Social Equity, Financial Inclusion, and Efficiency" is a payment sustainable index (PSI), measuring the sustainability performance of payment innovation. PSI integrates traditional ESG metrics with considerations of social justice, financial inclusion and efficiency weighted by their economic importance. The theoretical foundations of PSI have been explained. This is based on stakeholder theory, triple-end outcomes, and impact investment principles. Through case studies on mobile money and blockchain-based supply chain finance, we demonstrated the applicability of PSIs and their potential to guide financial institutions' decision-making. With discussion of the impact of PSI, this article concludes on financial institutions, political decisions-makers and consumers, promote innovation, inform regulations, strengthen consumers, and make more sustainable payment decisions.

Rajesh Shankaranarayana, Shalini Ramaswamy, Chaya Bagrecha, Madhavi A, Kiran Hiremath (2023) in their article "Promoting Economic Sustainability Through the Adoption of Digital Payment Systems" explores the impact on digital payment systems and its sustainability initiatives. A survey of 450 mobile consumers in Karnataka showed that digital payment systems were perceived at 93%, indicating that UPI is the most preferred digital payment mode based on linear regression and SPSS use. It is also seen that each bank transaction on economic sustainability saves time and has slight maintenance.

Peehoo Jain, Priya Gupta and Bhawna (2024) in their study "The Role of FinTech in Sustainability and United Nations' Sustainable Development Goals" examine the role of fintech in promoting sustainability and promoting the United Nations sustainable development (SDGS). It explores how fintech innovations contribute to economic and ecological sustainability in terms of financial integration, digital payments and green finance. This highlights the key role of regulatory support and cooperation between sectors that maximize the potential of fintech to promote sustainable development. It provides a framework for financial institutions and technology providers to innovate responsibly, create long-term social value, while simultaneously adhering to sustainability standards. This study highlights the innovative role of fintech in promoting sustainable development, but the need for more research to examine trends, assess long-term impacts, and develop robust methods.

Vilma Mattila, MD Rahman, Yen Zhang Pang (2024) in their report "AI in Fintech: Paving the Way for Sustainability" examines the diverse roles of artificial intelligence (AI) in fintech and its important contributions to sustainability across different aspects. The market overview highlights the rapid development of AI technology in the fintech sector. In this sector, AI is increasingly integrated into financial services to increase efficiency and promote sustainability. The essential focus is the role of AI in reducing CO2 footprint. AI financial institutions can help them become more environmentally friendly by optimizing processes such as energy consumption, digital transactions, and paper use. The AI-controlled green initiative paves the way for stronger investments in renewable energy, sustainable infrastructure and green businesses. This report also explores how AI can translate from layoffs and Fintech to sustainable growth opportunities. This article combines the effects of Green Finance (GFN) and Financial Technology (FINTECH) to check the regional carbon neutrality targets from 1990 to 2020, simultaneously checking energy innovation, economic growth and natural resource rents.

Alan Gelb, Anit Mukherjee, Brian Webster (2023) in their report "Adoption of digital payments and the digital ecosystem" says that the transition from bar to digital payments requires not only access to digital tools, but also changes in beneficiary behaviour. Instead of a fixed location and defined schedule of cash payments, you need to be aware of when the transfer will be affected and where the funds need to be withdrawn. There is an overwhelming preference for digital compared to cash payments. Almost 93% of the combined samples were considered digital wallets over those better than cash, with 6% being indifferent between the two.

Lee Ying Tay, Hen Toong Tai, Gek Siang Tan (2022) in their research "Digital financial inclusion: A gateway to sustainable development" developing countries are known to primarily Asian countries to embrace and improve digital financial integration to reduce poverty. However, the results show that there is a persistent gap between gender, rich, poor, urban and rural areas in developing countries regarding access and use of digital financial services. At the end of the study, they focus on improving digital infrastructure, simplifying complex banking processes, highlighting the importance of financial education, and some recommendations that allow for a smooth impact of the country's digital financial integration.

Chitranjan Singh (2022) in their article "India's Success with the Digital Payment System" This study shows that the digitized Indian goals are actively pursued by the Reserve Bank of India and its responsible organisations India is currently the largest and fastest growing ecosystem in digital payments in the world thanks to a map of more than 1 billion people, including online wallets, mobile apps, e-wallets other digital payment modalities. 59% of retail payment transactions were performed simply using UPI. Many encouragement factors have led to the industry steadily growing.

Aditi Bhatia Kalluri and Brett R. in their article "Transformation of the Digital Payment Ecosystem in India: A Case Study of Paytm" uses Paytm as a case study to better understand the global platform economy and its impact on social and economic inequality. It contextualizes the emergence of Paytm by bringing attention to India's developing digital infrastructure and relationships with marginalized groups - part of the platform's user base. It is clear that Paytm has a social advantage when reducing transaction costs and making digital payments more accessible to marginalized groups. It's harmful in an age where users' data and privacy are at stake, while at the same time restraining competition in the platform industry.

Minal Ritesh Parekh in their article "Financial Inclusion and Digital payment: Diving economic growth 2030" The key financial services for population groups of sizes, as digital payments revolutionize financial integration and allow access to critical financial services such as savings, loans, and insurance companies. It allows access to initiatives such as Pradhan Mantri Jan Dhan Yojana (PMJDY) and the Unified Payments Interface (UPI) have accelerated access to the formal financial system and promoted a cashless economy India can enable anyone in society to benefit from financial integration by highlighting legislative support, including product design and strong cybersecurity..

III. RESEARCH GAP

The current literature focuses strongly on the technical and economic impacts of digital payments and fintech on sustainable funding. However, limited research examines how consumer behaviour, particularly environmentally conscious decision-making, is influenced by these innovations. Empirical research combining the introduction of fintech tools from consumers with ecological awareness and sustainable financial participation is needed.

IV. SCOPE OF THE STUDY

The scope of this study focuses on research as well as integration of digital payment systems and fintech innovation, consumer behaviour, financial decisions, environmental awareness, and households and low income, rural population groups, small and medium-sized businesses. This study analyses how digital payments affect consumer spending patterns and preferences. Furthermore, this study examines the effectiveness of fintech to promote sustainable consumption, such as environmentally friendly purchases and donations to ecological causes.

V. OBJECTIVES OF THE STUDY

1. To understand how digital payments contribute to financial inclusion.
2. To examine how fintech innovations influence consumer behaviour.
3. To analyse the role of environmental awareness in adopting digital financial practices.

VI. RESEARCH METHODOLOGY

Research methodology is a systematic plan for doing research. It provides a systematic understanding of the different steps taken by the researcher.

VII. SAMPLING

Sampling Size: In any statistical context, including a public opinion survey or a scientific experiment, sample size is the total number of individual samples or observations. The sampling size is 105 respondents which consist of people from various age groups who have different opinions on sustainable finance. The sample responses collected were 105.

- **Sampling Procedure:** For the research, simple random sampling method is used.
- **Period of the study**: The time of carrying out this study on the topic "The effect of digital payments on reducing financial exclusion and promoting sustainable financial practices: An analysis on the consumer behaviour" took a period of one week.
- **Area of the study**: The area of the study was confined to respondents who belong to Chennai.

VIII. DATA COLLECTION

Both primary and secondary sources provided the data needed for this study.

• **Primary Data:** A primary data source is an original source of information, meaning that the researcher gathered the information directly from the source for a particular project or goal. Google forms were used to distribute questionnaires online in order to gather the primary data. We utilized the Statistical Package of Social Science (SPSS) to process the data. The MS-Excel was also used to make manual calculations and MS-word used for documentation.

• **Secondary Data**: Secondary data means data that is already available. Secondary data can be classified as either unpublished or published. The internet, books, periodicals, journals, and newspapers were consulted in order to gather secondary data.

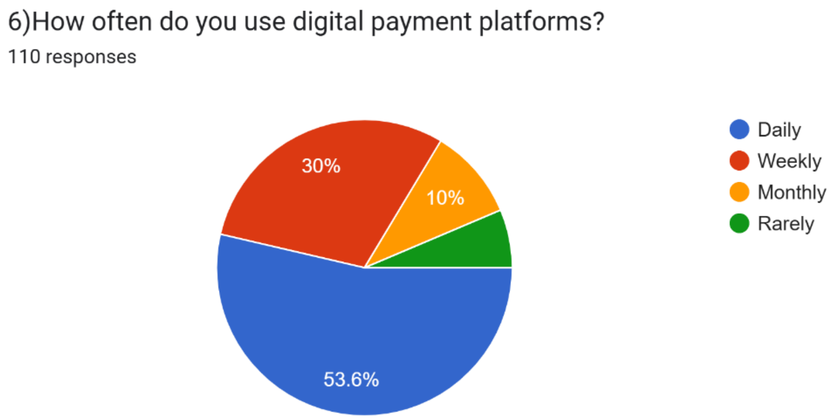
IX. STATISTICAL TOOLS USED

Chi-square analysis and Anova.

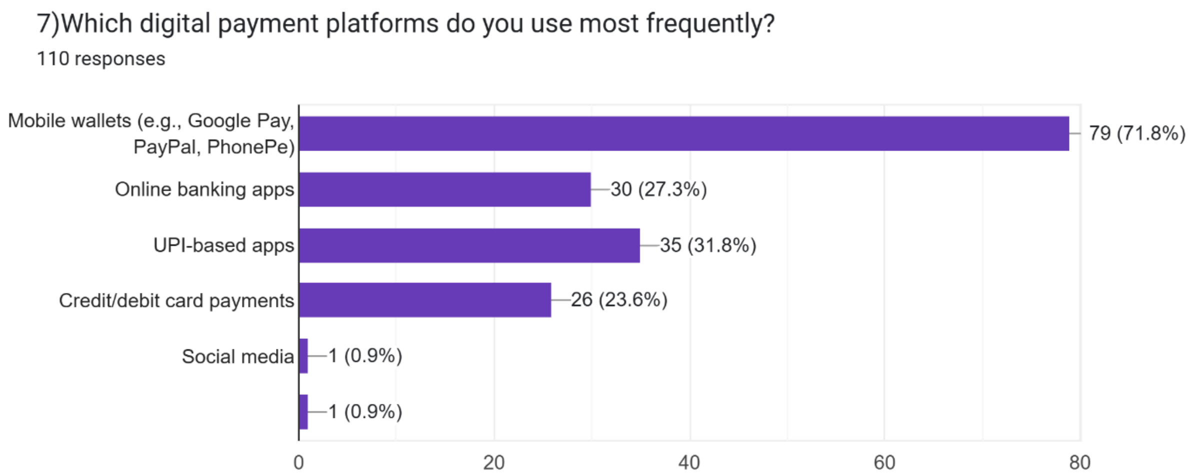
X. DATA ANALYSIS AND INTERPRETATION

FIGURES:

1.

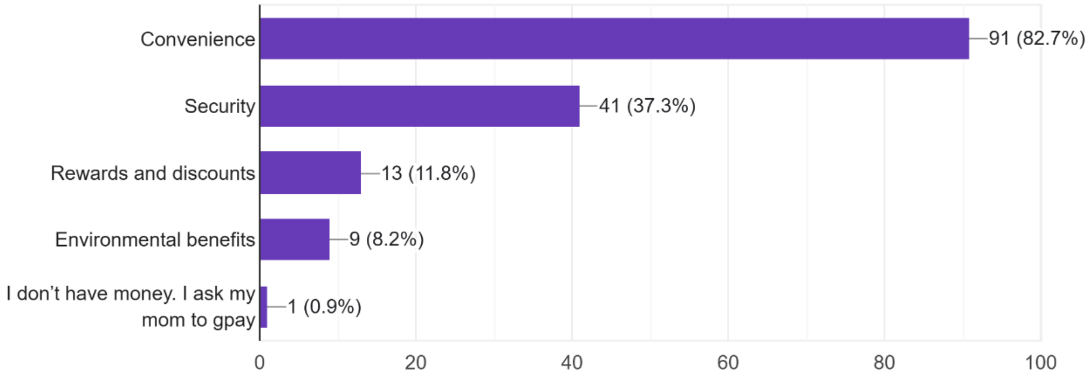


2.



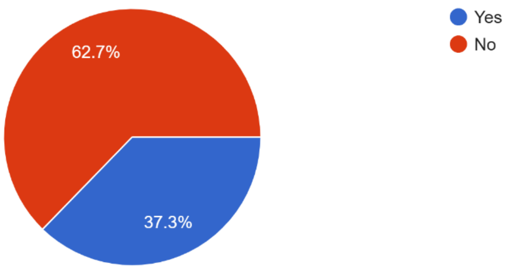
3.

8)What factors influence your choice of digital payment platform?
110 responses



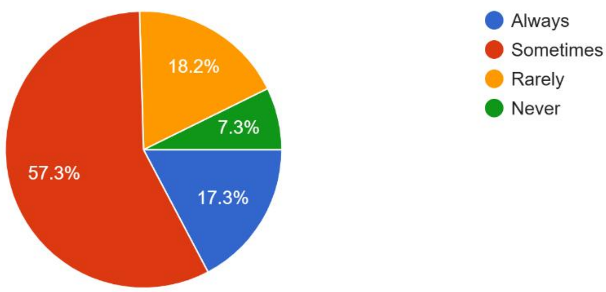
4.

9) Are you aware of any fintech platforms promoting sustainable practices (e.g., carbon footprint tracking, green investments)?
110 responses



5.

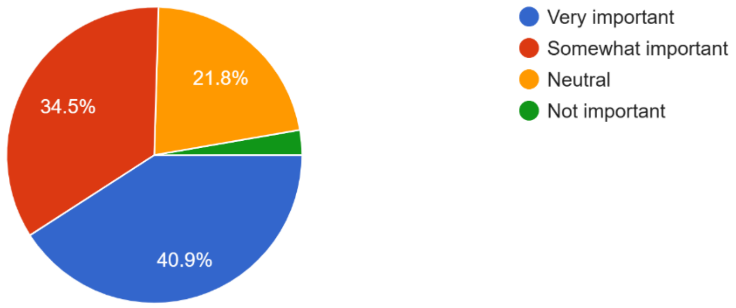
10)Do you consider environmental factors when making purchases or financial decisions?
110 responses



6.

11)How important is it to you that a payment platform supports sustainability initiatives (e.g., reduced paper use, eco-friendly operations)?

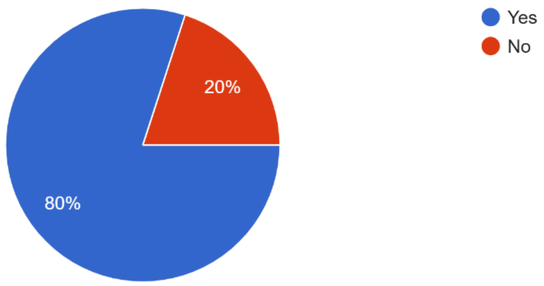
110 responses



7.

12)Have you ever opted for a product/service because it was marketed as sustainable or eco-friendly?

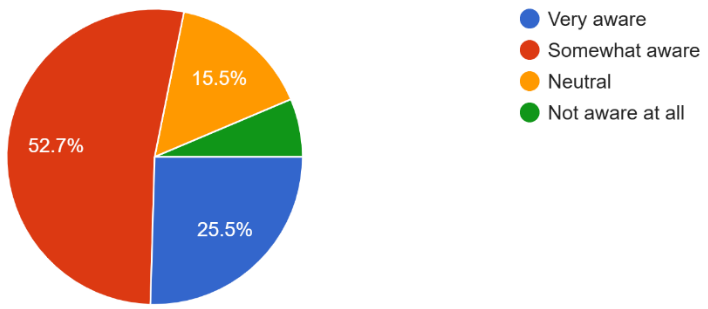
110 responses



8.

13)How aware are you of the environmental benefits of digital payments compared to cash transactions?

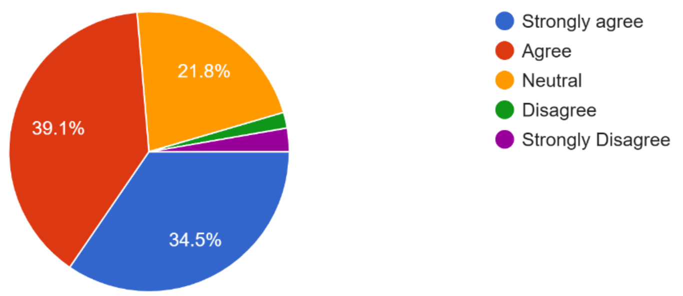
110 responses



9.

14)Do you think digital payment systems reduce the environmental impact (e.g., by reducing paper usage, fuel consumption for cash logistics)?

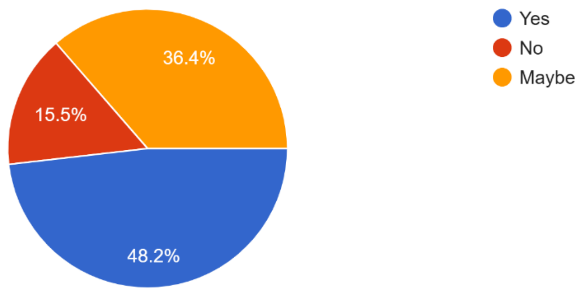
110 responses



10.

15)Would you support initiatives where a portion of your digital transaction fees goes toward environmental conservation projects?

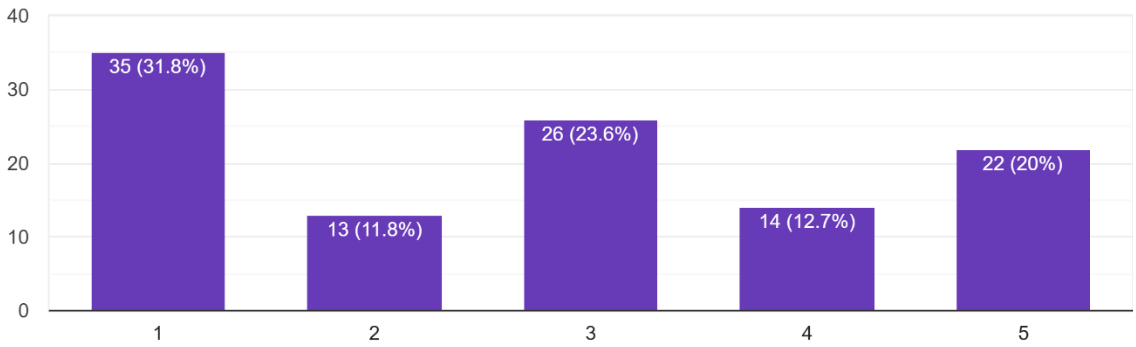
110 responses



11.

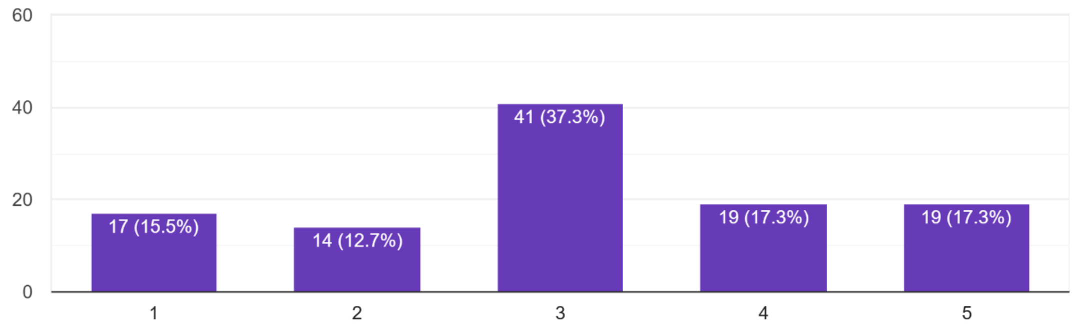
16) I find digital payment methods convenient for everyday transactions(Scale: 1=Strongly agree,5=Strongly disagree)

110 responses



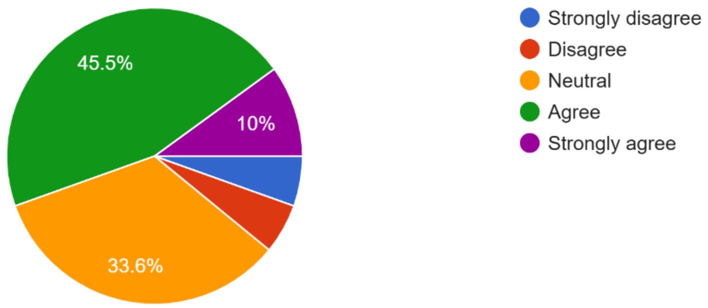
12.

17)I feel that digital payment systems are not yet widely accepted in all types of businesses.(Scale: 1=Strongly agree,5=Strongly disagree)
110 responses



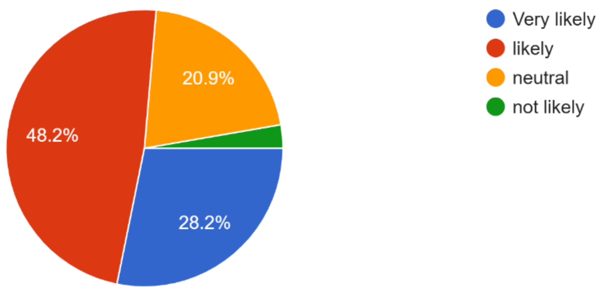
13.

18)I believe more education is needed to understand the benefits of fintech and digital payments.
110 responses



14.

19)How likely do u think digital payments should prioritise environmental sustainability?
110 responses



15.

20)Rate these factors based on your own experience related to fintech and sustainability

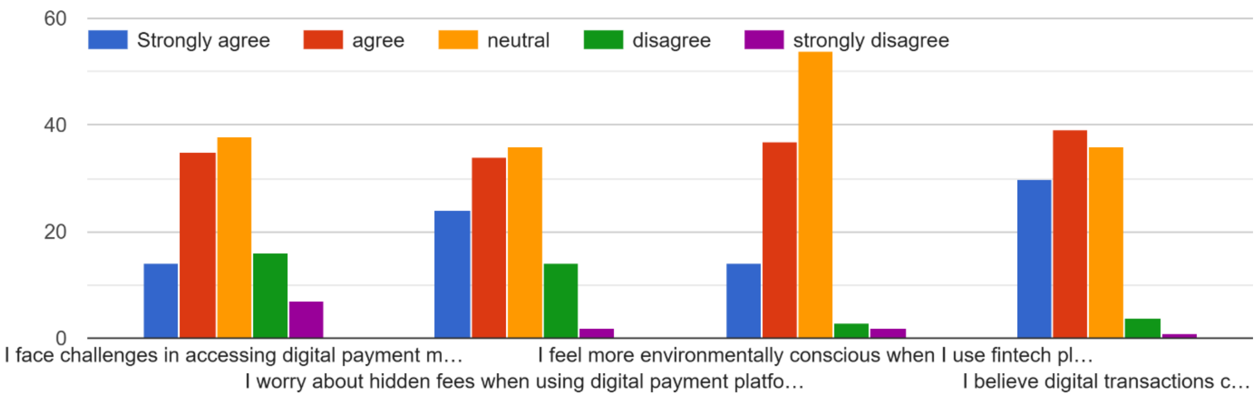


TABLE 1.1 IMPACT OF DIGITAL PAYMENT AWARENESS AND PERCEPTIONS OF ITS ENVIRONMENTAL BENEFITS (CHI-SQUARE Results)

Chi-Square Tests	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	38.941	12	< 0.001
Likelihood Ratio	38.247	12	< 0.001
N of Valid Cases	105		

12 cells (60%) have an expected count less than 5.
The minimum expected count is 0.13.

Based on the Chi-Square test results in our research, here is an inference with the null and alternative hypotheses:
Null Hypothesis (Ho): There is no significant relationship between digital payment awareness and perceptions of its environmental benefits.
Alternative Hypothesis (H4): There is a significant relationship between digital payment awareness and perceptions of its environmental benefits.
INFERENCE:

- The Pearson Chi-Square value is 38.941 with 12 degrees of freedom.
- The p-value (Asymptotic Significance 2-sided) is <0.001, which is less than the standard alpha level (0.05).
- Since the p-value is very small, we reject the null hypothesis (Ho) and accept the alternative hypothesis (H).
  There is a statistically significant relationship between individuals' awareness of digital payments and their perception of its environmental benefits.
  This implies that people who are more aware of digital payments tend to recognize their environmental advantages, such as reduced paper usage and lower carbon emissions from cash logistics.

TABLE 1.2 IMPACT OF DIGITAL PAYMENT AWARENESS AND PERCEPTIONS OF ITS ENVIRONMENTAL BENEFITS (ANOVA Results)

ANOVA

VAR00001

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	14.124	4	3.531	6.006	<.001
Within Groups	58.790	100	.588		
Total	72.914	104			

Null Hypothesis (Ho): There is no significant relationship between digital payment awareness and perceptions of its environmental benefits.

Alternative Hypothesis (H4): There is a significant relationship between digital payment awareness and perceptions of its environmental benefits.
Level of significance: 0.05 (5%)

XI. INFERENCE

The calculated value (<.001) is lesser than the allowed level of significance i.e., 0.05; hence alternative hypothesis is accepted, and null hypothesis is rejected. There is a statistically significant relationship between individuals' awareness of digital payments and their perception of its environmental benefits.

XII. FINDINGS

- **High adoption of digital payments**: Many (53.6%) use digital payments weekly or daily, with mobile wallets and online banking apps being the most popular. This provides a strong basis for further introductions to fintech.

- **Convenience is key**: Convenience is a major factor in the choice of digital payment platforms (82.7%) Security is another important concern (37.3%)

- **Moderate perception of sustainable practices**: 62.7% Fintech platforms know to promote sustainable practices. There is a separation between consciousness and action.

- **Mixed view of environmental impact**: Many of the views that digital payments can reduce environmental impact (60.9% and votes) remain neutral in the important part (34.5%) is There are also different perceptions of certain environmental benefits.

- **Support for sustainable initiatives exists**: environmental causes trading fee direction (36.4% yes, 48.2% maybe) This shows an aspiration to deal with sustainable fintech when it is effectively presented.

- **Educational needs**: Many respondents believe that more education is needed to understand the benefits of fintech and digital payments.

XIII. SUGGESTIONS

1. **Improved User Experience and Security:**
   - **Prioritize Seamlessness:** Focus on an intuitive interface, fast transaction speeds, and minimum steps to fill out your payment.
   - **Enhanced Security Measures:** Implementing robust safety protocols, including multi-factor authentication, fraud detection systems, and transparent data protection guidelines.

2. Promoting Sustainable Practices and Transparency:

- **Integrating Sustainability Features**: Develop features such as CO2 footprint trackers for transactions, CO2 emission compensation options, environmentally friendly dealers and develop information about investment options.
- **Partnership with Environmental Organizations**:

Implement conservation projects funded by initiatives with environmental NGOs, transaction fees or other mechanisms. Publicise these partnerships to demonstrate our commitment

3. **Education and Public Relations:**
   - **Education Campaign**: Start campaign to notify users about the benefits of FinTech, including environmental benefits. Use variety of channels, including social media, online tutorials, and community events.
   - **Dealing with Misconceptions**: Correct misconceptions regarding the safety or accessibility of digital payments Sustainable Action Concessions.
4. **Incentivize Sustainable Behaviour:**
   - **Reward Program:**

   Preparation or discount for using sustainable fintech features or choosing an eco-friendly dealer.
   - **Gamification:** Introduction of gamification elements such as badges and commander committees to promote sustainable financial behaviour.
5. **Discuss the Digital Gap:**
   - **Infrastructure Improvement:** Better Internet Access and Digital Infrastructure in Rural and Sub-Supply Regions for Attorney.
   - **Offline Options:** Explore hybrid solutions that combine digital and offline elements to close the gaps in people with limited digital services.

XIV. CONCLUSION

In this article, we will introduce the efforts to help consumers harmonize environmental and social values by promoting a more efficient, transparent, and integrated financial system. It concludes that we will allow them to contribute to reducing exclusions. The most important results show that the implementation of digital payment solutions reduces cash reliance, leading to a decrease in CO_2 footprint and waste production. By promoting environmentally conscious consumer behaviour and the use of innovative financial products, this synergy offers the potential to make significant advances in achieving global sustainability goals.

XV. LIMITATIONS OF THE STUDY

- This study relies on a small or region-specific sample. It may limit the findings to cultures , or geographical regions.
- Cross-sectional research captures only a snapshot of behavior.
- Self-reported environmental awareness may be biased, such as overstating concern due to social desirability.
- A detailed study was not possible due to shortage of time.

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