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Research Paper

“CUSTOMER ADOPTION OF MOBILE AND GREEN CHANNEL BANKING: IMPLICATIONS FOR BANKING EFFICIENCY”

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Abstract: Digital banking has transformed the customer journey towards financial services and has inspired banks to put themselves on board with technology-enabled banking channels that are faster, more convenient and environmentally friendly. The introduction of mobile banking and green channel banking solutions has emerged as one of the highly significant innovations as these provide the users with an opportunity to perform banking transactions without depending heavily on paper, visits to the branches and manual transaction processing. Using the current study, customer adoption of mobile and green channel banking and implications for banking efficiency are explored. Accessibility, ease of use, convenience, transaction speed, security, awareness and customer trust are among some of the factors that can impact consumer willingness to transact in an alternative channel. The study also looks at the potential of higher adoption of the technology to help alleviate branch workload, lower transaction costs, quick service, better resource utilisation and for environmentally responsible banking. The information can be accumulated in the shape of a survey-based process that asks bank customers about their awareness, usage pattern, satisfaction and perceptions of mobile and green banking services. The research is likely to yield implications from both the perspective of customers' acceptance of technology-enabled banking channels as well as operational and service efficiency. The results could also support banks in recognising key barriers to adoption and developing appropriate strategies to juice up the uptake of the use of digital and carbon friendly banking services.

Keywords: Mobile Banking, Green Channel Banking, Customer Adoption, Banking Efficiency, Digital Banking, Customer Satisfaction, Operational Efficiency, Sustainable Banking

Introduction: The sector of Banking underwent considerable changes owing to technological advances. Traditional banking relied heavily on the need of its customers to head to the physical bank outlets for services, like account services, payments, withdrawals, fund transfers as well as deposits, and has increasingly been complemented by electronic banking and digital/online means. All these advancements have benefited the customers with more flexibility and helped banks to enhance their speed and effectiveness when processing transactions.

In addition to the Internet, the mobile banking channel has become one of the most widely available digital banking channels. Mobile banking applications and other services also enable the consumer to view accounts, move funds, pay bills, set beneficiaries, get a statement, and even resort to a number of banking facilities without having to go to the branch. Mobility has revolutionized the provision of banking services: anytime, anywhere and always has become the reality. With the increasing use of mobile technology, increasing the amount of routine transactions handled by branch employees may be reduced. Improved use of resources in the organisation may also be realised.

Given the increased focus on environmental sustainability, green channel banking has also become of growing concern, in addition to mobile banking. The ultimate aim of green banking is to promote banking operations which would minimize the use of paper, energy conservation and other intake of physical resources. Typical services with an environmental-friendly approach are ATM, cash deposit machines, internet banking, electronic statements and digital payments, self-service kiosks and self-service paperless transaction services. These channels can also minimize the reliance on traditional documentation and supply clients banking services sooner.

However, a key question is whether one of these technologies will be effective in boosting the performance of the banking sector when adopted by customers. Technology is not the same as using the technology. The choice between adopting and not adopting these services can be influenced by the customers' awareness, perceived usefulness, ease of use, security concerns, trust in technology, quality of service, and access and experience with other digital services. The ages of the individuals and their educational levels, digital literacy, and banking technology can also impact adoption behaviour.

Consistently using either mobile ad or green banking could have significant effects on banking efficiency. Banks can decongest their branches to make business more efficient as customers carry out simple transactions at their own, using digital or self-service infrastructure, which means branches need less staff, can wait and serve people quicker, and can have less paper. Electronic transactions can also speed up transactions and deliver a more standardized service.

Meanwhile, there are some obstacles that might hinder the acceptance of the customer. The risk of online banking fraud or any sort of privacy issues, technical glitches, confusing interface, lack of confidence of online banking knowledge or inadequate network access and awareness could deter some customers from availed banking services. So it's important to know what customers think, to determine the places where banks have room to improve their digital services.

The present study derives focus on the mobile and green channel banking adoption by the customers and the effect of the same on the efficiency of the bank. The research seeks to understand the uptake trends in the various banking channels, perceived issues, customer satisfaction and adoption barriers that become impactful in an environment of efficient, accessible and sustainable banking operations by gaining insight into customer behaviour.

Related Works:

Walker and Johnson (2006) studied the reasons why consumers accept or avoid technology-enabled services. Consumer decisions are heavily influenced by convenience factors, utility and perceived risk as well as confidence in using technology, they discovered. Their research demonstrates that offering a technical service is not sufficient to achieve support for it. If customers are confident about the technology and are convinced about its value, they are more inclined to take advantage of these services.

Laukkanen (2007) drew a similar comparison between the perceptions of customers from internet banking services and mobile banking services. Consumers assess these services primarily in terms of convenience, accessibility, efficiency and returns on the use of the service. Mobile banking was deemed particularly beneficial as users could use banking from other visiting sites. The research emphasized the need for an understanding of what customers expect from digital banking when developing digital banking services.

Cruz, et al. (2010) analyzed mobile banking in Brazil. They found many reasons which can hinder mobile banking adoption such as mobile banking services cost, difficulty using the technology, perceived risk, and lack of knowledge. When customers lack in-depth knowledge

of the functions of mobile banking or have concerns about security of transactions, they are likely to be deterred from using a mobile phone banking service, the authors noted. They recommended building the awareness of banks related to mobile banking and to make it easier and safer for customers.

Püschel, Mazzon and Hernandez (2010) analysed the customer adoption process of mobile banking using a framework integrating three phases of adoption into a one-time process. They found that usefulness, compatibility with customer needs, social influence and behavioural control influence customers' mobile banking intentions. The study brought the understanding that user adoption is not technology dependent but it is dependent on multitude of other personal and social and technological aspects.

Akturan and Tezcan (2012) studied on the attitudes of mobile banking adoption by the young customers. They have concluded that four factors, namely customer attitude, usefulness, social risk, and performance-related concerns, affect customers' intention of using mobile banking. While young individuals are more likely to feel at ease with mobile technology, they might feel security is an issue and financial transaction is not always reliable. The report highlighted the importance of the banks offering safe and reliable mobile services.

Hanafizadeh et al. (2014) investigated the causes of the adoption of mobile banking among Iranian banking customers. They concluded that usefulness, ease of use, trust, compatibility, and perceived risk were factors that influenced customer acceptance. A much higher proportion of customers were more likely to use mobile banking if they thought it made their banking task simpler and easier. Another factor that was also highlighted is trust, which is of importance as customers rely on the security of digital financial transactions.

Baptista and Oliveira (2015) have explored the adoption of mobile banking by accounting not just for potential technology acceptance variables, but also for cultural factors. They have concluded that "Performance Expectation, Ease of Use, Social Influence, Support Available, Cultural Characteristics" can influence the actions of customers. Adoption of mobile banking was therefore not recommended to be studied just from a technology perspective, as social and cultural factors could affect consumer readiness to interact with the technology.

Alalwan et al. (2017) explored the determinants of customers' mobile banking adoption in Jordan. The authors added trust as an influencing variable in the UTAUT2 model. They concluded that performance expectations, effort expectations, price value, motivation, and trust have impact on customers' intention to use mobile banking. Trust was highlighted as a key aspect of the study since mobile banking carries financial information and sensitive personal information.

Bose et al. (2018) studied Green Banking as per the dimensions of Environmental Disclosure, Institutional pressure and Corporate Governance etc. In their study, they found that green banking isn't just about digital banking transactions or cutting down on paper usage; it's about aligning banking practices with sustainable environmental conditions. It also covers aspects of banks' communication of their environmental responsibilities and their approaches to sustainability in their business. The study pointed out how management and institutional arrangements could promote banks' practice and disclosure of environmentally responsible practices.

They Chitra and Gokilavani (2020) introduced their study on Customer Awareness and Knowledge of Green Banking Practices in India. Their study found that awareness is an important determinant in the adoption of green banking services. Having customers who are aware of services like digital payments, online banking, statements online and paperless transactions will make them more likely to use them. The study recommended banks to organise awareness program to enhance awareness of their customers about the goodwill that is offered to them by green banking.

Sharma and Choubey (2022) delved into the concept of green banking and analyzed the various green banking initiatives embraced by banks in India. They talked about their study on mobile banking, internet banking, electronic statements, paperless transaction, green loans, and green banking practices. They noted that they can contribute to environmental sustainability and the efficiency of banking activities as part of the initiatives. Meanwhile, the research outcomes showed that there are challenges, including low customer awareness, technical difficulties, and a lack of institutional support.

Thapliyal, Gupta, Jindal and Mishra (2025) investigated the effects of green banking measures on the environmental performance of Indian banks and their involvement in green financing. The outcomes of their research indicated that good green banking practices could contribute to an enhanced environmental performance and sustainable engagement in financial activities. The study also highlighted the increasing importance of digital services and green financing in the development of a more sustainable banking sector.

The literature reviewed reveals that customer adoption of mobile banking is affected by a number of factors such as convenience, usefulness, ease of use, security, trust, compatibility, customer awareness and others. Research on green banking further reveal that paperless service, digital payments, environmental awareness, and institutional support are significant factors in promoting environmental-friendly banking operations.

Previous research has looked at mobile banking and green banking individually. There are still opportunities for research on the impact of customer uptake of both channels of banking on the general efficiency of banks. Mobile and green banking can potentially decrease physical branch dependence, lessen time required for transactions, decrease paper usage and enhance customers' convenience, while also increasing efficiency within bank resources. Thus, in the present study the customer adoption of mobile and green channel banking and its impact on the banking efficiency is put under scrutiny.

Objectives of the Study:

1. To examine the level of customer awareness, adoption and usage of mobile banking and green channel banking services.
2. To identify the major factors influencing customer adoption of mobile and green banking channels, including convenience, ease of use, security, accessibility and customer trust.
3. To evaluate the implications of customer adoption of mobile and green channel banking for operational efficiency, service efficiency and sustainable banking practices.

Material and Methods:

The research design used for this research is a descriptive research design; this research aimed at finding the phenomenon of mobile banking and green channel banking adoption by the customers and understand the implications on implication of banking efficiency. Primary/Secondary sources were taken into consideration. A structured questionnaire was used to answer primary questions from bank customers and secondary data were gathered from research articles, journals, reports, and published papers pertaining to a digital banking, mobile banking, customer technology adoption and green banking.

A sample of 150 bank customers was considered for the study. Customers taking banking services from public and private sectors were selected as the respondents. The convenience sampling was used to collect responses from people who were familiar with at least one digital or self-service banking facility.

The questionnaire was segmented into a series of parts to measure the frequency of the adoption of use of the mobile and green banking services, the factors affecting the use of the mobile and green banking services and the perception of customers about the improvement of making banking more efficient. This included factors like convenience, availability, ease of

use, how fast a transaction takes place, how secure it is, how aware of it the customer is, and how environmentally friendly it is.

Level of use of the channel was studied on a four-point scale with regularly = 4, occasionally = 3, rarely = 2 and never = 1. A five-point Likert scale: strongly agree = 5 to strongly disagree = 1 was used for perception related sentences.

Analysis of the study:

Table 1. Customer Adoption of Major Mobile and Green Banking Channels

Banking Channel	Regularly (%)	Occasionally (%)	Rarely (%)	Never (%)	Mean Score
Mobile banking applications	64	22	8	6	3.44
ATM/Cash Deposit Machines	58	26	10	6	3.36
Digital payments/fund transfers	56	26	12	6	3.32
E-statements and paperless services	52	28	12	8	3.24
Self-service banking kiosks	38	30	18	14	2.92

Customer Adoption of Major Mobile and Green Banking Channels

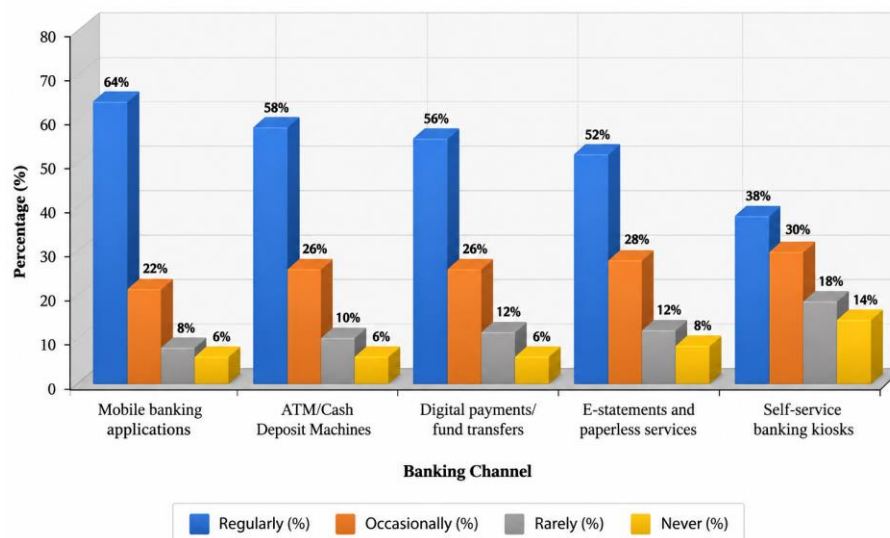
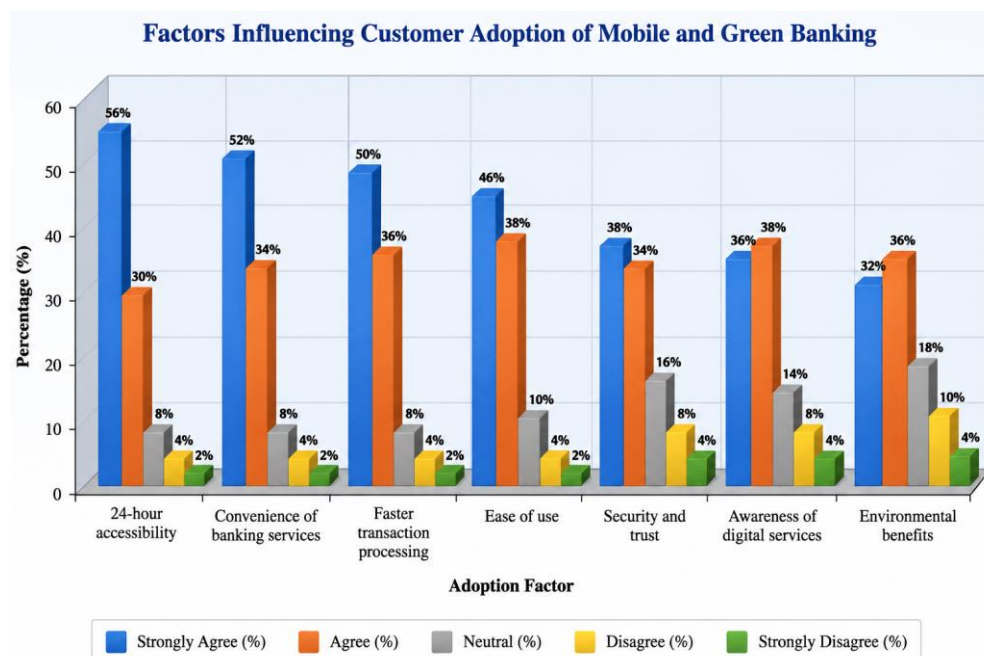


Table 1 indicates that the most used banking channel was mobile banking applications which reached 64% of the respondents that used the apps frequently. Also, adoption rates were relatively high for ATM and cash deposit machines. E-statements and paperless banking services were regularly used by more than half of the respondents. On the contrary, the lowest mean score (2.92) was for the use of self-service banking kiosks, indicating that customers were less reliant on banks during self-service days.

Table 2. Factors Influencing Customer Adoption of Mobile and Green Banking

Adoption Factor	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)	Mean Score
24-hour accessibility	56	30	8	4	2	4.34
Convenience of banking services	52	34	8	4	2	4.30
Faster transaction processing	50	36	8	4	2	4.28
Ease of use	46	38	10	4	2	4.22
Security and trust	38	34	16	8	4	3.94
Awareness of digital services	36	38	14	8	4	3.94
Environmental benefits	32	36	18	10	4	3.82



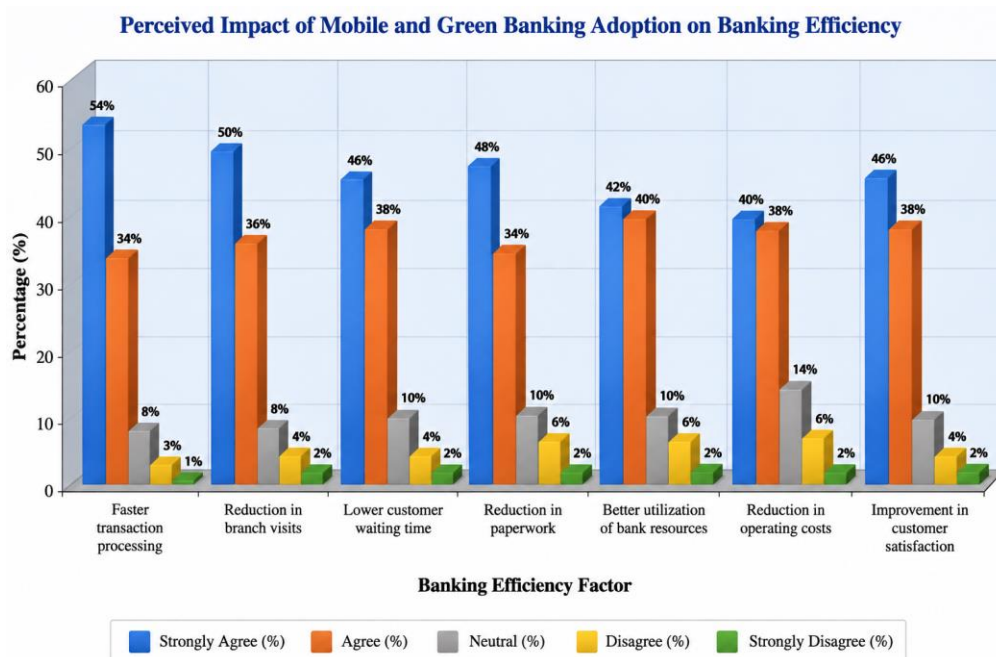
From Table 2 it could be seen that continuous access was the best factor to influence the adoption with a mean score of 4.34. The mean responses for the ease of use, transaction speed and convenience factors were also rated highly. These findings indicate that one of the key reasons for customers to use digital banking avenues is because it saves their time and effort on their everyday banking needs.

Trust and security achieved a mean score of 3.94, which means customers have more trust in digital banking, but some remain concerned. The lowest mean score was with respect to environmental benefits with 3.82. The score is generally received in a positive way, but it

does imply that convenience and functional benefits are of greater importance to the uptake than environmental factors.

Table 3. Perceived Impact of Mobile and Green Banking Adoption on Banking Efficiency

Banking Efficiency Factor	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)	Mean Score
Faster transaction processing	54	34	8	3	1	4.37
Reduction in branch visits	50	36	8	4	2	4.28
Lower customer waiting time	46	38	10	4	2	4.22
Reduction in paperwork	48	34	10	6	2	4.20
Better utilization of bank resources	42	40	10	6	2	4.14
Reduction in operating costs	40	38	14	6	2	4.08
Improvement in customer satisfaction	46	38	10	4	2	4.22



With a mean score of 4.37, table 3 shows that the major efficiency benefit customers saw was "faster transaction processing. A reduction in branch visits also came in at a high score of 4.28. Mean scores between 4.00 and higher indicate that users had a positive perception of the mean scores of lower waiting time, reduced paperwork and improved customer satisfaction, thereby capturing the efficiency gains of digital and green banking.

Results and Discussion:

The results of the study reveal that customers have become more and more using the channel banking and mobile channel to deal with their basic banking need. Compared to the other channels investigated, the mobile banking applications showed the largest regular usage, with 64 per cent using these applications regularly. This was followed by the adoption of ATMs/Cash Deposit Machines at 58% and access to digital payments/services for transfers of funds at 56% of the respondents. These findings clearly show that the banks which are accessible through easy methods of payment which take a smaller number of visits to the bank branch are preferred.

The results also showed that the greatest influence over customer adoption was the accessibility in the 24-hour period with a mean score of 4.34. For convenience, the mean was 4.30 and for faster transaction processing it was 4.28. The ease-of-use (2.01) and functional parts of the CPG tools (2.81) were also good. The findings reveal that time-saving, ease of transacting and building flexibility in accessing banking are the key motivations that have brought customers as customers to digital banking.

The security and trust obtained comparatively low mean of 3.94. Despite the generally high level of confidence in digital banking services, customers remain somewhat concerned about fraud, online transfers, data privacy and cyber-security issues when deciding to join digital services. To maintain robust security systems, banks need to ensure they have appropriate systems in place and provide clear information for the customers about how to practice safe banking online behavior.

The mean rating for environs was 3.82, but was higher than convex and access. This means that the customers are mostly interested in green banking service for its functional aspects, but not necessarily because of its environmental attributes. However, access to electronic statements, mobile transactions, ATM, electronic payments, and other paperless financial services can help lower the consumption of paper and reliance on branch client transactions.

The same study also found a positive perceived correlation between the adoption of customers and banking efficiency. Customers perceived having faster transaction processing as the highest level of efficiency-related mean score, 4.37, indicating high association of increasing service speed with digital banking among their preference. Reduction in the number of branches visited had a mean score of 4.28, and waiting time decreased and customer satisfaction increased with a mean score of 4.22.

The mean score for a reduction in paperwork was also high at 4.20. The use of electronic receipts, online statements, mobile payments and electronic documentation can minimize paper use and manual effort. This can have a positive impact on banks as it helps to reduce administration costs, while also promoting eco-friendly banking practices.

Reduction of operating costs also recorded a mean score of 4.08 with better utilisation of banking resources recorded a mean score of 4.14. By having customers conduct common activities digitally and through self-service, bank personnel can focus on more omitted tasks, like customer service, financial advice, loan origination and dealing businesses with complaints. This can help to optimize the use of labour and capital resources.

In general, the results show that customer use of mobile banking and green banking is beneficial for customers and banks. For the consumers, they enjoy the convenience and have access to the banks faster, have shorter transactions and reduced usage of physical branches and on the other hand, for banks, there is a potential of reduced workload and paperwork, efficient use of resources, and better service delivery.

The results also indicate that mobile banking and green banking are well interconnected. Technology-enabled banking products and services, including electronic payments, fund transfers, digital statements, and Internet banking services, are also helping to achieve the goals of green banking, and they are reducing the amount of paperwork and increase in the need to travel to branch offices. Thus, the promotion of customer adoption of digital banking can help ensure efficiency and sustain environmental protection.

Conclusion:

The study is conclusive and reveals the significance of going mobile and green in the banking domain to improve the efficiency in banking, or banking system. Mobile banking applications, electronic payments, ATMs, cash deposit machines, electronic statements and other self-service services are some important competing options to traditional branch banking.

The results reveal that the most important factors, which encourage the customers to use these services, are being accessible, convenient, fast in transactions and easy to use. Banking facilities where customers can access services during the day and night to conduct transactions without having to wait in line long after banking hours have ended are becoming more popular.

The study further shows that leveraging the use of mobile and green banking services can help process transactions faster than usual, encourage customers to reduce their bank branch

visits or wait times, reduce paperwork and queue wait times, increase the efficiency of the bank's resources use, and improve customer satisfaction. The importance of technology banking channels in the value addition from the service and operational efficiency can be inferred from such gains.

But a lack of security awareness, low awareness and access to digital literacy are likely to limit adoption for some customers. It is thus recommended for banks to improve digital security, simplify banking platforms, bank customers' education and awareness on secure use of digital bank services.

Furthermore, the dissemination of a message about the environment benefits of green banking should be increased. Customers should be notified that using electronic statements, mobile transacting, digital payments and self-service can help minimize paper usage and reliance on banking processes.

Finally, the combination of mobile and green channel banking can create a banking system that will be more accessible, efficient, customer-friendly and environmentally friendly. For banks aiming at efficiency and contributing to the digital and sustainable banking trends, gaining the awareness and confidence of customers in these services will be crucial.

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