

Welfare Analysis of Voluntary Insurance as New Product in Bank-led Digital Banking Services: Winners and Losers of Digitized Banking Transactions

Akim M Rahman^{1*}, Lavina M Zaman²

¹Faculty of Business Studies, Dr. Momtaz Begum University of Science and Technology, Bangladesh

²Institute of Business Administration (IBA), University of Dhaka, Bangladesh

Abstract

Today humankind lives in a world of business-mentality with a technology-driven lifestyle where services are carried out in a multifaceted, competitive and rational manner. Banking services are no different. Accordingly, it has resulted in the usage of digital banking services. However, it is characterized by evolving many factors that are often unpredictable. It faces serious pitfalls, being it riskiness when it comes to choices using digital banking, particularly bank-led digital banking services. Customer here faces perceived risk such as psychological risk, social/privacy risk, hidden charges and account hacked risk etc. Adaptation of the VI as a new product in bank-led digital banking services can affect two groups of bank customers. They are: i) winners who benefit from accessing the VI product and ii) losers who supposedly worsen their relative position when the growth trends of digital-banking services will be in full swing, i.e., the cashless society in economy country-wise such as Bangladesh. Accordingly, it can be impetus for policy-design meeting the challenges of today's digital-banking in economy country-wise such as Bangladesh. Regarding price or cost, a fixed price for insurance can have both positive and a minor negative implication depending on the market structure, which will overall reduce transaction cost and increase access to it. Welfare analysis ratifies that it increases consumer surplus, bank's profit, economic growth, employment opportunities and social welfare by improving quality of life. Strategic tools like SWOT analysis ensured here a comprehensive understanding about the VI product and ratifies win-win prospects.

Key Words: Bank-led digital-banking services; Perceived-risk; Voluntary Insurance (VI) as a new product; Fixed price for insurance; Win-win prospect for customer & service providers; Social welfare function

***Corresponding Author:** Akim M Rahman, Associate Professor, Faculty of Business Studies, Dr. Momtaz Begum University of Science and Technology, Bangladesh; E-mail: akim_rahman@hotmail.com

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1. Introduction

Today humankind lives in a world of business-mentality with technology-driven lifestyles where services are carried out in a multifaceted, competitive and rational manner. Time values & reliability of relevant services in this journey are counted more than ever before no matter where we reside. Thus, decision factors mainly expediency and cost-effectiveness, have led individuals or businesses to welcome usage of ICT in many ways. As a result, in technology-driven world-economy country-wise, service sector like banking services have been modernized. Similarly, customers compete for comparative time-saving options and banks strive to marginalize its operating costs without deteriorating the quality of services [1,2].

Accordingly, besides having Mobile Financial Services (MFS) in economy country-wise, banks themselves have been promoting digital banking services in many ways. It is well recognized that some MFS providers are subsidiary of different banks, and they operate under the authority of Central Bank in economy country-wise such as Bangladesh. For example, in Bangladesh, bKash is an MSF provider, which is a subsidiary of BRAC Bank and operates under the authority of Bangladesh bank. Although the MFS services started with one MFS provider in Bangladesh in 2011, now there are 13 organizations and it has been growing since the beginning. But MFS services are no grievance free [3]. Also, the services here charge fees in most cases unless the company's promotional offers is in place.

Besides this advancement of the MFS, banks in financial sector of economy country-wise such as Bangladesh, provide digital services in many ways. Banking digital services are delivered through the internet.

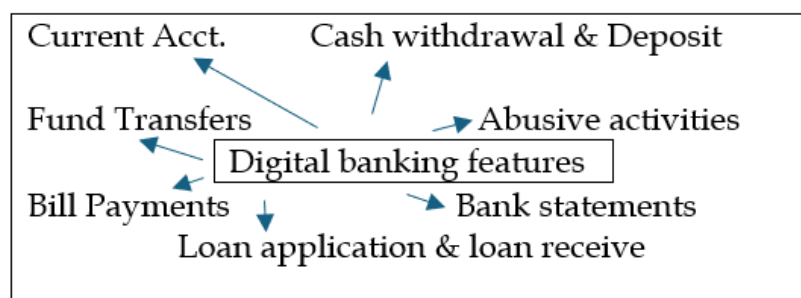


Figure 1: *Today's digital-banking's features.*

Source: *Author's creation.*

However, the MFSs are not dispute & risk free in economy country-wise such as Bangladesh where the study was completed by joint efforts of the Bangladesh Bank and University of Dhaka [4]. This group study clearly identified several major challenges about the MFSs in Bangladesh. Here majority of customers complained about the high-rise in-service fees charged by MFSs operators.

Many customers have bad experiences like blackmailing and hijacking money for using MFSs by criminals [4,5]. Besides these incidents and controversies, the MFS industry in Bangladesh faces challenges such as agent network management, security concerns, customer education, and the need for greater interoperability.

On the same token, bank-led digital-banking services are not risk-free either [5-7]. Particularly bank-led digital banking faces serious pitfalls being riskiness such as

- Security risks from different angles.
- Breach of privacy.
- Disparity in services offered by banks.
- Cybercrime existence, which is undeniable no matter what country we talk about.
- Systemic risks in completion transactions.
- Abusive activities in digital banking services.
- Customers in general do not remember their bank balance all the time. So, sending text messages may not be helpful except getting info about transactions.
- Lack of digital literacy & consumer knowledge of some unbanked population.
- Governance issue – includes lack of transparency, weak mgt practice & corruptions.
- Psychological risk factors - they discourage probable customers from signing up.

Besides this, if a customer does not follow the security guidelines provided by the bank, such as creating secure passwords, not sharing passwords, or failing to log out of the customer's digital banking account and such others, they could become a victim of online fraud [8].

All these together might have led to a slower-growth of bank-led digital-banking in countries like Bangladesh. Transferring cash takes a lot of trust in the system where many people in Bangladesh do not seem to truly trust the digital money transfers [8,9].

Overall, this dilemma is characterized by evolving many factors that are often unpredictable. It faces serious pitfalls, being it riskiness. Customers compete for time-saving options. Banks compete to marginalize their operating costs then enhance generating revenues. Most cases, customers do not scan or read terms & conditions of services, and they do not save contract-copy. These weaknesses cause abuse. Customers face perceived risks such as hiding charges, extra fees, account hacking etc. and, in some cases, it takes a lot of effort to resolve it [8,10].

No matter what country's digital-banking system we talk about, transferring cash or digital-banking takes a lot of trust in the system. Based on current digital system setup country-wise such as Bangladesh, a customer receive text message relates to the transaction and account balance information. However, from time to time it gets failed to reach the customer because of electricity or mechanical failure. Secondly, customers do not exactly remember the customer's bank balance. Thirdly, filing a complaint to respective authorities on the issue is not easy to get it done. Accordingly, many people in countries such as Bangladesh do not seem to truly trust bank-led digital money transfers. Thus, trust is pivotal [8,11].

Addressing today's digital-banking dilemma, particularly the bank-led digital dilemma, the current author proposed Voluntary Insurance in literature as a product in bank-led digital-banking services [6]. Under the proposal, bank will introduce "Voluntary Insurance (VI)" as a new product in digital-banking-services where customers will decide buying or not buying it [6]. Literature clearly supports that innovations include the introduction of a new product or service, obviously, a legal product or service stands as a pillar of support for the overall financial system [12]. However, no economy country-wise such as Bangladesh has yet introduced the VI policy, which could have been a win-win to parties involved in today's digital-banking service-market.

Accordingly, this study advances with setting up the technique of pricing the proposed VI product and then carrying out welfare analysis of the presence of the product in digital-banking services in economy country-wise such as Bangladesh. Finally, we carryout welfare analysis of having the VI as a new product in bank-led digital-banking services in Bangladesh economy.

2. Literature Review

It is well recognized that innovation or new products, obviously a legal one, fosters social welfare. Technological and organizational changes create or facilitate new opportunities addressing societal changes and to improve human life [6,13]. In today's Tech-driven world economy, the service sectors such as banking sector have been modernized cost-effectively. Similarly, customers are competing for comparative time-saving options and marginalizing costs no matter what economy country-wise we talk about. Besides traditional banking, Mobile Financial Services (MFS) such as bKash, Western Union etc. serve new ways financial services, however these services are not complaints or grievance free in operation [14,15].

In today's world, many factors are often unpredictable. Strict laws & its fullest application can marginalize the magnitudes of "perceived risk". On this matter, developed countries are doing better and ahead of developing countries. But it does not guarantee absolute risk-free digital-banking, particularly bank-led digital banking even in developed countries. On risk issue, developing countries are vulnerable, which might have led a slower growth trend of bank-led digital transactions in countries such as Bangladesh.

Dealing with the determinant the "Perceived Risk", the current author proposed in literature Voluntary-Insurance, which is known as Akim's model where the proposal has also been treated as a policy-proposal in digital-banking system [6]. Akim's Model has been well recognized in literature in many formats including a book published by Lambert Academic Publishing, European Union, etc. [6,16].

In today's world, it is well recognized that digital transformation is not just a buzzword. It is the profound transformation of business processes and competencies for fully leveraging the changes & opportunities of digital technologies and their impact across society in a strategic and prioritized way. However, the growth-trends of digital transactions, particularly in the bank-led digital service-market have been almost steady or declining slowly in economy country-wise such as Bangladesh.

Accordingly, this study advances further making the VI proposal as a new product appealing to policymakers & bank management for relevant policy design so that digital-transactions growth-trends can be faster in economy country-wise such as Bangladesh.

3. Objectives

The primary objective of this study is to carry out welfare analysis in dual faucets – i) social welfare analysis on adopting the VI as a new product in bank-led digital banking services and ii) welfare analysis of the VI policy, Akim's Model, in digital banking services in economy. The specific objectives are as follows,

- To examine whether the VI as a new product can facilitate a net increased number of VI users, i.e., consumer & producer's well-being in bank-led digital banking services.
- To examine the productivity using welfare analysis adopting VI product in digital banking.
- To hint on setting up price or cost of insurance (the VI product) that can ensure efficiency cost of competitive pricing under welfare analysis in digital banking service market.
- To carry out SWOT analysis of the VI as a new product in bank-led digital banking service market in economy country-wise such as Bangladesh.

4. Methodology

In aim to establish the basis of the VI as a new product in economy country-wise such as Bangladesh, this study uses the theory of consumer choice & behaviors [17]. For guidance in policy design-adoption of VI policy including assessing amount of cost or prices for insurance, this study carries out Welfare Analysis of the application of VI model. Also, this study uses strategic tools like SWOT to enhance the analysis for further understanding of the VI product.

5. Social Benefits of Adopting VI as a New Product in Bank-Led Digital-Banking Services

It is well recognized that having a new product or an innovation in a business can foster social welfare where banking business sector is no different [18,19]. Here technological & organizational interest for change and then advancement can create new opportunities addressing societal changes improving human life. This is the fundamental motivation, which has been spurring the development of innovation research and policymaking over the last 50 years or so [18,19]. It is also recognized in literature that these recent technologies contribute to address societal challenges and foster welfare in human society [20-22].

Underpinning motivational efforts of having or adopting innovation or new product in activities/services or in lifestyle, two states of world can be compared where one is with VI in bank-led digital banking services. And the other one is without VI as a new product in Bank-led digital banking services [18,19].

To fix ideas, let us assume that the probability of adopting an innovation, i.e., VI as a new product in bank-led e-banking services at time (t) depends on the magnitude of policymakers' or bank-management efforts at 0 (zero) time plus other characteristics or features that have been helping conducting e-banking services [1,17].

Accordingly, $Pr \{INt\} = f(\text{policy makers' efforts introducing VI as a new product}) + \epsilon \dots (1)$ where IN represents inclusion of VI as a new product at time t [1].

And $Pr \{NIt\} = f(\text{policy makers' efforts to introduce VI as a new product}) + \epsilon \dots (2)$ where NI represents no inclusion of the VI as a product in bank-led digital banking services [1].

Here a state of this world is defined as a matrix X that denotes the bundle of resources and capabilities allocated to everyone in that given situation. Accordingly, our framework seeks to compare social welfare that is associated with state of the world XNI (social alternative with no innovation or no VI product) and XIN (social alternative where VI has been adopted as a new product in bank-led digital banking services).

Innovation: Adding VI as new product and a broader notion of well-being in bank-led digital banking services

It can facilitate a broader notion of e-banking users well-being, which goes beyond the traditional economics concept of utility maximization through preference satisfaction [1,2,23]. Accordingly, the utility function can be written as,

$$U_i(X_i) = U_i(X_{i1}; X_{i2}, \dots, X_{id}) \dots (3) [6]$$

In dynamic terms, the intertemporal utility function may be written as

$$U_i(X_{it}) = \int U_i(X_{it}) e^{-\rho t} dt \quad \dots (4) [6]$$

where ρ is the rate of time preference, accounting for the fact that well-being today is preferred to well-being tomorrow. This dynamic formulation is important for our framework because innovation is an inherently dynamic activity: some of its effects will manifest in a brief period, whereas others will only become visible in a longer-term perspective. It is thus important to make an explicit distinction between short-run and long-run effects because these may have different relevance in terms of social effects and related options for innovative policy makers. We may then specify individual well-being that is associated with different time horizons: $U_i(X_{iS})$ is short-run well-being (if the integral in equation 3 is defined between 0 and S); and $U_i(X_{iL})$ is long-run well-being (if the integral in equation 3) is defined between 0 and L) where S = short-time and L = longtime.

5.1. Using Social Welfare Function (SWF)

With this setup, the bank-management or policymakers in case of ensuring higher growth-trend of digital-transactions in economy country-wise such as Bangladesh should acknowledge that an innovation or new product will lead to a shift from state of the world NI to IN, is welfare associated to IN greater than welfare associated to NI. Accordingly, we use here Social Welfare Functions (SWF), an analytical tool that has long been used in welfare economics to theorize the foundations of public choices [24]. Here SWF is also known as simple utilitarian, which defines social welfare as the simple sum of individuals' well-being (utility) [20,24,23]. Using this technique, the graphical presentation can be carried out as follows

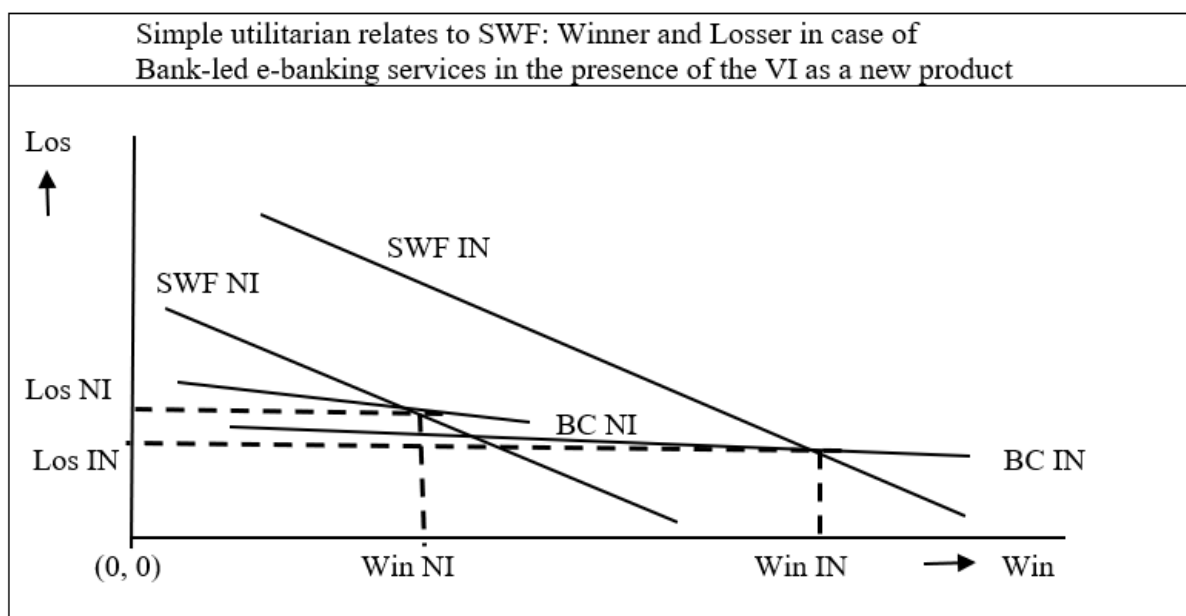


Figure 2: Effects of VI as new product on social welfare: a comparison of a simple and a generalized utilitarian Social Welfare Function (SWF). Here Win = Winners; Los = Losers; BC = Budget Constraint; NI = No Innovation, i.e., no VI adaptation; IN = Innovation i.e., with VI adaptation in bank-led digital banking services.

Source: Author's creation.

Figure 2 shows the static effects of the VI product on two groups of bank customers. They are:

- Winners who benefit from accessing the VI product and.
- Losers who supposedly worsen their relative position when the growth trends of digital-banking services will be in full swing, i.e., the cashless society in economy country-wise such as Bangladesh.

Since innovation is a dynamic phenomenon that unfolds over time, some of its effects may be visible in the short-run, whereas others take many years to manifest, and they will only be visible in the long-run. Here it is reasonable to suggest that the effects of this innovation on social welfare may change over time. It may decrease the impact of the VI over time (strong in the short term, vanishing eventually), whereas other technological changes may have increasing effects over time.

So, it is palatable raising question: what is voluntary insurance (VI) and how should it work in bank-led digital banking services in economy country-wise such as Bangladesh.

6. Voluntary Insurance (VI): What is it? How Should it Work? Why is it Essential Now?

- What is Voluntary Insurance?

In today's digital-banking service-market, addressing the risk-factor issues, especially perceived risk-factors that undermine the growth of digital-banking in world-economy country-wise, Voluntary Insurance (VI) as a product or a policy proposal was proposed by Akim Rahman in literature [25]. It has been well recognized in literature in many formats. However, no economy has yet adopted the VI policy, despite the reality that banks are facing a slow growth trend of transactions in the economy country-wise such as Bangladesh.

- How should it work?

The financial sector can introduce it in digital-banking operation where the bank or third party can collect premium ensuring secured services. The way it would work is the customer's participation will be voluntary. Insurance will be attached to the customer's bank account, if and only if, the customer wants it for digital services. Since the program will be designed in a way of transferring the risk away from its premium-payers, it will ensure premium-payers with a sense of certainty. Under the proposal, the bank sector will introduce it as a product of bank services. Transferring risk away from customers will benefit both PCBs and bank-customers. This model can facilitate the parties involved increasing usage of on-the-go banking services while customers can maintain optimal utility of usages.

Here premium receivers will take extra measures for ensuring risk-free digital-banking services such as digital transactions such as paying bills, shopping etc. whenever a customer needs to do it. Besides this, for example, ATM Card or Credit Cards, Bank Cards etc. can be protected by setting two identifications such as password and a finger-scan. Suppose a customer wants to use an ATM card to access the customer's account, the customer will have to use two identifications namely own setup password and previously chosen finger-scan say his thump or forefinger scan. Here finger scan in addition to password can be connected to the ATM system, which will make digital banking to be enhanced secure. Overcoming the risk of heist or hacker's access to bank accounts, under the proposed VI policy, similar own

set up identifications can be used. In global banking cases such as remittances, the program can ensure risk-free on-the-go or digital banking services.

- Why is it essential now?

Besides infrastructure limitations, online banking in Bangladesh faces significant challenges including cybersecurity threats and frauds, financial illiteracy, and regulatory hurdles [7]. These issues hinder the adoption and growth of digital banking services and necessitate targeted solutions. No regulatory policy has yet been ensured, which undermines overcoming the dilemma of “Psychological Risk-Factor”. Also, the concerns about data-privacy, security, and the reliability of online banking services have been making it difficult for some customers to adopt digital banking services as they need it daily. Here, the risk factors perceived, i.e., peoples’ psychological factors, are undermining the growth trends of digital transactions. On psychological risk-factor, people in rural areas feel it to be riskier than that of people residing in city areas [6,8,10].

Perceived risk-factors are undeniable no matter where individuals reside. Since we live in the 21st Century business-driven world where no mother feeds a baby unless the baby cries in terms of economics, perceived risk factors play significant roles in an individual’s subjective assessment of potential negative consequences or losses related to a particular choice or action [17]. It is about the uncertainty a person feels when faced with a decision, particularly in areas like making a purchase, engaging in risky behavior, or using a new system such as digital banking services.

However, with time constraints and ensuring conveniency in lifestyle, people prefer using digital banking services even if it is needed to spend some extra money for ensuring secured services. In this case, having access to VI product can ensure absolute risk-free services where VI policy adaptation by the policymakers and bank management stand out as a precondition in economy country-wise such as Bangladesh. It can help customers' needs to be able to access banking services including account creation and registration, making payments, e-commerce transactions, applying for loans etc., easily, quickly from anywhere and anytime.

With these limitations and prospects, the VI product can attract new customers who were on the brink using digital banking but just felt it was too risky. This model can facilitate the parties involved increasing usage of on-the-go banking services while customers can maintain optimal utility of usages. The VI product under the VI policy, which is crucially needed to be adopted in digital-banking service market in economy of Bangladesh.

7. Setting Price / Cost for the VI Product Ensuring Risk-Free Bank-Led Digital Banking Services

In today’s digital banking services, customer compete for time saving option and service provider (bank) compete for securing higher revenues in economy country-wise such as Bangladesh. It is well recognized that bank-led digital-services in Bangladesh first started in early 2000s [11]. Since then, it has been growing slowly but steadily where in 2010, banks began taking up a wide range of initiatives as part of their efforts to encourage customers to adopt the digital window. Despite these efforts in diverse ways from banks in Bangladesh, risk-factors particularly psychological risk factors have been discouraging the probable customers signing up for bank-led digital banking-services. As hinted by the Bangladesh Institute of Bank Management (BIBM), a supportive policy and regulatory environment are the crucial prerequisites for the digitization journey of the financial sector [11,15].

With this progression, the bank-led digital banking services i.e., the online banking platforms typically charge fees for numerous services like transaction fees, account maintenance, and statement requests etc. Obviously, the amount of fees or charges varies from bank to bank in financial sector of Bangladesh. The breakdown of bank-led digital service fees or costs can be summarized as follows [26].

7.1. Breakdown of current bank-fees in financial sector of Bangladesh

Transaction fees: Domestic transfers - fees for transferring funds between accounts within the same bank or to other banks vary by bank but generally range from Tk. 10 to Tk. 100 per transaction, depending on the amount and type of transaction.

Fees for debit cards/credit cards: Issuing cash withdrawal cards such as debit card, credit card etc. where bank charges as annual fees. Also, bank charges transaction fees if the ATM is not within their own network.

Account maintenance fees:

Minimum balance: Some banks may charge a fee if the account balance falls below a certain minimum.

Statement fees:

Account statements: Some banks may charge a fee for providing account statements beyond the standard free statements.

Certificate/report fees:

Balance confirmation certificates: Some banks charge fees for issuing balance confirmation certificates, especially for additional requests beyond the standard yearly or half-yearly provision.

Solvency certificates: Fees may be charged for issuing solvency certificates.

7.2. Setting up price/cost for the proposed VI product in digital banking services

It is well recognized that to establish the price of a new product, a bank will need understanding its competitive landscape, then setting prices strategically based on factors like cost, value, and market demand [17,26]. Here the bank's pricing strategy will likely involve various pricing methods, potentially including cost-plus pricing, value-based pricing, or competitive pricing, according to a general understanding of business principles [17].

However, in today's appearance of nanotechnologies and artificial intelligence, the financial institutions particularly banks must prepare themselves for a revolutionary shift in financial technologies where banks may produce added charges for digital [7,11,15].

Accordingly, the price for the proposed insurance, though it appears to be simple & straightforward, can ensure absolute risk-free digital services, i.e., the price of the VI can be set up based on regulatory procedure where the price can be considered as a fixed price.

This is because a fixed price for insurance can have both positive and negative welfare implications depending on the market structure and individual circumstances [17]. A fixed

price can lead to efficiency gains by simplifying the insurance market, but it can also create issues like adverse selection and potentially increase costs for insurance providers [17].

7.3. Potential benefits of having a fixed price for insurance under VI policy

Market simplification: It can simplify the market of the VI making it easier to decide whether the digital banking user will purchase insurance or not, particularly for those with limited financial literacy.

Reducing customer's time on choices whether insurance or no insurance: Fixed prices can reduce the time & effort needed for individuals to shop around for insurance. Potentially it can facilitate the market to be efficient.

Increasing access to insurance: Fixed prices can make the insurance more accessible to individuals who might be priced out of the market due to high premiums or complex pricing structures.

7.4. Potential drawback of having a fixed price for insurance under VI policy

Probability of moral hazard: Fixed prices can incentivize individuals to take on more risks because they are protected by insurance, potentially leading to higher overall costs for the bank or insurance service-provider.

8. Welfare Effect of VI in Bank-Led Digital Banking Services

Any product, obviously a legal one, innovation naturally has a positive welfare effect by increasing social surplus. That is this facilitation in a market system eases a net increase in consumer and producer well-being, i.e., the consumer and producer surpluses.

Since the VI as a new product can ensure total risk-free digital-banking transactions, having a customer's access to it can ensure achieving an increased consumer surplus, i.e., customer's benefit from higher digital-banking transactions. On the other hand, it facilitates increasing bank profits by cutting down its operating cost of banking services. With this positive impact, the specific welfare effects can vary depending on number of digital transactions a customer complete and the service market structure. Surely offering a bonus or discount to customers for having a higher number of digital transactions can attract more customers there.

More detailed on the welfare effects of having the VI as a product in the banking service-market.

8.1. Static framework

Increased consumer surplus: Having bank customers' access to VI products such as new features, improved quality with security assurance, lower customer cost by receiving bonuses on offer, which may be offered by the bank for having a higher number of transactions etc., which can lead to an increased consumer surplus. Surely, the presence of the VI product will attract current digital customers and most probable customers who are enthusiastic but psychological risk-factors were undermining their desires to enjoy the digital-banking facilitations. This is because this VI product will ensure greater utility for the customers, or they can get the same utility for lower prices or cost of the VI product after receiving bonuses.

Increased bank profits: The adaptation of the VI product can lead to increased profits for the banks who will adopt the VI e-banking services meeting a customer's needs. This can be due to having higher growth-trend of digital transactions, which will reduce bank's operating cost without detreating its service quality.

8.2. Dynamic framework in the long-term

Economic growth: The adaptation of the VI product will drive economic growth by boosting productivity, creating new markets, and fostering competition in the digital-banking service market. This new service in digital-banking services will lead to higher outcome, and it will encourage banks and other relevant firms' organization to become more efficient, further contributing to growth. The reason is that, by having VI in place, more companies and organizations will feel secure doing all digital transactions through banks.

Increased employment: The VI adaptation as a new product can lead to the creation of new jobs, particularly in innovative-related industries. It can also lead to the creation of new industries for providing insurance services, technical support for securing services etc.

Technological advancements: The VI product can fuel technological progress, leading to better products & services in the digital banking service market, which in turn improves the overall standard of living. It can ensure cash-less human society sooner than delaying.

Social welfare: This VI new product can lead to increased overall social welfare by improving the quality of life, offering more choices, and contributing to a more efficient economy. Furthermore, by having more access to digital services, individuals will be able to save more time, which can be invested in completing other tasks on duty.

8.3. Potential negative effects (less common)

Displacement of existing products: This VI product will surely not lead to displacement of existing products in banking services, but it may potentially cause temporary job losses of banking-service providers for enhancing bank's profits without deteriorating banking-service quality.

No increased complexity: This VI product might not be complex requiring more specialized skills. Rather than creating a barrier to entry for consumers, it will faster inspire customers by having bonus provisions based on number of digital transactions.

8.4. Uneven distribution of benefits

The benefits of the VI product might not be evenly distributed. In summary, the overall welfare effect of having VI in place is generally positive, contributing to increased social surplus, economic growth, and improved living standards. However, it is important to consider ensuring that the benefits of the VI product are shared broadly.

9. Perceived Risks vs Digital Banking Services: Application of Consumer Choice Theory

Most often economists use the terms supply and demand in market-economics. The concept of a market is a way in which an economic activity is organized between buyers or service-

receivers and sellers or service-providers through their choices and interactions with another. Here, an exchange of goods or services, with or without money, is a transaction [17]. It can also be said that demand in the market is decided by many factors [17,22]. Thus, when there is a change in demand for a product due to one or more than one factor, other than price, results lead to the shift of demand curve. When factors positively influence the demand of the product, demand shifts outward from its original position. It shows that consumers face higher prices and buy more units of the product. Conversely, the demand curve shifts inward from its original demand curve showing that consumers face lower price but buy less.

Surely the innovation of digital banking services is a great achievement in today's tech-drive world. However, it faces serious pitfalls such as perceived risk or being it risky. This dilemma is characterized by evolving many factors that are often unpredictable. Here customers compete for time-saving options. Banks compete to marginalize their operating costs then enhance generating revenues. Most cases, customers do not scan or read terms & conditions of services, and they do not save contract-copy. These weaknesses cause abuse. Customers face perceived risks such as hiding charges, extra fees, account hacking, cybercrime etc.

9.1. Digital banking transaction under consumer choice theory

The consumer choice theory interprets how a consumer or individual decides to spend consumer or individual's money based on individual preferences and budget constraints. As a branch of Microeconomics, Consumer theory shows how individuals make choices, subject to factors such as how much income they have available to spend, that means budget, the prices of goods or services and the necessity of the product or services. Also, understanding how consumers use, or consumers' behaviors makes it easier for vendors to predict which of their products will sell more and enables economists to get a better grasp of the shape of the overall economy.

- Equilibrium price vs equilibrium number of digital transactions in presence of VI product.

First this study considers the current digital banking, which suffers with many risk-factors such as perceived-risk where an individual has choice or preference to use digital-banking or other options for completing a monetary transaction.

In aim of overcoming the current digital banking dilemma, it is assumed that the bank has introduced the VI product underpinning VI policy adaptation by the bank management and policymakers in economy of Bangladesh. Here buying insurance is voluntary and it will be attached to the customer's bank account, if and only if, the customer wants it. Here a consumer has absolute freedom in choices or preferences underpinning an individual's budget constraint or constraint to use it as needed.

In this setup consumer or individual can come from either avenue – new to digital-banking or the one who is not new but have been with digital-banking choices. On the other hand, banks are producers or sellers in the market where digital services are products with absolute assurance of security i.e., absolute risk-free digital banking services where customers will have to sign up with insurance and pay insurance fees, which will be deducted through a customer's bank account.

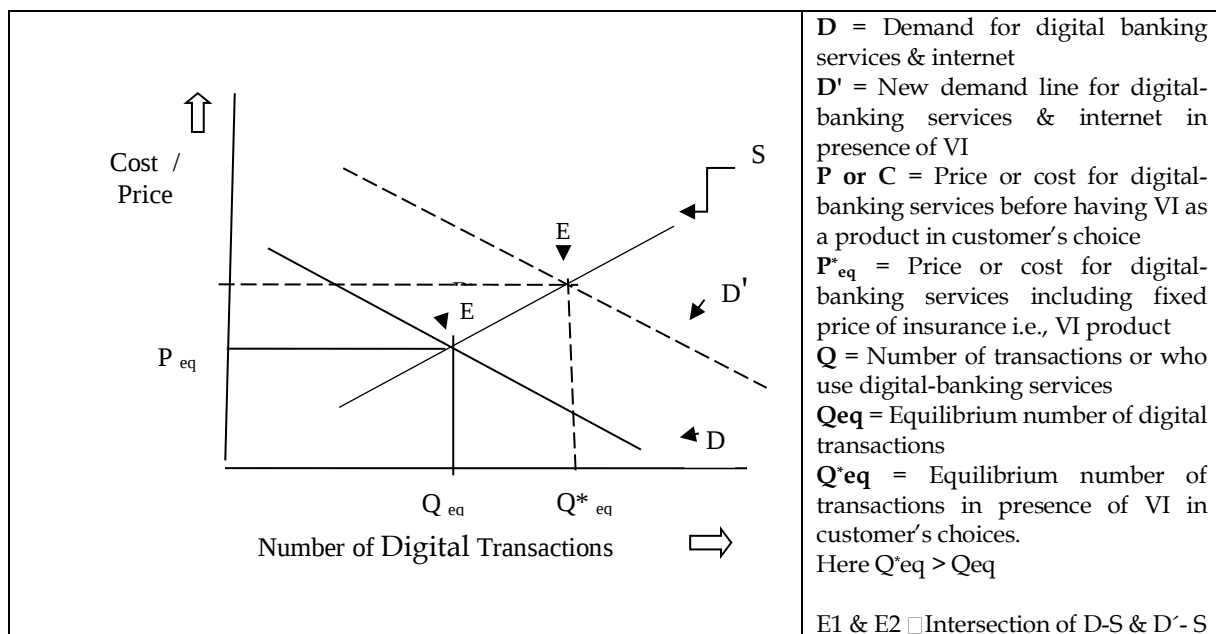


Figure 3: Digital banking service market in presence of VI.

Source: Author's creation.

Here service-providers charge fees or prices for the services underpinning government regulations. On the same token, users of digital-banking are the consumers or buyers of digital-banking-services in Bangladesh-economy. Accessing to digital-banking-services, customers must have access to internet, computer, mobile phone etc., which may incur extra costs for the customers, which is together the market price of the product, digital-banking-services. Obviously, there are no charges for bank-led digital banking transactions.

Demand for digital banking services: Let us assume that the demand curve for digital-banking-services is DD , and this DD curve shifts outward due to having VI product in place for ensuring absolute risk-free digital banking services, which is shown by dashed line DD' in Figure 3.

It is further assumed that each customer makes a discrete choice of whether to buy VI services or not where demand is a function of the relative price P or cost C for the services.

Also, it is assumed that the bank cannot offer different prices to different customers for the insurance. To the extent that banks or insurance service providers can make prices depend on the observed characteristics. It is assumed that if customers choose to buy or use the services, they buy or use them at the lowest price at which it is available. So, it is sufficient to characterize demand for digital-banking services as a function of the lowest price P , which ensures a competitive market price of digital-banking-services. It is noted here that market P includes consumer is all cost such as all digital banking related fees for completion of transaction plus the cost for the insurance. Mathematically, $D = f(P)$ or $D = f(C)$ where D = demand for digital-services and P or C = price or cost for having digital services in choices for digital-transaction.

Supply and equilibrium: Let us assume that there are $N \geq 2$ service-providers or banks in digital-banking cases that set prices in a nash equilibrium. There might be both imperfect and

perfect competition in the market. But we choose to focus on the case of perfect competition as it stands for a natural benchmark for the purpose of furthering our economic analysis.

It is further assumed that when multiple banks set the same price, individuals or number of transactions that are decided to buy digital services at this price choose a bank randomly. We also assume that the only costs of supplying services to individuals i or it can also be considered as number of transactions i . Here X-axis stands for the number of transaction services provided by banks. Y-axis stands for price or cost for the digital services per transaction.

For example, cost for ATM card, etc. fees, internet usage or minute charges, individuals' time value and other fees plus the charges for the insurance. Obviously, the charges will be on a yearly basis. In other words, all current fees or charges of the bank and the fees for the insurance in digital banking services will be collected annually if the individual has an account with the bank. If the individual does not choose insurance, the bank will charge other fees as they do now.

Figure 3 shows that the market of digital-banking services where supply curve intersects with first demand curve (D) at point E1 which shows corresponding equilibrium digital-transactions number Q_{eq} corresponding to equilibrium price P_{eq} . In other words, in this digital-banking-service market, advantageous-users of digital-services buy the services, and the bank sells or supplies the digital-services to the buyers or users of the services. Advantageous users are those who have been using it for a lengthy period i.e., in this case, they started using it before having the VI policy in place. In this case, the users are advantageous users, and they are taking advantage of it.

Now in the presence of the VI product, the demand curve for digital-banking services shifts outward. It results in higher demand for services in the digital-banking service market, which leads to higher prices or cost for accessing digital-banking services. This is because besides advantageous users (who have already been using digital-banking services and taking part in the market) the new-users who were probable-users and were facing psychological risks to use digital-banking services.

It has resulted in higher demand for digital-banking services, which leads to higher prices or cost for the services in the competitive market where some banks are taking part. In this competitive digital-banking-service market, Q^*_{eq} stands for equilibrium number of transactions or individuals who use digital-banking services corresponding to equilibrium price or cost P^*_{eq} .

In this setup, $P^*_{eq} > P_{eq}$ and $Q^*_{eq} > Q_{eq}$, which suggests because of the VI product, the demand for digital-banking-services increases, which leads to higher cost for the services.

10. Summary of SWOT Analysis of VI Product Proposal in Digital-Banking Service Market

Table 1: *Summary of SWOT analysis of VI as a new product in bank-led digital banking services.*

Category	Key points	Details and evidence
Strengths	Risk-free e-banking services.	Because of having high percentage of remittance's, most people prefer to use secured digital services.
Weakness	May impact profitability of insurance provider.	It may significantly impact profitability because of unforeseen circumstances. If costs unexpectedly rise, the fixed price can lead to losses for the insurance provider. It can volatile markets or long-term policies, as the price remains constant regardless of changing risk factors.
Opportunities	Become a cashless society in long run.	VI can increase growth trends of digital transactions, which can secure to be a cashless society soon.
Threats	Moral hazard.	Moral hazards may increase. This is because VI may create a disincentive for carefulness of the e-banking users.

11. Directions for Future Study

Underpinning the models and equations as noted in Section 5, Section 8 and in Section 9, the future study can be completed supported by hypothetical data or case comparisons.

12. Conclusion

In today's world, humankind lives with business-mentality and technology-driven lifestyles where services are conducted in multifaceted, competitive and rational manners. Banking services are no different. It is carried-out in competitive mode that has resulted digital-banking particularly bank-led services in world-economy country-wise such as Bangladesh. However, it is characterized by evolving many factors that are often unpredictable. It faces serious pitfalls being risky when it comes to digital banking, particularly bank-led digital banking services. In this busy world, most customers do not read terms & conditions of services, and they do not even save contract copy's in general. These weaknesses cause abuses. Customer faces perceived risk such as psychological risk, social/privacy risk, hidden charges and account hacked risk etc. Addressing today's growth trends of bank-led digital banking services, adaptation of the VI as a new product in bank-led digital banking services can affect two groups of bank customers. They are: i) winners who benefit from accessing the VI product and ii) losers who supposedly worsen their relative position when the growth trends of digital-banking services will be in full swing, i.e., the cashless society in economy country-wise such as Bangladesh. Accordingly, it can be impetus for policy-design meeting the challenges of today's digital-banking in economy country-wise such as Bangladesh.

On setting up price of the VI product in the digital-banking service market, a fixed price insurance can be more effective than that of competitive prices in the market. It can simplify the market, reduce costs for customers and increase access to it and the bank can enjoy higher profits by reducing operating costs in many ways. Welfare analyses are used as guidance for ensuring efficiency cost of competitive pricing of insurance so that VI becomes appealing to parties involved. In the case of bank as insurance-provider, adverse selection in insurance

market, welfare cost of inefficient pricing is quantitatively small, and advantageous selection results the opposite. The SWOT analysis here clearly provides a comprehensive understanding of the proposed VI product. It can be instrumental to policymakers and bank-management in consideration for effective policy-design ensuring absolute risk-free bank-led digital banking services in financial sector of economy country-wise such as Bangladesh.

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