

**Assessing the
Introduction of
Electronic Banking in
Egypt Using the
Technology Acceptance
Model**

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EXECUTIVE SUMMARY

The developments taking place in information and communication technology are increasing competition in financial institutions worldwide. Thus, the deployment of advanced technologies is essential to achieve a competitive edge. Recently, the banking industry was highly affected by the technology evolution that transformed the way banks deliver their services, using technologies such as automated teller machines, phones, the Internet, credit cards, and electronic cash. In line with global trends, retail banking in Egypt has been undergoing many changes. In the past, banks faced significant uncertainty regarding investments in advanced technologies, but recently, banks have been investing heavily in technology to maintain a competitive edge. However, to better forecast the future, banks need to understand the different factors influencing customers' choice between traditional and unconventional banking instruments. This case covers the introduction and diffusion of retail banking in Egypt and the development in electronic delivery channels and payment systems in its marketplace. The case represents a model for the application of advanced information and communication technology in the context of a developing nation.

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BACKGROUND

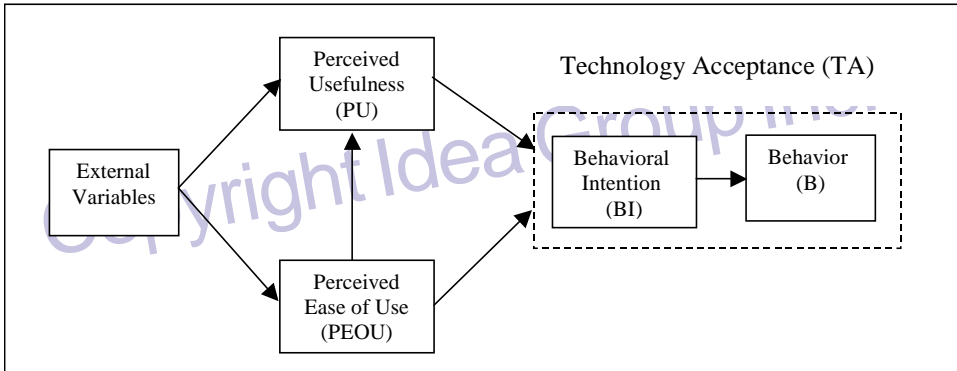
Global changes are penetrating all societies and communities around the world, bringing more innovations, competition, products, and services and introducing new trends, directions, and ways to do things differently. The Internet and the World Wide Web have introduced new ways for doing business (Kamel, 2001). This has created many challenges and opportunities in the global market-place to the main players of the business cycle; among which are financial institutions. Respectively, in order to face its increasing competitive pressures, they were required to recognize the need to perform a balancing act between achieving strategic goals and meeting the continuous changing customer needs and requirements. While strategic goals are usually corporate-specific and can be achieved in different ways, understanding and meeting customer needs may be studied and analyzed at the industry level. Today, the use of cutting-edge information and communication technology is becoming a cornerstone in dealing with the competitive pressure faced by different businesses around the world.

Over the last few decades, the banking industry has been highly affected by such technology evolution, with an emphasis on the way services are delivered to retail banking customers. For more than 200 years, banking was a simple branch-based operation. However, things started to change since the early 1980s, with the use of multiple technologies and applications that surfaced with the penetration of computing in various sectors and industries, including banking. Among such technologies were the growing number of technology-based remote access delivery channels and payment systems, such as automated teller machines that displaced cashier tellers; the telephone, represented by call centers that replaced the bank branch; the Internet that replaced snail mail; credit cards and electronic cash that replaced traditional cash transactions; and shortly, interactive television that will replace face-to-face transactions (Kamel & Assem, 2002).

In Egypt, in line with global trends, the retail banking business has been undergoing tremendous changes over the last two decades. As a result, the banking industry was always facing a significant uncertainty regarding the potential investments in advanced banking technologies required to implement the different electronic delivery channels and payment systems. Regardless of the return, currently, banks in Egypt are investing large amounts of money in technology, not only to maintain a competitive edge but also to remain in the business. In order to make better forecasts for business planning and decision-making, banks need to better understand the different factors influencing the Egyptian customer choice among traditional and electronic banking instruments (Kamel & Assem, 2002).

The success in the application of different information and communication technology in retail banking delivery channels and payment systems relies to a large extent on the ability of customers to accept and adopt such systems. In Egypt, most of the technology-related decisions are based on reactions to other decisions taken by the competition, without a real study of actual customer needs or perceptions, which leads to the creation of a high level of risk associated with such strategy. An overestimation of the level of customer acceptance of the technology can misguide decision-makers to get involved in investments, which are not ready to give return, while underestimation of the acceptance level can lead to the loss of substantial market share.

This case analyzes the banking sector in Egypt and the deployment of information and communication technology in the sector in terms of adoption, diffusion, and innovation, while providing an understanding of the acceptance level of consumers of different

Figure 1. Technology Acceptance Model (TAM)

technology-based delivery channels and electronic payment systems and the extent to which various factors influence consumers' willingness to use different technologies. The case depends on the use of the Technology Acceptance Model (TAM) (shown in Figure 1), introduced by Davis in 1985 to study the level of customer acceptance to new banking technologies in Egypt. TAM, by definition, considers user perceptions of ease of use and usefulness as the main factors affecting the acceptance level of any technology. The case will also consider the role of trust as an external variable affecting consumer adoption of electronic banking delivery channels and payment systems, which is a factor that is much associated with the cultural aspect of the society in Egypt, which for a long time was not accustomed to the use of banking services and facilities (Kamel & Assem, 2002).

The research variables tested that were directly extracted from TAM include perceived ease of use (PEOU), perceived usefulness (PU), and technology acceptance (TA). PEOU and PU were simultaneously acting as dependent and independent variables, while TA was merely a dependent variable that depended on PEOU and PU. Moreover, trust (T) was used as an independent variable, which was indirectly affected by TA through its direct effect on variables PU and PEOU, as shown in Table 1.

In addition to TAM, the case used a PEST analysis to study the different environmental factors affecting the banking sector in Egypt and its deployment of different technology-

Table 1. Research Variables

Variable	Description	Type	Associated Data Type	Scale
TA	Technology Acceptance	Dependent	Ordinal	Discrete (0-7) 0: Accept, 7: Reject
PEOU	Perceived Ease of Use	Independent /Dependent	Ordinal	Discrete (0-7) 0: Easy, 7: Not Easy
PU	Perceived Usefulness	Independent /Dependent	Ordinal	Discrete (0-7) 0: Useful, 7: Not Useful
T	Trust	Independent	Ordinal	Discrete (0-7) 0: Trustful, 7: Trustless

Table 2. Research Hypotheses

Null Hypotheses	Alternative Hypotheses
PU has no significant effect on TA	PU has a significant effect on TA
PEOU has no significant effect on TA	PEOU has a significant effect on TA
PU has no significant effect on PEOU	PU has a significant effect on PEOU
T has no significant effect on PU	T has a significant effect on PU
T has no significant effect on PEOU	T has a significant effect on PEOU

based systems. The case study focused on a number of research issues, including the identification of the main environmental factors affecting the Egyptian banking sector in general, and the electronic retail banking delivery channels and payment systems in particular; the extent to which banks were encouraging their customers to use technology-based systems, and the degree of support provided to them; and the determination of the main patterns of customer usage of different electronic delivery channels and payment systems. A number of hypotheses were formulated and tested during the study that mainly describe the relationships between different research variables as proposed by TAM; such hypotheses are shown in Table 2.

Based on the analytical nature of the study, the methodology used in the research was based on a combination of quantitative and qualitative approaches, where a research questionnaire was distributed among a sample of different bank customers. The survey instrument is shown in Appendix I. The objective of the questionnaire was to demonstrate and investigate the relationship between the research variables by measuring the salient beliefs and intentions of bank customers in Egypt toward technology-based delivery channels and electronic payment systems. Moreover, the questionnaire measured the level of awareness among customers, and how this awareness was built. The subjects chosen to respond to the questionnaire consisted of a random sample of bank customers with varying demographics and different professions. All questionnaires were sent by electronic mail, facsimile, and, in some cases, it was handed to the respondent in person in an interview session, to provide the opportunity to explain the purpose of the research and to guide the respondent through the questionnaire. Moreover, a number of interviews were conducted with top executives and managers working in the banking sector or in the field of information and communication technology to include policy makers, major players, and decision makers as part of the survey. Most of the results of the questions in the questionnaires and the interviews were of a quantitative nature, with the intent to measure each of the research variables extracted from TAM and to understand the relationships between them.

Technology Acceptance Model (TAM)

The complexity of adopting new technologies was first popularized by the theory of diffusion of innovations (Rogers, 1983), where Rogers summarized the key influences of user acceptance behavior as relative advantage, complexity, compatibility, trialability, and observability. Rogers stated that an individual's perceptions are the basis of a widely studied model from social psychology entitled the theory of reasoned action (TRA), which was first proposed by Ajzen and Fishbein (1980). TRA is a model that has demonstrated success in predicting and explaining behavior across a wide variety of domains (Davis, 1989). Addition-

ally, an extension of TRA is the theory of planned behavior (TPB) (Ajzen, 1991), which accounts for conditions with which individuals do not have complete control over their behavior (Taylor & Todd, 1995). Based on the three above-mentioned user acceptance research areas, diffusion of innovation, TRA, and TPB, TRA has emerged as a prominent model that has served as a basis for expanding user acceptance research. Specifically, a modified TRA model defined in the F. D. Davis study (1985) resulted in a concise, complete, reliable, and valid model for predicting user acceptance, entitled the technology acceptance model (TAM), that has repeatedly shown viability in predicting user acceptance of new and different technologies (Adams, Nelson, & Todd, 1992; Taylor & Todd, 1995; Davis & Venkatesh, 1995; Doll et al., 1989).

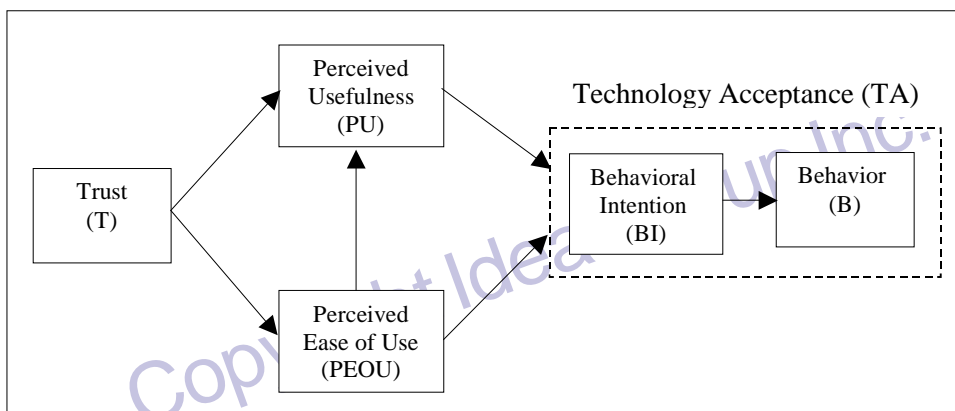
The basic goal of TAM is to provide an explanation of the determinants of technology acceptance that are capable of explaining user behavior across a broad range of end-user technologies and user populations, while at the same time, being both parsimonious and theoretically justified (Davis et al., 1989). According to TAM, perceived usefulness and perceived ease of use are the fundamental determinants of attitude toward usage intentions and actual technology usage. In TAM, behavior in terms of technology usage has been explained by investigating the perceived usefulness and ease of use the individual experiences or expects when using a specific technology. According to TAM, the easier the technology is to use, and the more useful it is perceived to be, the more positive one's attitude and intention toward using the technology; therefore, technology use increases. During the last few years, TAM has offered researchers and practitioners a relatively simple and cost-effective way to predict the ultimate measure of system success, whether or not that system is actually used (Morris & Dillon, 1997). It has been used to explain the use of a number of technologies including databases, communication technologies, and electronic mail, among others. The empirical evidence indicates that increasing the PEOU of the system will increase PU and will translate into an increased behavioral intention (BI), resulting in a larger margin of TA. However, research also indicates that the influences of PEOU on PU diminish over time, as users become proficient with the target system (Chau, 1996; Davis et al., 1989). Therefore, the literature suggests that PEOU determinants will have the greatest contribution to user acceptance in the early stages of system deployment, when users have limited experience with a target system. This concept is significant to consumer acceptance of banking technologies, and as customers are offered use of an unfamiliar banking technology, they can quickly become discouraged if that specific technology is not easy to use, regardless of the technology usefulness. However, it is important to note that the cultural differences that exist between different countries may affect the adoption and diffusion of new technologies.

Trust in Banking Technologies

The level of uncertainty avoidance plays an important role in building trust. Therefore, the research considered the effect of trust on the adoption and usage of advanced banking technologies as an extension to the basic TAM. Within the literature, organization theory provides a cross-disciplinary definition of trust that applies to a large range of relationships among individuals and organizations. In that context, trust implies benevolence, integrity, and ability in an exchange relationship (Mayer et al., 1995).

In a study conducted in Egypt in 2001 on the delivery channels for retail banking products, focusing on measuring the satisfaction levels of customers of banks with the in-person bank branches and their possible shift to alternative delivery channels, results

Figure 2. Effect of Trust as an External Variable



indicated high dissatisfaction levels due to lack of bank awareness of customer needs. The research showed low loyalty levels, where 62% of customers surveyed stated their willingness to change their banks if offered more convenient banking alternatives. Responsive service was found to be the major satisfaction driver, followed by a 24-hour accessibility feature. Moreover, 71% of surveyed customers showed interest in using e-banking, if their banks guaranteed its security. When customers were asked to rank the importance of the five delivery channels, automated teller machines (ATMs) came first. See Table 3 for the rest of the results.

SETTING THE STAGE

The Banking Sector in Egypt

The banking sector in Egypt is among the oldest and largest in the region. The National Bank of Egypt (NBE) was the first bank to begin operation in the country in 1898; also in the year 1898, the stock exchange was established. In that time, central bank functions were partially performed by the National Bank of Egypt, which was the sole body licensed to issue Egyptian banknotes. The size of the banking sector has grown rapidly during the first half of the 20th century. In 1956, a total of 32 banks were operating in Egypt. Those banks included 26 commercial banks, four mortgage banks, one agricultural bank, and one industrial bank. All were foreign banks except the National Bank of Egypt and Bank Misr (Huband, 1999).

Table 3. Customer Preferences for Different Delivery Channels

Delivery Channel	Extremely Important	Important	Not Important
Bank Branches	36.96%	35.87%	27.17
ATMs	70.65%	26.09%	3.26%
Mobile Banking	19.02%	33.70%	47.28%
Call Centers	32.07%	51.63%	16.30%
Internet banking	17.39%	35.87%	46.74%

During the period 1957-1974, nationalization had a dramatic impact on Egypt's financial system. The closure of the Egyptian stock market and the confiscation of all foreign banks turned the financial system into a stagnant, non-competitive sector. Only fully owned Egyptian banks were permitted to operate. In February, 1960, the National Bank of Egypt was nationalized, and in 1961, the Central Bank of Egypt was established to perform its responsibilities as the unique entity responsible for setting banking system regulations (World Investment News, 1998). Starting in the mid-1970s, the Egyptian banking sector expanded markedly, along with the country's open door policy that aimed at an outward-looking growth, with an active role for the private sector to promote economic performance, which was coupled with a new banking law enacted in 1975 defining the nature and mode of operations for all banks. Today, Egypt has a total of 62 banks, with more than 2400 branches, as well as 28 representative offices of foreign banks and three unregistered banks, which do not report to the Central Bank of Egypt (CBE, 2001).

Evolution of Retail Banking in Egypt

Capitalizing on its comparative advantages in the service sector, financial-sector growth potentials, and noticeable economic growth, Egypt is currently moving steadily toward becoming the biggest financial center in the region. Owing to the flourishing privatization program and the prospering domestic bond market, banks have encountered new investment fields, which helped them, diversify their portfolios and lower their financial risks. Retail banking was the most important among those new fields (Egypt SIS, 1999). Retail banking is that part of commercial banking concerned with the activities of individual customers, generally in large numbers. Retail banking is considered less risky compared to corporate banking, as it involves a more diversified loan portfolio across a mass market. Retail customers provide reliable low-cost sources of funds for asset management and good opportunities for retail securities placement and fund management. However, the retail business requires heavy investments to increase the number of branches, enlarge staff size, expand the ATM network, and establish various delivery channels (Grant, 1984).

Since the mid-1990s, the banking sector in Egypt has been changing fast, and after decades of focusing on generating corporate assets, most public and private banks are starting to recognize the potentials for retail business represented in the relatively under-branched banking sector, compared to the high population and the rising per capita income. Accordingly, most banks started to penetrate the retail market. Recently, the number of individual bank customers reached 9 million (*Business Monthly*, 2000), and a variety of retail products are currently offered by a large number of banks, including payroll accounts, car financing, mutual funds, credit cards, and personal loans. Moreover, banks are competing in expanding their branch networks and diversifying their delivery channels to include ATMs, call centers, mobile banking, and Internet banking. As part of the research, an environmental PEST analysis was conducted to study the political, economic, social, and technological factors affecting the banking sector, with a focus on retail business activities and the deterrents facing the development and growth of the banking sector.

Political Factors

The political system in Egypt played a significant role in the growth and expansion of local and international banks and played a major role in attracting banks and financial institutions worldwide to establish joint ventures or representative offices in Egypt. The

banking sector has been entirely public since the late 1950's, when it was nationalized. However, in the mid-1970's, an open-door policy allowed the establishment of private banks. In 2002, there are a number of international players in the market, including Barclays, American Express, Citibank, HSBC, and recently, Standard Chartered Bank (CBE, 2000). Moreover, a number of laws and regulations were established to help the banking sector grow, especially focusing on the retail banking business, including an electronic law, which is expected to have a positive effect on the growth of the credit card market of different banks. Additionally, the expected approval of the new mortgage law represents another opportunity for banks to expand their retail activities in the area of housing loans (*Business Today*, 2001).

Economic Factors

Since the mid 1980s, Egypt started to follow an economic reform program, which was designed to establish a stable and credible economy. Macroeconomic indicators look positive, with a growth rate at 6.5%, inflation rate at 2.8%, and budget deficit at 3.6% of gross domestic product (BSAC, 2001). Egypt's success on its macroeconomic agenda secured the stability necessary to establish investor confidence and stimulate the capital market (BSAC, 1999). The growth rates of banks' assets, deposits, and loans are direct reflections of the economic growth of the banking sector, yielding a CAGR of 12.6% during the period between 1995 and 1997 (CBE, 2000).

Social Factors

The Egyptian population of more than 68 million in December 2001, represents many attractions for local and foreign banks to expand their business. The current individual bank customers represent around 13% of the population. Among those customers, the number of credit and debit cardholders is less than 7%, which directly reflects the great potential for plastic money in Egypt (*Business Monthly*, 2000). According to age, bank customers can be divided into three segments:

1. Youth (20-30 years old) represent the most important target group, with their accounts and student loans. They easily adopt technology, but their loyalty to the bank they deal with is not guaranteed, requiring continuous innovative financial services to attract them and cost switching to keep them.
2. The second age group, 30-50 years old, represents good potential due to the large number of housewives within that segment who are willing to use different electronic delivery channels, like ATMs and phone banking.
3. The last segment, above 50 years of age, shows some reluctance to deal with banks in general, and to using technology-based services in particular, requiring special care and incentives, such as retirement packages and special senior accounts.

Market Assessment of Banking Services

For a long time, the market in Egypt was dominated by cash society values, with people reluctant to go to the bank and open an account for purely cultural reasons, opting to keep their cash at home. However, recently, the private sector started to include their employees in various payroll plans offered by different banks. As a result, the number of individual bank customers increased, and a relatively high level of awareness was established among certain segments of the society, which started to recognize the benefits of retail banking. However, it is important to note that the society highly values human interaction, which affects the

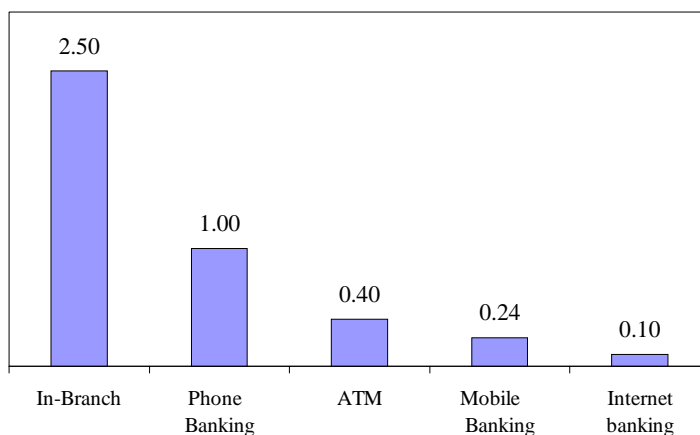
penetration of retail banking through electronic delivery channels, especially among the less-educated, who are not comfortable dealing with technology-related equipment. Moreover, among the other current problems is the fact that credit cards are scary for some people due to the high interest rates; very few people are using ATMs for deposits or are willing to use their credit cards over the Internet. It is important to note that the average illiteracy among the population is more than 39% (EFG-Hermes, 2001), and a large portion of the remaining 61% is considered under-educated. Consequently, ease of use, simplicity, and Arabic interfaces are key factors for the adoption of new services provided by banks. In general, consumers in Egypt are considered flexible and fast to adopt new habits, which is obvious in the penetration rates of mobile telephony, which was first introduced in 1997. There are now more than 3.5 million subscribers, even though telephony was introduced early in the last century and to date, there are only 7.1 million land lines (www.mcit.gov.eg). However, in order to capitalize on such an advantage, banks need to familiarize consumers with the services and products they offer through solid marketing communications strategies. Such services have to provide an attractive value proposition to the local market.

Technological Factors

The rate of information and communication technology adoption in the banking sector was increasing steadily over the last decade as a result of the growth in retail banking activities, opening of competition within the sector, and noticeable government support of automation efforts. Offering retail banking services involves providing customers with electronic payment systems, such as plastic money debit and credit cards, as well as technology-based delivery channels for performing their daily transactions. Such channels, which are known as remote access systems or self-service banking, include ATMs, call centers, phone banking, Internet banking, and mobile banking. The use of plastic money has a number of benefits, including reducing the cost of printing money and the proliferation of money not fit for circulation. Moreover, the introduction of remote access electronic delivery channels relatively increases access to customers and significantly cuts the cost of transactions, as shown in Figure 3 (Beck et al., 1999).

Since the mid 1980s, Egypt has focused on building its information and communication technology infrastructure, which was reflected in the introduction of the liberalization

Figure 3. Lower Transaction Costs Through Technology



program of Telecom Egypt in 1998, and the establishment of the Ministry of Communications and Information Technology (MCIT) in 1999. The tremendous improvements in telecommunications infrastructure cost, reliability, bandwidth, and reach achieved are providing a strong impetus to substantial technology investments in the banking sector in Egypt (Magued, 2001). However, despite the increasing technology investments made by banks, the sector is still considered in the early development stages in terms of banking technology infrastructure necessary for future large-scale card issuing, widely distributed ATM networks, efficient call centers, and automated clearing operations.

In the mid-1980s, banks started to install point-of-sale machines and encouraged members to accept payment by credit cards, correspondent to the growth in international and business travel. By the early 1990s, the first locally issued credit card found its way to the local market. Currently, 26 banks in Egypt issue debit and credit cards, but the number of cardholders is small, estimated at 600,000 locally issued cards, among which, more than 400,000 are credit cards, representing less than 7% of bank customers, which is estimated to be around nine million. However, the market for debit and credit cards has great potential and is expected to reach one million cardholders in 2002, according to the forecasts of Visa International (*Business Today*, 2001). One of the indicators for such potential is the success that Citibank Egypt realized in the issuance of 50,000 credit cards in less than two years. In addition to the traditional debit and credit cards, banks are competing to introduce a number of innovative card products. For example, in 2001, Citibank and Vodafone, Egypt's leading mobile operator, launched a co-branded credit card to add a new product to the variety of credit cards issued in the Egyptian market (*Business Today*, 2001). Moreover, the use of ATMs, as a remote access channel to banks, has been in place since 1994; however, the rate of growth and adoption is fairly low, and according to the Commercial International Bank, Egypt's leading retail bank, the average number of ATM transactions performed monthly by a bank customer is currently four times the number recorded in 1998. The installed ATM population is currently low, but the rate of installation growth is relatively high. In August, 2001, the total committed ATM population in Egypt was 721, expected to double in 2002, which is still a relatively small number in comparison to the United States, with its 197,500 machines. Moreover, several banks have installed interactive voice response (IVR) systems and are considering the installation of call centers to follow the Citibank Egypt initiative introducing the concept of call centers in Egypt in 1999, known as Citiphone (Kamel & Assem, 2002).

With respect to Internet banking, Internet access in Egypt dates to 1993, mainly through governmental and educational organizations. Commercial Internet access was available since 1994. However, it was in January, 1996, that the government made an official address authorizing the private sector to step into the provision of Internet services. By April, 2002, Egypt's 51 private-sector Internet service providers delivered service to an estimated one million subscribers (www.mcit.gov.eg). The government is currently in the process of increasing Egypt's transmission capacity on the Internet in order to meet the increasing number of Internet users, who are expected to reach two million by the end of 2002. Moreover, the government, starting 14 January 2002, underwent a major step to diffuse the use of the Internet across its 26 different provinces by providing Internet connectivity for free (www.mcit.gov.eg). Internet banking, also known as online banking, is still not fully introduced in Egypt, mainly due to the relatively low number of Internet users. However, since late 2001, Citibank offers the first of such services as a prototype, allowing customers to check their account balances, perform internal transfers, and pay their monthly credit card bills

through the Internet. Most of the other commercial banks have short-term plans to launch Internet banking as well.

With respect to mobile telephony, the GSM service started in 1996 by the government was soon after privatized, and competition was introduced. However, despite the rapidly increasing number of mobile subscribers, mobile banking is currently only offered by the National Societe Genarale Bank and is still not very popular among bank customers. Therefore, more efforts need to be made in that area in terms of increasing the simplicity of the user interface and conducting customer education and awareness programs.

To conclude, retail banking is strongly affected by political, economic, social, and technological factors. The current environment of the retail-banking sector includes many opportunities, as well as a number of risks. Although the potentials are high, the challenges are much higher. Therefore, in order to succeed in the market and build a respectable customer loyalty, banks operating in Egypt need to work on increasing customer awareness, and to carefully study and understand customers' social and economic needs. Such understanding can be achieved through different marketing communications tools, which can provide banks with customer feedback about the products they offer.

CASE DESCRIPTION

The study covered five different leading banks operating in Egypt, including Commercial International Bank (CIB), Mistr International Bank (MIB), National Societe Generale Bank (NSGB), Egyptian American Bank (EAB), and Citibank Egypt. The cases highlighted their strengths and weaknesses with respect to retail banking activities and strategies, in order to provide a general understanding of the present environment as well as some insight into the future of retail banking. Table 4 demonstrates the profile of the different banks surveyed.

CIB and MIB were chosen as being the largest private sector banks in terms of assets, deposits, and market share. The EAB was chosen because of its perceived service leadership

Table 4. Bank Profiles

	CIB	MIB	NSGB	EAB
Growth in assets	10.77%	11.85%	20.71%	9.05%
Growth in loans	6.18%	8.37%	10.17%	-2.84%
Growth in deposits	11.66%	11.65%	21.19%	8.95%
Loans per branch	156,676	339,394	313,448	117,850
Deposits per branch	162,502	482,839	391,617	172,689
Market share loans	6.40%	3.50%	2.00%	1.98%
Market share deposits	5.20%	4.00%	1.97%	2.09%
Number of ATMs	90	14	19	25

in the banking sector through a widely diversified range of products and services, including retail banking. The NSGB was chosen as a result of its high retail business growth rates over the last two years, beginning in 1999, as well as for being the first bank to introduce mobile banking services in Egypt. Finally, Citibank Egypt was selected, because it is setting the pace in the market through its innovative products and trends in retail banking; and over the last few years, it has been taking the lead in continuously diversifying and introducing new technology-based services for bank customers.

The sample population was randomly selected with varying demographics and professions. It was small due to the fact that the population capable of responding to the survey instrument, as perceived by the researchers, and that represent active online users of the technology with willingness to receive bank information online, was small. It was easy to identify those groups, because only a few hundred customers met those criteria after searching online bank databases and selected customers' databases with e-mail accounts used corresponding with at least one of the banks. The questionnaire was distributed among 200 bank customers; the valid response rate was 103, including 64 (62.14%) male and 39 (37.86%) female of three age categories: 21-30, 31-40, and 41-50 years old. Table 5 shows the distribution of the respondents. It is obvious that a larger sample would have provided more accurate results and would have led to the development of more concrete findings. However, it is important to note that this research represents the initial phase of more comprehensive coverage of the sector, which should lead to more macro-level findings (Czaja & Blair, 1996).

In addition to basic demographic data, subjects were asked to name the banks they dealt with. Responses included the names of 19 public- and private-sector banks: 56.29% of the respondents indicated that they were using private-sector banks, and 43.71% reported using public-sector banks. Some of the major issues addressed in the survey included the role played by banks in technology adoption, and general customer perception of the banking-sector services. In that respect, the private-sector banks took the lead in technology introduction and diffusion at the retail banking level.

With respect to the role of banks in technology adoption, 72% of respondents felt that banks provided the necessary support and assistance when using different electronic delivery channels. Moreover, 70% of respondents felt that banks encouraged them to use remote-access technology-based delivery channels instead of visiting bank branches. The relatively high positive values may have been due to recent efforts exerted by many banks in order to direct customers toward using different electronic delivery channels after recognizing the large benefits they could realize, including reducing the load on bank branches, improving the quality and efficiency of the services offered, and introducing additional added-values to various customers.

With respect to general customer perceptions, 47% of respondents ranked trust as the most important feature they look for in technology-based delivery channels and payment systems, followed by 31% for ease of use and 23% for usefulness, as the primary factors that can encourage them to use such systems. These results seemed logical and in compliance

Table 5. Overall Subject Demographics

	21-30	31-40	41-50	Total
Male	42	14	8	64
Female	27	7	5	39
Total	69	21	13	103

with the high level of conservatism and uncertainty avoidance, which are common characteristics of the society in Egypt. In general, those results implied that for most bank customers, it is of highest priority to be convinced that the technology is secure and trustful, and only then may they try to use that technology. If it is easy and simple, they will be able to use it and, accordingly, find out whether it is useful or not.

A statistical analysis has been performed based on the hypotheses testing on the data collected, in order to test the association between different research variables, as shown in Figure 4. The objective was basically to find out whether the results would succeed or fail to reject the null hypotheses, and accordingly, determine the significance of the alternative hypotheses. Following is the assessment and perceptions of survey respondents of the different electronic delivery channels and payment systems.

Automated Teller Machines

The results obtained for ATMs, shown in Table 6, indicate that most of the alternative hypotheses were confirmed with different significance levels, except H_4 (trust will have a significant effect on perceived usefulness). Accordingly, the relationship between trust and perceived usefulness was not clear in the responses received. The lack of such relationship implies that perceiving ATMs to be secured and trustful delivery channels does not affect the customer perception of its usefulness. Such a conclusion may be valid for ATMs, although at this point, there is no proof whether this will also apply for other systems. However, such indications could set the pace for preliminary expectations with regard to customer acceptance of various electronic retail banking delivery channels. According to the resulting p -values, which are measures of the significance of the alternative hypotheses and the strength of the relationship between any two variables, perceived ease of use has a relatively significant effect on technology acceptance, as well as on perceived usefulness.

Similarly significant is the effect of trust on perceived ease of use, while the effect of perceived usefulness on technology acceptance was shown to be the least significant. Those results adhere, to a large extent, to the general results highlighted earlier, and they comply with the conclusion previously stated, that trust is the major factor affecting perceived ease of use, which in turn, drives perceived usefulness and eventually technology acceptance. It is also important to note the element of cultural adaptation and local market conditions in Egypt. In that respect, it is useful to mention that until the mid-1980s, retail banking was hardly diffused among the population. Therefore, the gradual increase in the retail banking

Figure 4. Technology Acceptance Model and Research Hypotheses

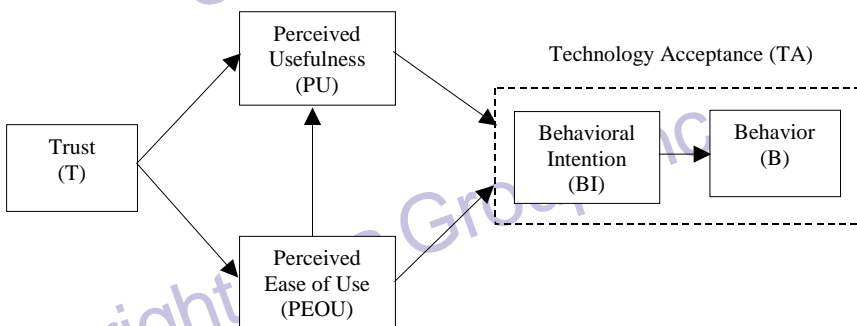


Table 6. Association Coefficients for the Model on ATM ($\alpha = 0.05$)

Dependent Variable	Independent Variable	R ²	Association Coefficient	Significance of (p-Value)
TA	PU	0.07367	0.138	< 0.01
	PEOU	0.07905	0.123	< 0.005
PU	T	0.01235	0.097	> 0.1
	PEOU	0.4585	0.642	< 0.005
PEOU	T	0.3479	0.322	< 0.005

population from three million to more than 10 million in less than 20 years is a major development. However, it has to be implemented gradually to avoid cultural deterrents and resistance to change.

Credit Cards

The responses addressing the acceptance of credit cards as a payment system have confirmed the alternative hypotheses H_{2a} , H_{3a} , and H_{5a} , while they disconfirmed H_{1a} and H_{4a} , as shown in Table 7.

The table shows the significant effect of perceived ease of use on technology acceptance as well as the significant role of trust in building such perceived ease of use. However, unlike the case of ATMs, credit cards' results confirmed the relationship between perceived usefulness and trust, but did not confirm the relation between perceived usefulness and technology acceptance of credit cards as a technology-based payment system. The results obtained for credit cards imply that trust is a major factor in the usage of electronic payment systems, and its indirect effect through perceived usefulness and perceived ease of use is the most significant determinant of the acceptance level. Such results were expected for credit cards, which, for many bank customers, may involve a relatively non-affordable level of risk compared to a technology like ATMs.

Phone Banking

The results obtained for phone banking were consistent with all five hypothesized relationships between the research variables. The significance of each of those relationships is shown in Table 8.

Table 7. Association Coefficients for the Model on Credit Cards ($\alpha = 0.05$)

Dependent Variable	Independent Variable	R ²	Association Coefficient	Significance of (p-Value)
TA	PU	0.02723	0.190	> 0.05
	PEOU	0.18349	0.249	< 0.01
PU	T	0.39682	0.311	< 0.005
	PEOU	0.06466	0.007	> 0.1
PEOU	T	0.26798	0.226	< 0.01

Table 8. Association Coefficients for the Model on Phone Banking ($\alpha = 0.05$)

Dependent Variable	Independent Variable	R ²	Association Coefficient	Significance of (p-Value)
TA	PU	0.21489	0.561	< 0.005
	PEOU	0.14849	0.558	< 0.005
PU	T	0.23272	0.371	< 0.005
	PEOU	0.66378	0.870	< 0.005
PEOU	T	0.17264	0.138	< 0.01

The results indicate that the majority of the responses confirmed that technology acceptance is directly related to perceived usefulness and perceived ease of use, and is indirectly affected by the element of trust in technology. The significant relationships indicated from the above diagram imply that phone banking is considered of high potential, as it allows customers to access their accounts in a fast and easy way through the phone and does not involve the effort of moving from one place to another, as is the case with ATMs. However, if we go further in comparing phone banking with ATMs, it is important to mention that phone banking lacks an important feature—cash access.

Internet Banking

Similar to phone banking, the results obtained for the acceptance of Internet banking were consistent with the hypothesized relationships. However, the significance levels (*p*-values) of all relationships were relatively low compared to those obtained for phone banking. The similarity between the results of Internet and phone banking is attributed to the fact that both technologies provide bank customers with the same range of banking services, namely, balance inquiry, transfers between accounts, and bill payment, without direct access to cash. The low significance of different relationships shown in Table 9 is most likely due to other factors affecting the usage of Internet banking, such as the availability of a PC and an Internet connection and knowing how to use them. This is also affected by the fact that computer literacy in Egypt is only 8% (www.mcit.gov.eg). In addition, the perception of the relatively high risk associated with performing financial transactions over the Internet, as well as the low level of awareness of that technology, have played significant roles in forming these results.

Table 9. Association Coefficients for the Model on Internet Banking ($\alpha = 0.05$)

Dependent Variable	Independent Variable	R ²	Association Coefficient	Significance of (p-Value)
TA	PU	0.16974	0.028	< 0.01
	PEOU	0.14154	0.083	< 0.01
PU	T	0.13388	0.067	< 0.01
	PEOU	0.09032	0.068	< 0.01
PEOU	T	0.29107	0.095	< 0.01

Summary of Results

The analyses of Tables 6 to 9 indicate that the questionnaire responses failed to confirm the alternative research hypotheses in three out of 20 cases, with varying significance levels. This implies that TAM can be considered as a useful tool when used to determine the customer acceptance of electronic banking delivery channels. It is also useful in identifying the related aspects that affect the behavior of different customers with respect to various technologies.

Accordingly, banks can rely to a fairly large extent on the perceptions of their customers regarding any new or existing technology-based service to predict and measure the acceptance levels and the potentials of that service, bearing in mind the effects of other external factors that differ from one technology to the other. With respect to usage patterns of banking technologies, the respondents, as shown in Figure 5, revealed that most of them are using ATMs for cash withdrawals and balance inquiry, while few of them are using it to perform cash or check deposits, and fewer are using it for bill payment. Respectively, such patterns can be attributed to the low level of awareness and lack of trust, which implies that the focus of the banks' efforts should be directed at building such trust and awareness among their customers.

The patterns of credit card usage show that most customers are using the cards for cash advance, as if they were bank loans. The usage of credit cards over the Internet is still in a premature stage, with 7.77%, while their usage for other purchase transactions involving human interaction, such as shopping, restaurants, and hotels, is approaching 50%, as shown in Figure 6.

Figure 7 includes the patterns of phone banking as a technology-based delivery channel, which shows less than 50% of customers using or willing to use such a channel to inquire about their account balances. Despite the high potential for phone banking, less than 20% of the customers have shown interest in using the phone to perform transfers between their accounts or pay their credit card bills. The fact behind such results is that phone banking

Figure 5. ATM Usage Patterns

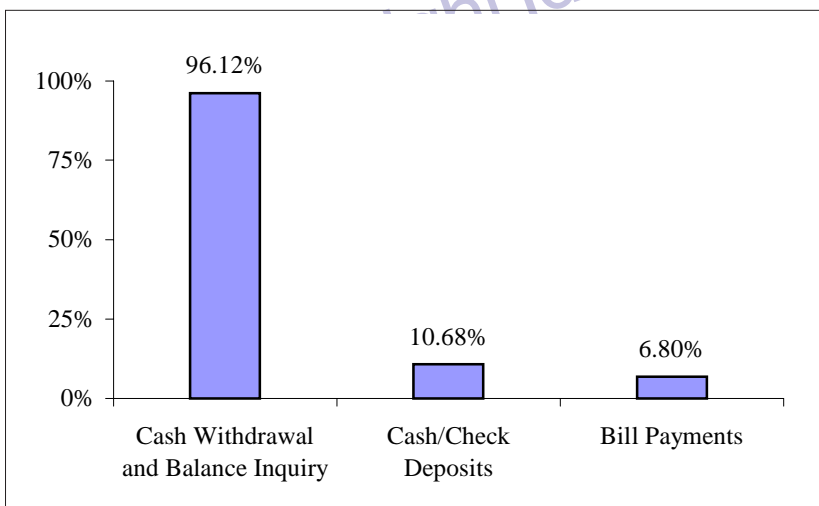
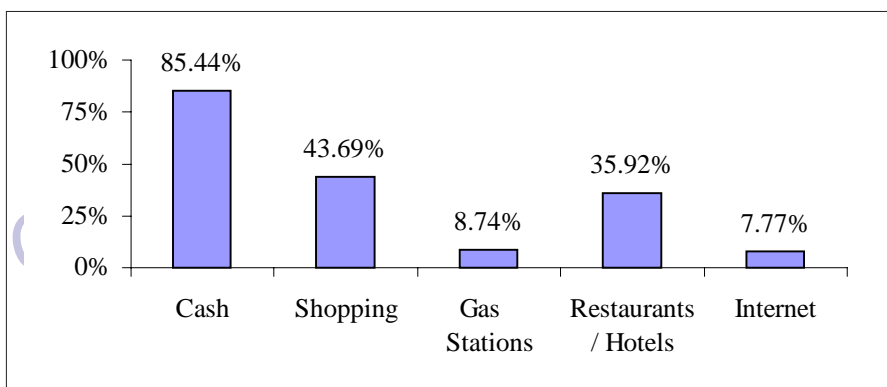


Figure 6. Credit Card Usage Patterns



is still a recent development and is offered only by two banks in Egypt. However, with some marketing efforts, it is possible to build the necessary awareness and trust among different customers and increase their willingness to use such a channel.

The usage of the Internet as a banking delivery channel was shown to be of minimal interest among the respondents (Figure 8). As mentioned earlier, the challenge faced by that channel is lack of awareness as well as the cost associated with the hardware and the Internet connection, which may not be affordable except to a few specific socioeconomic segments. To conclude, it is worth noting that the research succeeded in confirming most of the alternative hypotheses for all banking technologies, and the results clearly highlighted the potentials for each technology as well as the overall perceptions of Egyptian banking customers and their willingness to use electronic delivery channels and payment systems, provided that they are trustful, secure, and easy to use. However, there are extensive efforts that still need to be exerted from banks operating in the retail business in Egypt, especially in the area of building awareness and trust among their customers.

Figure 7. Phone Banking Usage Patterns

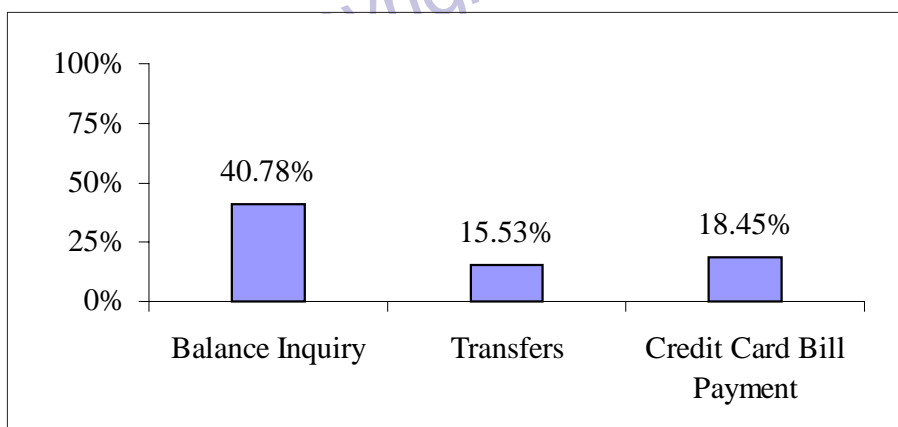
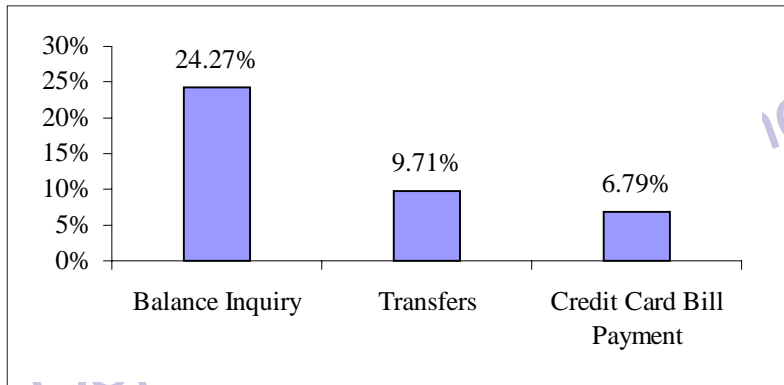


Figure 8. Internet Banking Usage Patterns



CURRENT CHALLENGES AND PROBLEMS FACING THE ORGANIZATION

Electronic retail banking delivery channels are becoming important not only for competitive purposes among banks but also for their survival, development, and growth. Thus, banks in Egypt have realized the challenge to cater to the growing needs of the market to channel their interest in improving the infrastructure, while focusing on customers' needs rather than solely serving their competitive strategies. It is important to note that the more the banks will be able to provide a convincing value-proposition to their customers, the more they will realize their targeted objectives and increase their market share, which represents a vital challenge relating to the banks' visibility in the market as a technology service provider. However, at the same time, banks must cater to local values and cultures of the society and smoothly adopt, diffuse, and adapt such technologies to serve their customers' needs without facing major resistance.

The challenges also include the diffusion of innovation among the community and the development of the infrastructure required. Also challenging, is diffusing it among Egypt's 27 provinces, while avoiding the creation of communities of haves and have nots and attempting to leverage the statistics of technology penetration, which currently stand at 15% of the population engaged in retail banking and benefiting from its services. There are a lot of questions that need to be answered that represent a set of challenges. If turned into opportunities, these challenges could help boost the banking sector. Can banks cater to changing customers' needs? Can they provide a convincing value-proposition? Can they provide customers with easy-to-use trustful technology tools and delivery channels? Can they make that shift and still focus on their organization-based competitive strategy vision? With continuous development in electronic banking, banks in Egypt have realized that there are no easy solutions. At the same time, they realized that a change of strategy has to take place in order for them to remain in the competition, not only globally but also locally, and that represents the main challenge for the main players in the industry.

The research study results showed that despite the challenges faced while adopting various technology-based retail banking systems in Egypt, there are still strong indications that, over time, technology will permit banks to provide useful services to customers while

improving their marketing and communication, increasing their efficiency, and reducing cost of delivery. Moreover, the analysis showed that, consistent with TAM, perceived ease of use and perceived usefulness are playing relatively important roles in defining the acceptance level of different banking technologies. Additionally, the role of trust as an external variable affecting the acceptance level proved to be significant for all systems, including ATMs, credit cards, phone banking, and Internet banking. To summarize, it is believed that major efforts in infrastructure build-up, including technology and human resources development, need to take place not only by banks but also by all players in the new digital economy, including governments and the private sector.

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