Zulikha, J. & Abdullah, E. (2001). Banking Technology in Malaysia Based on The Interactive Voice Response System: A Measurement of Preparedness for E- Commerce, Proceedings of CollECtor 2000 Collaborative electronic Commerce technology and research. available www.collecter.org/collecter2000.html, Colorado, USA

Banking Technology in Malaysia Based on The Interactive Voice Response System: A Measurement of Preparedness for E-Commerce

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Abstract

The objective of this paper is to provide a clear picture about the awareness among banking customers towards virtual banking, and the implementation of interactive voice response (IVR) banking technology in Malaysia. The result of this study can be used as an important reference material to the banks for the purpose of measuring customer's preparedness towards phone banking as one of the popular method of e-commerce. The methods used for data collection were library search, questionnaires and interview. The respondents consisted of two groups: bank's customers, and commercial banks, which implemented the IVR system. Data were analyzed using descriptive statistics. The findings highlighted the following issues: (1) customers' profile and the profile of the commercial banks implementing IVR system; (2) the benefit of the system as viewed by the customers and the banks; (3) the cost of accessing the system; (4) the channel of accessing the bank services; (5) the kind of IVR banking services offered; (6) service charges; (7) the developer of the system and the configuration/technology used; and (8) the future of IVR banking. The results revealed that the IVR banking attracted younger customers who believed that this method of banking could increase the customer service and satisfaction because the system can be accessed at any time. However, accessing the bank services via telephone is not the most popular channel of banking. The most popular services are balance inquiry and bills payments. Almost all IVR banking customers found that banking by phone is a lot cheaper, whereas non-IVR customers believe otherwise. Configuration, technology, lines support, hardware and software supports do not differ very much from one bank to another. They use a model, which is quite similar although not the same. To date, accessing the IVR banking services does not incur extra charges, except for third party bill payments. Based on the findings, the future of IVR banking in Malaysia is definitely bright, thus it is considered as a booster for e-commerce in this country.

Keywords: *Interactive voice response system (IVR), IVR banking, banking technology, telebanking, phone banking, e-commerce, virtual banking.*

Background

Computers have been implemented in the banking sector in developing countries since the 1950s and the interactive voice response system (IVR) technology has been around for the past 15 years (Essinger, 1999). But this technology was in the form of large systems implemented in big, expensive computers and was treated as a luxury item. During that time, only the largest banks could afford to implement such a system. The emergence of PC-based systems has put this technology reachable and thus could be owned by ordinary banks.

Banks and other financial community are the first organizations to use IVR with increasing number of users from day to day (Meehan, 1996, Robins, 1998). Banks[1] now realized the dire need of providing and maintaining better banking services to customers and the general public. As an addition to ordinary banking services, banks also take the opportunity from technology and automation to upgrade their readily available services and create new banking services such as the cash machine, popularly known as automatic teller machine (ATM), electronic fund transfer point of sales (EFTPoS), and IVR banking (Pang & Savarimuthu, 1991).

The Progress of Banking Technology in Malaysia

The evolution of banking systems in Malaysia has been very effective. It began with ATM in the late 1970s. Following the great success of ATM, banking sectors were inspired to look into other virtual banking[2] services. Thus, EFTPoS was introduced, followed by IVR banking, PC banking[3] and recently, the use of smart cards.

Financial and banking structures today vary and sophisticated (Pang & Savarimuthu, 1991). A few banks in Malaysia already have infrastructure facilities for virtual

[1] The word 'bank' in this paper refers to commercial banks involved in providing services to the customers, general public and businesses.

[2] Virtual banking is defined as any banking services which are controlled by a computer system and the customers can access the system via channels such as telephones, computers and other channels besides the ordinary channel which require the customers to physically present at the bank counters.

[3] PC banking is a banking method that allows customers to connect or make 'calls' to their bank account from their personal computer and perform banking transactions.

banking purposes. However early investigations reveal that, on average, the customers are not confident using this method. Also, there has not been any strong evidence that the banks have a clear vision towards a virtual banking revolution by exploiting technology to the maximum to provide automatic services such as cash access, account information or payments services to the customers. This is why the momentum towards this technology in Malaysia, is rather slow. New applications were also launched temporarily by those long sighted but cautious banks. Most banks take the phased-in[4] approach in implementing virtual banking. There are still banks, however, who prefer to wait and see.

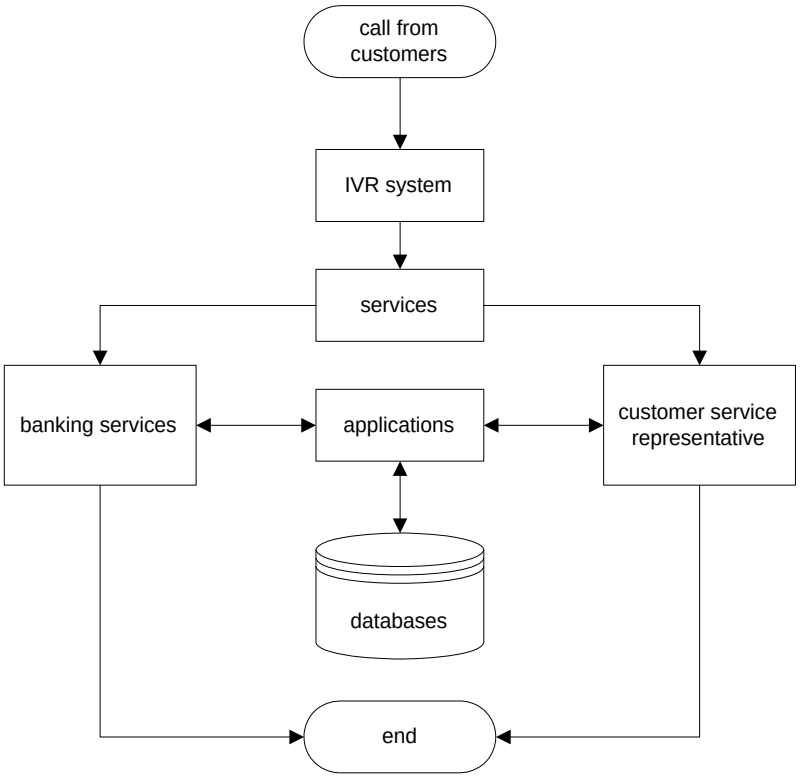

Figure 1: Operation transaction flow of an IVR banking system

IVR banking is defined as a product that allows account and financial information (i.e. selected banking services) in the computer databases to be accessed through

[4] Phased-in approach is a method that brings in the product to the market as soon as possible to fulfill the urgent demands and to protect customers from migrating to the competitors. The services offered begin with basic service package such as bills payment and balance enquiry. Later, the virtual banking function is upgraded according to the demand from time to time by upgrading the system from one phase to the other.

touch-tone telephone. This system is popularly known as telebanking[5], direct banking, phone banking or home banking. It has been used by the banks and their customers since 1994 (Arab-Malaysian Bank, 1999). It has however gained more popularity since 1997. The application enables the customers to inquire and change information virtually, thus the term virtual banking was introduced. Generally, operation transaction flow of an IVR banking system is as in figure 1.

Electronic commerce (or e-commerce) is much more than buying and selling over the Internet. Some authors prefer the term "e-business" because it calls to mind more of the ways that information technology (IT) can serve an institution's mission. The most basic form definition of e-commerce would refer to transactions that are handled electronically than on paper. Thus, it also refers to transactions done over the telephone, and since telephone banking is one of the oldest methods of e-commerce in this country, it is used to measure the preparedness of Malaysian banks' customers for other extensive e-commerce applications.

The Purpose of The Paper

This paper attempted to present the level of awareness and the status of implementation of IVR banking technology in Malaysia as a measurement of their preparedness for e-commerce. For that purpose, this survey looks into seven main issues that were highlighted in the library search (Schmandt, 1994; Bates & Gregory, 1997, Leonardi et. al., 1997; Essinger, 1999), namely:

1) The profile of the Customers and the commercial banks that has already implemented IVR banking system;
2) The benefit of the system as viewed by the customers and the banks;
3) The cost of accessing the system;
4) The services offered by IVR banking;
5) The channels of accessing the banks' services;
6) The service charges;

[5] Telebanking refers to banking service handling using the telephone by the customers.

7) The developer of the system, the configuration and technology used;

8) The future of IVR banking

Methodology

Data were collected using a library search, interviews and questionnaires. In investigating the IVR banking technology, various aspects could be highlighted depending on what the researcher intended to find and investigate. Issues (1), (2), (3) and (4) concern both the customers and the banks representatives. Thus two sets of questions were prepared for the two different groups of subjects. For parts concerning only the banks (5, 6, 7), their views and perspective are taken into account using questionnaires and interview sessions.

Out of 36 commercial banks in Malaysia (before the merging), 15 have already implemented IVR. However, only eight banks were willing to be interviewed and release required information. Questionnaires for close ended and those of fact gathering type questions were also given to the banks' representatives.

100 banks' customers were selected randomly during their visit to the bank. Out of 100, 50 of them were IVR banking customers at least for the past 6 months, whereas another 50 were those who did not quite use the system much, or did not use the system at all. These customers were picked randomly from banks located in Kedah, Pulau Pinang, Kelantan and Kuala Lumpur.

Raw data gathered from the banks' representatives and the customers were tabulated in the findings. Preliminary analysis methods were made using descriptive statistics. Analysing data from the banks using descriptive statistics is adequate because the survey involved all subjects, i.e. all the eight banks identified, and no sampling involved. However, for the customers' survey, descriptive statistics is not adequate because the sampling method used is random sampling. This is one drawback of this survey.

Findings of the Survey

The findings of the surveys regarding the elements stated above are as follows:

1) Customers And Commercial Banks' Profile.

This part of the survey looks at the customers' age, education, the date they become IVR customers, and the date they first used the system. The customers who have used the IVR banking system at least for the past six months, and frequently use it, are those between 17-34 age group. Out of 50 respondents, 31 (62%) of them fall into this category. The rest (38%) are between 35 – 54 years old. From the percentage, it is obvious that IVR banking system in Malaysia attracts younger customers (table 1).

Age group	Customers for at least the past 6 month			New customers (less than 6 month)		
	Number	%	Frequency (monthly)	Number	%	Frequency (monthly)
17 - 25	10	20	5-10	15	30	2-4
26 - 34	21	42	5-10	18	36	2-4
35 and above	19	38	5-6	17	34	0-4
Total	50	100		50	100	

Table 1: Those who frequently access the IVR banking system are those between 17 – 34 age group.

Young and educated bank customers (30%) are enthusiast about IVR banking. Table 2 shows that 50% of the customers who had used the system for the past 6 months are enthusiast in using the IVR banking system. These are the customers who push the banking technology to grow. Other customers are either essentially unconvinced or, do not care (20%). For most new customers (50%), they do not really need any new electronic banking other than ATM (table 3), although 40% of them are enthusiast in using the IVR banking system. Thus it is fair to say that on average, Malaysian banking customers are more or less ready for e-commerce. A major challenge remains in educating customers in the use of more complex types of transactions.

Age group	Enthusiast in using IVR	Do not care	Only need ATM
17 - 34	15 (30%)	4 (8%)	5 (10%)
35 - 54	10 (20%)	6 (12%)	10 (20%)
Total	25 (50%)	10 (20%)	15 (30%)

Table 2: Level of enthusiasm among established customers.

Age group	Enthusiast in using IVR	Do not care	Only need ATM
17 - 34	15 (30%)	3 (6%)	18 (36%)
35 - 54	5 (10%)	2 (4%)	7 (14%)
Total	20 (40%)	5 (10%)	25 (50%)

Table 3: Level of enthusiasm among new customers

As for the banks, out of 36 commercial banks (as announced by the Bank Negara Malaysia on the 30th April, 1999, i.e. before the merging), only 15 have already installed the IVR system with 8 banks being very active in implementing and upgrading the application (table 4).

Commercial Banks	**Year IVR banking was implemented**
Arab Malaysian Bank Berhad	1994 (AM Direct)
Bank Bumiputra Malaysia Berhad	1997 (Juwara Telebanking)
Malayan Banking Berhad	1996 (Kawanku Phone Banking)
Standard Chartered bank (M) Berhad	1995 (Phone Banking)
RHB Bank Berhad	1996 (RHB Telebanking)
Southern Bank Berhad	1995 (Direct Access)
HSBC Bank Berhad	1996 (Telephone Banking)
EON Bank Berhad	1998 (TeleBanker)

Table 4: The list of 8 commercial banks in Malaysia (before the merging) actively involved in IVR banking.

2) The System's Benefit As Viewed By The Customers And The Banks

Using close-ended questionnaires based on the scale of 5 (scale 1 strongly disagree, scale 2 disagree, scale 3, indifference, scale 4 agree, and scale 5 strongly agree) and an open-ended question, the surveys revealed the following benefits regarding IVR banking: (sorted according to priority)

1. Increased customer service and satisfaction as the service being available seven days a week, 24 hours per day and every day of the year. Customers do not have to go out from their offices and do not have to rush during office hours to deal with the banks (85% answer 4 and 5).

2. Customers do not have to queue and wait for their turn to be served. Lots of time can be saved especially for those who live far away from the banks or their branches (83% answer 4 and 5).

3. Customers feel that they have more privacy and confidentiality because they interact directly to the computer system. They also feel comfortable because they could get help from a customer service representative (CSR) whenever needed (80% answer 4 and 5).

4. Bills payments via IVR banking are far cheaper compared to payments made by cheque (52% answer 4 and 5).

As for the banks, the benefits of the systems are as follows: (sorted according to priority, as stated by the banks' representative)

1. It reduces business cost because they can reduce the number of human operators and counter staff (100% answer 5).

2. It increases productivity because the system takes over routine information handling (100% answer 5).

3. It increases the banks' image and reputation, and the banks believe that a good image will generate more confidence among the customers about the efficiency and stability of the bank (100% answer 5).

4. It enables the announcement about the banks' new information, product and service to be easily and effectively conveyed to customers (50% answer 4, another 50% answer 5).

3) The Cost Of Accessing The System

IVR customers involved in this survey gave their opinion regarding the cost of accessing the bank services using the IVR system and comparing it to the cost of accessing the same services by physically going to the bank's counter.

The following charts show the percentage of respondents who feel that accessing banking services by telephone are more expensive or cheaper than the traditional way. From 50 respondents who used the system at least for the past 6 months, 86% felt that it was cheaper, and 14% did not realized or never bothered to calculate the cost (refer figure 2). None thought that it was expensive. For the 50 new customers who rarely used the system, 56% thought that it was more expensive, 20% thought it was cheaper and another 24% did not have any idea about the cost (refer figure 3). It is interesting to note that many believe that banking by telephone is more expensive compared to traditional banking. It could be implied that the new customers who do not fully use /utilize the system, believe that new electronic banking services tend to be more expensive.

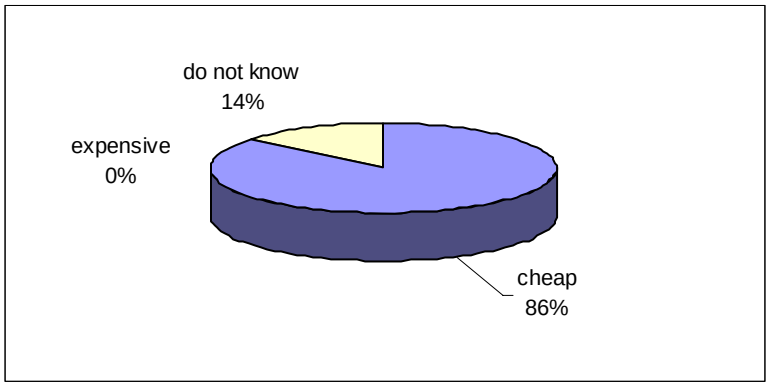

Figure 2: Chart showing the belief of 50 experienced respondents regarding the cost of accessing the IVR banking system.

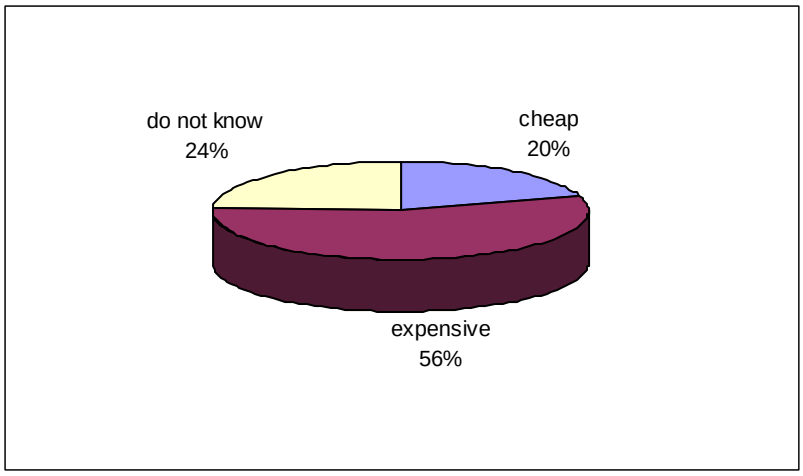

Figure 3: Chart showing the belief of 50 respondents whom rarely (or never) use the IVR banking system.

The banks also found out that IVR banking system was a cheaper method of banking. These could reduce:

1. the number of counters in the branches
2. the number of branches
3. the number of staff (particularly operators and counter staff)

Interestingly, the cost involved in developing bank counters and paying salaries is far more expensive than the cost of developing and implementing the IVR banking system. This is thus a major contributing factor for electronic banking, and hence e-commerce.

4) IVR Banking Services Offered

Gathered from the questionnaires and interviews, listed in table 5[6] are the services offered by the banks.

Even though not all banks could offer all of the services listed in table 5, all banks offered these services: balance inquiry, cheque book-related matters, fund transfer

[6]Not all banks offer the same number of services. Some only offer 3 to 6 simple services and 2 complex services. Some do offer up to 9 simple services and up to 4 complex services.

(normally third party transfer are not allowed), various statements inquiry, rate inquiry, and payment services (bills, loans and other payments).

From those six services, our survey showed that the most popular services, according to priority, were:

1. balance inquiry
2. bill payments
3. fund transfers between accounts
4. chequebook requests
5. statement inquiry

Simple services	**Complex services**
Balance inquiry: Current account Saving account Fixed deposit account Loan account **Cheque book related:** Cheque status (claimed or not) stop payment ordering cheque book **statement inquiry:** current account saving account loan account **bills payments** **general inquiry:** fixed deposit interest rate foreign exchange rate **account code inquiry** **payee code inquiry** (e.g.: telekom 100, celcom:110, TNB: 400) **bill payment limit inquiry** **service code inquiry** **ATM related:** Lost report Lost PIN Terminating ATM service Changing new PIN Urgent new PIN inquiry **On line bill registration** **Cancellation of 3rd party account** **Bank product information** **ordering: 1)travelers cheque** **2) bank drafts** **3) cashier order** **option to speak to the CSO/CSR**	**Shares trading** Trade balance Current loan amount Financial margin Marginable current share values Real time count inquiry Buying, selling & cancellation Market information inquiry KLSE or global index inquiry **Zakat's payment (all 8 types of zakat)** **Fund transfer** **New account opening** **On line payments** (for direct dealers registered with the bank) **Depositing fixed deposit** **Renewing fixed deposit** **Future payment** **Authorized third party transfer** **Last deposit made** **Bank loans payment** **Credit cards payment**

Table 5: List of services offered by the commercial banks in Malaysia.

72% (36 out of 50 IVR banking customers) of respondents who frequently use the system, wish that they could access more bank services via the telephone. 30% (15 of

50) of respondents who rarely use the system also hope that they could access more services by the telephone. Bill payments, being the second most popular service could indicate that paying bills electronically is more convenient. This is another indicator of positive preparedness for e-commerce.

5) The Channels Of Accessing The Banks' Services

Among the available channels, this survey revealed that the traditional channel remains the most important and the most used channel by Malaysian customers to access banking services. All the 8 banks have most customers accessing their services by being physically present at the bank counter. Banking using the IVR system comes after the traditional channel, followed by PC banking using Internet facilities, as the third most important channel. IVR banking is the second most important channel with an average of 13,000 calls a day. This figure does not differ very much from one bank to another (standard deviation of 0.954). The result implies that traditional branch remains the most trusted channel and it could also means it will take longer for e-commerce to establish and become part of our culture.

6) Service Charge

To date, almost all banks offer IVR banking services free of charge. However, some banks do charge a very small amount, between US$0.26 to US$0.53, for certain services, such as bill payments. This is a supporting factor towards boosting e-commerce in the banking sector.

7) The Systems' Developer, Configuration And Technology Used

No banks that were involved in this survey developed the system on their own. They used a vendor's service to develop, integrate, test and install the system for them with a certain agreement made regarding payments, maintenance and tests. The vendor was chosen based on certain criteria made by a bank. The main reason why banks do

not develop the system in-house is that they do not have enough (none for some banks) IVR and system integration experts. Other reasons mentioned were:

1. In-house developments take longer than scheduled to be completed. This is normally due to the changes made in the requirement. Users know that the system is built by their own programmers, thus they think changes to the requirement do not incur extra cost or other resources.
2. Based on the bank's experience, systems built in-house do not really consider the importance of documentation. As a result, the system's maintainer faced problems maintaining it especially when the programmers who developed the system have moved to another organization.

The system's integration and installation is also done by the vendor at the bank's premises. User acceptance tests are then carried out together with the Information technology (IT) steering committee and other identified bank users. Usually, some of the members in the IT steering committee are promoted as staff in the IVR production unit of the bank.

Inadequate technical support staff and expertise from within the bank itself, suggests that banks are dependent to their vendors. Being vendor-dependent is not a good sign for e-commerce readiness (Malayan Banking, Standard Chartered, 1999).

The technology used at the moment is a dual tone multi frequency (DTMF) or *touch-tone technology* with PBX IVR system without speech recognition ability. A few banks in this country are beginning to adopt speech recognition technology, but the amount of vocabulary understood by the systems is still very limited.

8) The Prospect and Future Trends of IVR Banking

The prospects and future trend of IVR banking was viewed from these perspective: (1) the demand for IVR; (2) technology used in implementing and enhancing the system's capability; and (3) the use of CSR in a fully automated IVR system.

The result of the survey, as perceived by the bankers, demonstrates that demand for IVR banking continues to increase. Data from one of the most active banks in using phone banking reveals that less people go to the bank this year, a reduction of 13% in the year 1997 – 1998, whereas more calls are received by the IVR banking system. The average number of calls received by all banks implementing the system was 13,000 calls per day. This is an 18% increment from the year 1997. Factors contribute to the increment as perceived by the banks are:

1. The addition of telephone facilities such as hand phone and PC phone;
2. More and more services could be offered via telephone. The comparable services could give more channel choices to the customers to access bank services.
3. Traffic jams and parking problems.

Current IVR technology is predicted to remain for a few years to come. The injection of a speech recognition system into it will take some time due to the failure of the system to properly 'understand' or 'listen' to each and every word spoken by callers. It is predicted that this technology will continuously be injected to the IVR phase by phase, but it will still use touch-tone technology as a backup. This situation seems to continue until the speech recognition technology becomes stable and reliable.

As perceived by the customers, banks that could become more effective and competitive are those banks, which offer options to the customers to speak to the CSR at any time (not restricted to office hours). This trend is anticipated to continue since no respondents like the system that only has an 'answering machine'. All of the respondents said that they still needed CSR for a certain transaction or at least for attendance.

Conclusion

In demonstrating the awareness level and the implementation of IVR banking technology in Malaysia, the following issues were addressed. 1) the profile of customers and the commercial banks implementing IVR system; 2) the benefit of the

system as viewed by the customers and the banks; 3) channels of accessing the bank services; 4) the kind of IVR banking services offered; 5) the service charges; 6) the cost of accessing the system; 7) the system's developer, configuration and the technology used; and, 8) the future of IVR banking in terms of the demand, the technology used, and the use of CSR.

It seems that the system is more attractive to the younger customers. The obvious benefit of the system is the enhancement of customer service and satisfaction as the system can be accessed anytime in the day. As for the banks, the major benefit lies in the business cost. The cost can be reduced because of the lesser need for human operators and counter staff. Phone banking is the second favorite channel after traditional branches. This result implies that banking at the bank counter is still the most preferred method of doing banking transactions by Malaysian customers, and it could also means it will take longer for e-commerce to establish and become part of our culture. All banks offer popular services i.e. balance inquiry, bill payments, fund transfer between accounts, chequebook application and various statement requests, but, more services were requested by customers. The request is another indicator of a positive preparedness for e-commerce. Up to now, the banks impose no additional charges for most services except for third party bill payment. This is a supporting contribution towards boosting e-commerce in banking sector.

In terms of cost, it could be concluded that banks' customers who have not been using IVR banking system believe that new electronic services tend to be more expensive. Of all the experienced respondents involved in the survey, none of them think that banking by phone was expensive as compared to having the same service at the bank counters. This finding supported the finding made by Booz-Allen and Hamilton[7] (1998b) which found out that the cost of each telebanking transaction was only 40% of cost of the same service accessed through bank counters (US$0.54 versus US$1.08). The banks also realized that IVR banking methods are far cheaper to be

[7]Booz-Allen & Hamilton is a global management and technology firm helping senior management in solving complex problems.

handled because bank branches do not have to have more counters and staff. This is thus a major contributing factor for e-commerce.

IVR banking systems used are provided by vendors. This includes system development, hardware, software, and the line support. System integration was also handled by the vendors. All banks rely heavily on vendors in maintaining the system. However, being vendor-dependent is not a good sign for e-commerce readiness.

Findings of this short survey also increases confidence that in the next 5 to 10 years, the number of users and those interested in using the IVR banking system will continue to increase. Among others, these are three factors that are anticipated to contribute to the increments: (1) the addition of telephone facilities such as hand phone and PC phone; (2) more services could be offered via telephone; (3) traffic jams and parking problems.

Based on finding 4, customers request more services to be offered by phone banking. Since banking technology in Malaysia are mostly driven by customer demands, it is realistic to expect that nearly 50% of a bank's functionality can be delivered by phone banking in about 5 year time. Base on that, it is also anticipated that there will be a reduction of about one quarter in the number of banks' branches.

With the e-commerce articles widely spread, more users know about doing banking transactions over the telephone and Internet. This indirectly contributes to telebanking and IVR banking. Data from a survey done by Ernst and Young (1999) also shows that the percentage of transactions done through call centers in banks in 20 countries increased from 8% to 10% for the year 1998 to the year 2002. This data also reflects the increment in the IVR banking system installment and its usage among the bank customers.

IVR banking system can be considered as a catalyst for the growth of e-commerce in this country. It offers one of the earliest electronic payment systems through

telephone banking. This study believes that in the next 5 –10 years, the number of IVR banking installations, its users and the numbers of those interested in using the systems will definitely continue to grow. The findings of this study strengthen Essinger's (1999) statement, who believes that in the coming years, implementation and the usage of IVR banking will continue to increase as mentioned by him:

> "...telephone banking is an important element of the virtual banking revolution and that any bank which wishes to succeed in the revolution should exploit telephone banking to the full as a way of providing customers with a comprehensive banking service that they can access from that most convenient, and generally private, of communications tools - the telephone".
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Acknowledgement

The authors would like to acknowledge the Malaysian Ministry of Science, Education and Environment for granting our IRPA grant to make the research possible.