

An exploration study on influential factors on information and communication technology

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ABSTRACT

During the past few years, information and communication technology (ICT) has revolutionized banking industry in the world. People are now able to do their business banking activities such as bill payments, transfer funds, etc. through the art of ICT features such as automatic teller machines, internet or telephone banking services. This paper performs an empirical investigation to find important factors influencing ICT implementation in Iranian banking industry. The survey uses factor analysis to find important factors using a questionnaire consist of 26 variables. Cronbach alpha is calculated as 0.901, which validates the questionnaire. The survey detects six factors influencing ICT including efficiency approach, new advanced technological achievements, human resource management, service strategy, growth strategy and supporting systems.

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1. Introduction

Information and communication technology (ICT) plays essential role in banking sector, while banking industry is a real engine of every robust economy. In fact, when banking industry fails to operate properly, the whole economy will be jeopardized. The impact of globalization, competition and innovation in the banking industry by its providers to offer their services makes it necessity to realize how different perspectives of consumer behavior influence the innovation and respond to customer service delivery (Van den Berg et al., 2008; Mohamed & Moradi, 2011). Abubakar and Tasmin (2012) performs an investigation to review the literature with an objective to investigate the effect of ICT on banks performance and customer service delivery. They also examined the effect of ICT on banks' performance to verify whether banks have successfully reached effective customer's service delivery, by providing high level of customer service through online delivery channel, besides operating cost minimization and revenue maximization.

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Banking industry has become highly ICT based and due to its inter-sectoral link, it is reaping the advantages of technological revolution as evidenced by its application in most of its operations. Osabuohien (2008) performed an empirical investigation of the anticipated role ICT has in enhancing the operations of some selected Nigerian banks. They stated that the need for the banks to regularly train their workers, and procure quality ICT gadgets, which would enhance efficiency was necessary to improve the banking sector. An implementation of other useful techniques such as Six Sigma could also improve profitability (Shoebridge, 2005).

Vilaseca-Requena et al. (2007) looked to explore the role that ICT played in the processes of product innovation and marketing – as an element that strengthens the cooperation and communication among various agents within the innovation project, reducing the barriers to innovation and enhancing the development of differentiated products as well. They stated that intensive ICT implementation in marketing makes the company more innovative, as it perceives that its usage breaks down obstacles to innovation and speeds up processes that in turn become more productive. In addition, increasing ICT implementation in marketing helps company predisposition to cooperate with and integrate particular agents within the business environment in the business development using innovation process, improving the degree of adaptation of the new product to market demands.

Agbolade (2011) investigated the role of ICT to increase banks profitability in Nigeria. He explained that the role of information in the actualization of different organizational objectives could not be over-emphasized. They reported that a positive correlation exists between ICT and banks profitability in Nigeria, which means that a marginal change in the level of the investment and adoption of ICT in the banking industry will yield to a proportionate increase in the profit level. Southard and Siau (2004) performed a comprehensive survey on online e-banking retail initiatives. Sullivan (2000) investigated how the adoption of internet banking influenced performance and risk in banks and discussed that while the existence of such services could contribute to banking industry, there must be some cautious on protecting the customers' information through secure implementation of information technology. Balamoune-Lutz (2003) performed an analysis of the determinants and effects of ICT diffusion in developing countries.

2. The proposed study

This paper performs an empirical investigation to find important factors influencing ICT implementation in Iranian banking industry. The population of this survey includes all regular customers who do banking business with one of Iranian banks named Bank Mellat located in city of Tehran, Iran. The sample size is calculated as follows,

$$N = Z_{\alpha/2}^2 \frac{p \times q}{e^2}, \quad (1)$$

where N is the sample size, $p = 1 - q$ represents the probability, $z_{\alpha/2}$ is CDF of normal distribution and finally ε is the error term. For our study we assume $p = 0.5$, $z_{\alpha/2} = 1.96$ and $e = 0.99$, the number of sample size is calculated as $N = 159$. The survey uses factor analysis to find important factors using a questionnaire consist of 26 variables.

Cronbach alpha has been calculated as 0.891 in preliminary stage and final 0.901 in final stage, which are statistically acceptable. In addition, Kaiser-Meyer-Olkin Measure of Sampling Adequacy is calculated as 0.844, which is within an acceptable limit and validates the results. Since factor analysis is sensitive on skewness of factors, we have decided to delete 11 questions. Fig. 1 demonstrates Scree plot on questions of the survey. Table 3 demonstrates the results of our factor analysis.

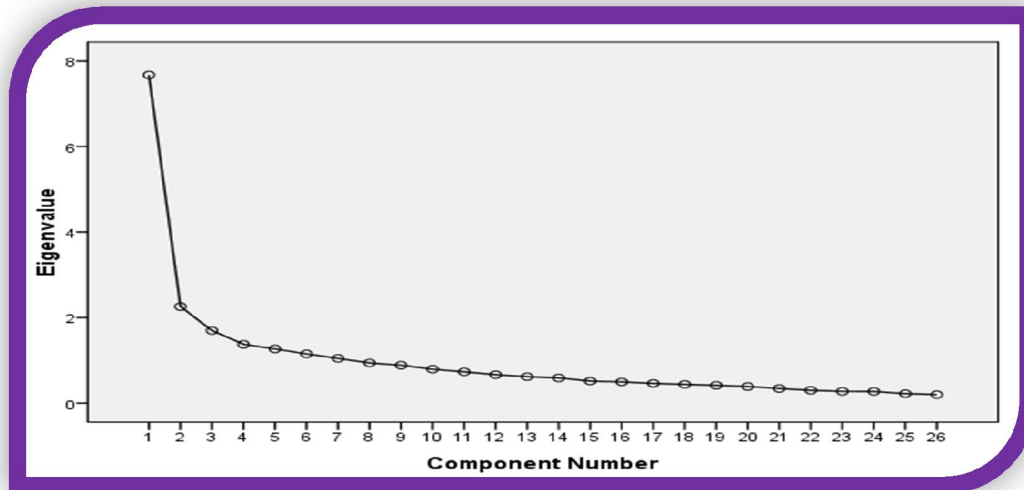


Fig. 1. The results of Scree plot

Table 3
The results of total variance explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.675	29.519	29.519	7.675	29.519	29.519	2.800	10.769	10.769
2	2.257	8.680	38.199	2.257	8.680	38.199	2.767	10.641	21.411
3	1.695	6.520	44.719	1.695	6.520	44.719	2.707	10.410	31.820
4	1.374	5.284	50.003	1.374	5.284	50.003	2.537	9.759	41.580
5	1.267	4.874	54.877	1.267	4.874	54.877	2.308	8.878	50.458
6	1.151	4.426	59.303	1.151	4.426	59.303	1.934	7.438	57.897
7	1.045	4.018	63.321	1.045	4.018	63.321	1.410	5.424	63.321
8	.939	3.613	66.933						
9	.886	3.406	70.339						
10	.792	3.047	73.386						
11	.732	2.814	76.200						
12	.663	2.550	78.750						
13	.618	2.377	81.128						
14	.588	2.263	83.391						
15	.515	1.981	85.371						
16	.496	1.908	87.279						
17	.461	1.773	89.052						
18	.437	1.680	90.732						
19	.416	1.600	92.332						
20	.387	1.490	93.822						
21	.341	1.311	95.133						
22	.299	1.150	96.283						
23	.274	1.054	97.337						
24	.273	1.052	98.389						
25	.220	.847	99.236						
26	.199	.764	100.000						

As we can observe from the results of Fig. 1 and Table 1, there are six factors influencing ICT including efficiency approach, new advanced technological achievements, human resource management, service strategy, growth strategy and supporting systems.

3. The results

In this section, we present details of six influencing factors on ICT implementation.

3.1. The first factor: efficiency

The first factor is associated with efficiency strategy, which includes four factors as follows,

Table 2

The summary of factors influencing efficiency

Option	Factor weight	Eigenvalue	% of variance	Accumulated
Processing information	.681			
Recording customer information	.716	2.990	42.712	42.712
Supporting customer's right	.715			
Higher education	.709			

As we can observe from the results of Table 2, recording customer information is the most important component followed by supporting their right, hiring highly educated people and processing information.

3.2 New advanced technological achievements

The second factor is associated with new advanced technological achievements, which includes four factors summarized in Table 3 as follows,

Table 3

The summary of factors influencing new advanced technological achievements

Option	Factor weight	Eigenvalue	% of variance	Accumulated
Automated payment systems	.781			
SMS alarming services	.807	2.562	51.241	51.241
Capability of accessing digital signature	.668			
Distance services	.672			

The results of Table 3 indicate that SMS alarming services play important role in accessing advanced technological achievement followed by automated payment systems, distance services and capability of accessing digital signature.

3.3 Human resource management

Human resource management is the third factor and it includes four factors summarized in Table 4 as follows,

Table 4

The summary of factors influencing human resource management

Option	Factor weight	Eigenvalue	% of variance	Accumulated
Productivity improvement	.709			
Information circulation	.710			
Removing barrier to reach more innovations	.668			
Social network and communications	.660			
Potential of having various multi-media	.782	1.994	49.839	49.839
Cooperation on innovative processes	.612			

The results of Table 4 indicate that potential of having various multi-media is number one priority followed by information circulation, productivity improvement, removing barrier to reach more innovations and social network and communication.

3.4 Service strategy

The fourth factor is associated with service strategy, which includes three factors summarized in Table 5 as follows,

Table 5

The summary of factors influencing service strategy

Option	Factor weight	Eigenvalue	% of variance	Accumulated
Using intranet services	.649			
Outsourcing	.764	2.289	45.777	45.777
Email services	.673			

The results of Table 5 demonstrate that providing email services is number one priority followed by outsourcing features and using intranet services.

3.5 Growth opportunities

The fifth factor is associated with new growth opportunities, which includes four factors summarized in Table 6 as follows,

Table 6

The summary of factors influencing growth opportunities

Option	Factor weight	Eigenvalue	% of variance	Accumulated
Scientific research	.607			
Web sites	.832	1.936	48.398	48.398
National access to internet	.656			
Investment	.744			

The results of Table 6 indicate that having efficient websites play important role in accessing growth opportunities followed by investment, national access to internet and scientific research.

3.6 Supporting systems

The last factor is related to supporting systems, which includes four factors summarized in Table 7 as follows,

Table 7

The summary of factors influencing supporting systems

Option	Factor weight	Eigenvalue	% of variance	Accumulated
Quality of maintenance	.805			
Levels of Profitability	.707	1.692	56.387	56.387
Health of internet	.607			
Training and learning	.656			

The results of Table 7 indicate that quality of maintenance of ICT components is number one priority in supporting systems followed by levels of profitability, training and learning and health of internet.

4. Conclusion

In this paper, we have presented an empirical investigation to study the influential factors on implementation of banking industry. The study has explained that ICT has become a primary source of sustainable growth in banking industry. The study has implemented factor analysis to find six important factors including efficiency approach, new advanced technological achievements, human resource management, service strategy, growth strategy and supporting systems. The study has shed

light on the relative importance of ICT in banking industry. However, ICT implementation may help us reach constructive results when all aspects of ICT such as internet security, infrastructure etc. have been carefully considered.

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