



ICT and its Impact on the Financial Development of the Banking System

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Abstract: In recent years, significant efforts have been made in many developing countries to use ICT. They are trying to expand their activities by balancing the revenue allocated to this sector so that they can quickly catch up with developed economies. In fact, the adoption of ICT policies is one of the most important programs for governments in most developing countries today. The banking system is also of special importance in this regard. Thus, having a dynamic and active banking system can help countries achieve their goals. Due to this, the purpose of this study is to investigate the effects of information and communication technology on the financial development of the banking system of 17 developing countries in the period 2008 to 2018 using the data panel method. The results indicate that information and communication technology, economic openness, financial globalization and the quality index of legal institutions have a positive effect and the size of the government has a negative impact on the financial development of the banking system in the countries under study.

Key words: ICT, Financial Development, Banking System, Panel Data.

1. Introduction

In recent years, with the development and expansion of communication and increasing the ways and facilities of establishing economic, social and political relations between different societies, the diversity of demand and the need to respond to it has emerged from different economic regions. In fact, the advancement of technology in the use of expertise and international division of labor has gradually led to the opening of closed economic structures so that the volume and scope of economic and trade relations in recent decades has expanded so that no country cannot need Imagine economic, commercial and political relations, etc. (Tamaddonnejad, 2007). In this regard, the role of financial markets cannot be ignored. A simple view of financial markets has led some to think of it only as a factor in the gain or loss of fluctuating financial asset prices, while the impact of financial structure on economic structure is so significant that many today believe that Without an efficient financial sector, economic growth and development cannot be achieved (Mohammadi *et al.*, 2014).

In this regard, economists such as Hicks and Schumpeter emphasize the development of financial structure and consider it as an engine and an integral part of the process of economic growth. Hicks (1969) believes that the financial system played a vital role in initiating the Industrial Revolution by equipping capital for large projects. Good banks strengthen technical innovations by identifying and financing employers who have the greatest chance of producing new products or implementing initiatives. In contrast, Robinson (1952) states that the financial system follows the real sector of the economy. When the real sector of the economy develops, so will the financial sector. Accordingly, financial development gives rise to certain types of financial arrangements, and the financial system automatically responds to this demand. Another group of economists do not believe in the importance of financial development and its role in economic development. Lucas (1988) argues that economists place too much emphasis on the role of financial elements in economic growth and development.

Development economists, on the other hand, are skeptical and occasionally ignore the financial sector in their analysis. At the same time, information and communication technology (ICT) is one of the main criteria for the economic and industrial development of human societies and plays a key role in the financial development of the banking system. It is now clear to everyone that the main reason for the slow pace of economic growth and development of developing countries in social, economic and even cultural progress is their inability to recognize or develop the right technology and use it in production activities (Kiani and Shadi, 2007).

Technology, if used properly, can help solve many crises in developing countries, such as inflation, unemployment, limited financial resources, and a negative trade balance. In the midst of technical developments, technology is growing very rapidly and unimaginably. How to use ICT and its ability to increase the development of the banking system is an issue that needs further investigation. New economic developments widely emphasize the expansion of ICT, especially the use of the Internet in banking and economic activities (Peace *et al.*, 2018). According to the above, the importance of the present study is to pay attention to ICT and the conditions for using its maximum capacity to develop the banking system. Given this importance, the present study seeks to examine ICT and its impact on the financial development of the banking system in 17 selected developing countries between 2008 and 2018. In the following, first the theoretical foundations and studies will be examined. Then the data and estimation pattern will be introduced. The model estimation results will then be examined. Finally, the conclusion will be discussed.

2. Background Literature

2.1. Financial Development

Financial development is one of the criteria for assessing the strength of the financial and banking market in a country. This can be examined by using the share of loans allocated to the private sector in the economy and the share of loans and credits granted through private banks in proportion to loans directed through the central bank and state-owned banks. The larger the ratio, the stronger the credit to the private sector, which is more sensitive to the quality of investment in the economy. An important point that some researchers focus on the relationship between financial sector quality and growth is that the financial sector ultimately improves the level of savings, capital accumulation, technology growth and economic growth by reducing transaction costs and information asymmetries in the economy (Komijani *et al.*, 2009). Meanwhile, the development of the financial and banking sector in the economy is one of the requirements for economic growth and development. The experience of many developing countries shows a reformist approach to the structure of the financial system and improving the banking system to boost the economy to address investment shortages (Azouji and Farhadi, 2007). The importance of the development of financial markets and their role in economic growth and the activity of economic enterprises has caused governments to be sensitive and play a role in expanding and regulating financial markets and directing resources to selected industries. Increasing the efficiency of financial institutions and correcting any misallocation of financial resources is the main goal of many governments in this action (Khatai, 1999).

Economists such as LaPorta *et al.* (1998) argue for the need for government reform to better influence the development of financial markets in economic growth (Asamoha, 2003). Examples include the studies of Levine (1998) and Beck (2003) in this field. It is noteworthy that the results of the research of famous economists such as Levin and Beck in this regard differ considerably from each other. Especially since these two researchers consider the two variables differently for the causal effect. Levine examines the effect of expanding trade relations on the development of financial markets, but in the proposed regression model, the effect of developing financial markets on the development of trade relations of countries is studied and evaluated in a data panel model (Mani, 2015).

Financial development is usually defined as the process that leads to the development of financial intermediary services in quality, quantity and efficiency. Today, financial development is recognized as an important factor for economic growth. Schumpeter (1912) describes the role of financial intermediaries in fundraising, valuation and project selection, risk management, and exchange facilitation as elements for economic development, assuming that the size of financial development is positively related to the quantity and quality of financial services. (Robinson, 1952) notes that economic growth drives demand for and services for financial services. Lewis (1955) states that in the first place, economic growth facilitates the formation of financial markets, and in later stages, the financial market helps to improve economic growth. Patrick (1966) also concludes that in the early stages of economic growth, there is a relationship between supply leadership and the causal direction from financial development to economic growth. While the demand-side relationship appears in the later stages of economic growth and the direction of causality is reversed. Goldsmith (1969) in his study found a positive relationship between financial development and economic performance in his sample of 35 countries. Mckinnon (1973) consider government intervention in financial development as an obstacle to the process of economic growth (Asiama and Mobolaji, 2011).

2.2. Information and Communication Technology (ICT)

ICT is always an essential factor in economic and social development and plays an important role. Today, it is clear to everyone that the main reason for the slowness of developing countries in social, economic and even cultural progress is their inability to recognize or develop the right technology and use it in production activities (Kiani and Shadi, 2007). A Technology, if used properly, can help solve many crises in developing countries, such as inflation, unemployment, limited financial resources, and a negative trade balance. In the midst of technical developments, technology is growing very rapidly and unimaginably. The increasing speed of ICT in the global production of goods and services has affected all markets and entered human life (Moshiri and Jahangard, 2004). ICT is also recognized as a major driver of economic growth and development through increased productivity and human development. It is obvious that changes in ICT, in addition to affecting productivity, change the type of jobs, skills and responsibilities and tasks of the workforce in organizations, institutions and society (Kiani and Shadi, 2007). Recent advances in ICT have revealed the willingness of countries and organizations to use modern technologies to achieve organizational goals and value creation more than ever before. Today's human beings experience an ICT-based society that has its own characteristics. Life in the new world requires full knowledge and skills to use these technologies, and without such tools, competition and life will be very difficult and lead to the loss of many opportunities in the daily lives of individuals and communities. Organizations must also have the necessary and desirable grounding for the optimal use of ICT so that they can take important and correct steps in the field of progress and development and provide the means for the continuation of organizational life. Today, the world is more associated with a constant and inevitable phenomenon, the intensity, speed and uncertainty of which is astonishing with the phenomenon of globalization, which has been called change, and in all economic, political, social and cultural fields. Is flowing. Studying, recognizing, predicting and adapting to these environmental changes requires having appropriate programs and strategies with a view to the future and a vision combined with creativity and innovation that is necessary for any organization, manufacturing enterprise and in a macro dimension for any country. And it is necessary. ICT is one of the important aspects of this global change. Significant developments in the field of ICT examine these changes in terms of intra-organizational, inter-organizational structure and economic, cultural, educational and value-added aspects for the audience, which ultimately leads to improved quality of products and services and increases speed, accuracy, Cost reduction and overall productivity improvement (Bahari *et al.*, 2010).

2.3. Previous Studies

Peace *et al.* (2018) examined the impact of ICT on the performance of Nigerian banks from 2006 to 2015. The results show that the adoption of various forms of ICT has a significant impact on the quality of banking operations, performance and in particular has increased the stock returns of banks. Using ICT can maintain the stock returns of deposit money banks in the long run. This study recommends that investing in ICT should be an important component of the overall banking performance strategy, as it makes Nigerian banks more efficient, profitable and competitive.

Asungu and Nwachukwu (2017) have evaluated the role of ICT (Internet and Mobile Infiltration) in completing financial sector development (financial and informal formalization) for financial access. Empirical evidence is based on the GMM method using data from 53 African countries for the period 2004 to 2011. The findings indicate that the relationship between ICT, financial sector development and financial activities is different. Thus, the interaction between ICT and financial formalization reduces financial activity and, conversely, the interaction between ICT and the informal market increases. However, the use of ICT has had a positive impact on the financial development of the countries under study. These factors can be seen more in the Internet banking and mobile banking sectors. The results also show that ICT is effective in reducing information asymmetry and excess liquidity.

Abubakar and Tasmin (2012) have investigated the impact of ICT on performance and service delivery to banks in the banking industry. The results show that the impact of ICT on the performance of banks has been very positive, because in this case, banks have been able to use it to provide high-level services to customers through the online delivery channel and similar items that in addition to the minimum Delivering operating costs and increasing revenue has successfully performed the function of an effective customer service provider.

Ozaee and Sohrabi (2017) have studied the role of new financial technologies and its impact on banks. They believe that the entry of FinTech companies into the field of competition with banks, depending on the type of their relationship, can reduce the role and importance of today's banks and help them better, faster and cheaper services.

Pirayesh and Salamat (2016) examined the impact of information technology on the development of monetary and banking financial system. The results of studies showed that information technology as an essential factor in the development of economic, monetary, financial and banking system and achieving a knowledge-based society and with strategic planning, productivity management and continuing education to empower human resources along with equipping technical and cultural infrastructures and the government's efforts to expand the infrastructure of this system, Iranian organizations can use this approach for the development of the country.

Rasekhi and Ranjbar (2009) studied the effect of financial development on economic growth of OIC member states in the period 1980-2004. The results showed that financial development by the private sector has a greater effect on economic growth than financial development by the banking sector.

3. Research Methods

3.1. Statistical Population and Research Model

The data used in the research model is panel data. The study period is 2008 to 2018. The statistical population of this study is 17 selected developing countries including Bolivia, Argentina, Brazil, Colombia, Chile, Indonesia, Latvia, Iran, Bangladesh, Morocco, Mexico, Malaysia, Paraguay, Russia, Slovenia, Ukraine and Uruguay. The time series data of these countries have been collected from WDI 2018. The model introduced in this research is follows:

$$LFD_i = \alpha_0 + \beta_1 LICT_i + \beta_2 LOPEN_i + \beta_3 LGOVS_i + \beta_4 LFGLOB_i + \beta_5 LQLI_i + \varepsilon_i \quad (1)$$

In the above equation LFD_i logarithm of financial development index (ratio of credits allocated by banks and other financial institutions to the private sector as a percentage of GDP), LICT_i logarithm of ICT index (number of mobile subscribers), LOPEN_i logarithm of index Per capita globalization of the economy (logarithm of total exports and imports per capita), LGOVS_i logarithm of government size (ratio of total government expenditure as a percentage of GDP), LFGLOB_i logarithm of financial globalization index (ratio of foreign direct investment to GDP) And LQLI_i logarithms show the quality index of legal institutions (which is measured by factors such as the quality of regulation, rule of law, political stability, etc.).

3.2. Panel Data Method

The econometric model used in this research is based on the data panel model. In the data panel model, the data are time-series and cross-sectional, ie the data is measured over time between sections. According to the principles and foundations of econometrics, the model is estimated by the ordinary least squares (OLS) method and the coefficients of β are obtained. This method provides more informative information, more variability or variability, less alignment between variables, greater degrees of freedom and efficiency, while time series are aligned. In panel data, due to the fact that they are a combination of time and cross-sectional series, cross-sectional dimension adds a lot of variability or variability, which can be used to make more reliable estimates (Ashrafzadeh and Mehregan, 2010).

4. The Findings and Results

The F-Lymer test was used to examine how to select the money and panel method, and the Hausman test was used to evaluate the use of the fixed or random effects method. The results of these tests can be seen in Table 1.

Table 1. The results of F and Hausman tests

Test	F Lymer Test	Hausman Test
	86/7832	42/5963
Prob	0/0000	0/0000

Source: Research findings

According to Table 1, the probability values of F and Hausman test statistics indicate the appropriateness of using the fixed effects method to estimate the model.

Accordingly, the results of estimating the model introduced to investigate the impact of information and communication technology on the financial development of the banking system using the fixed effects method of data panel are presented in Table 2. It should be noted that due to the logarithmic nature of the model under study, the coefficients of the variables represent the elasticity.

Table 2. Results of estimating the impact of ICT on the financial development of the banking system

Variables	Coefficient	T statics	Prob
LICT	0/0971	13/4215	0/0000
LOPEN	0/0551	9/3674	0/0000
LGOVS	-0/3217	-4/1274	0/0000
LFLOB	0/7136	6/7638	0/0000
LQLI	0/0478	3/9112	0/0001
$R^2 = 0/9293$		$\bar{R}^2 = 0/9120$	
		D-W = 1/79	

Source: research findings

The results of the fixed effects method show that all coefficients of variables are economically and statistically significant. As can be seen in Table 2, the estimated coefficient for the ICT variable is 0.09. This shows that with a 1% increase in the degree of openness of the economy, financial development improves by 0.09%. Undoubtedly, all countries have realized the importance of ICT dissemination in all areas, and in some cases, it is used as a development tool and a shortcut to developing countries. The role of this technology in the economic growth and development of all developing countries is not hidden from anyone, but what distinguishes countries from each other is the type of strategy they adopt regarding ICT. Expanding the use of this technology can have positive effects on the financial development of the banking system in developing countries. In order to use this technology as a development tool, desirable and optimal ICT expansion policies should be adopted according to the existing facilities and structure of the country in order to increase economic efficiency.

As can be seen in Table 2, the estimated coefficient for the degree of openness of the economy is 0.05. This shows that with a 1% increase in the degree of openness of the economy, financial development improves by 0.05%. According to the results, it can be acknowledged that the degree of openness of the economy and financial development have a positive relationship with each other. Economic openness actually plays a vital role in determining the level of financial development of the private sector, and trade development policies not only do not restrict the financial sector of the economy, but also lead to the expansion and development of this sector. Increasing trade in the economy can lead to the development of exports of economically viable sectors due to scale, and this increases the need of industries and enterprises of that country for financial resources outside those enterprises and industries, and consequently develops the financial system of the country's economy. Thus, the degree of openness of the economy can be an incentive to adopt less disruptive policies and systematic macroeconomic management to maintain macroeconomic stability and increase the competitiveness of domestic firms in world markets, and this increase in competitiveness has a positive effect on financial development.

The elasticity of financial development relative to the size of the government is -0.32. That is, by increasing (decreasing) one percent in the government size variable, financial development decreases (increases) by 0.32 percent. This suggests an inverse relationship between government size and financial development in the countries surveyed. The negative relationship between government size and financial development confirms the policy view of government participation in the financial sector. This means that one of the tasks of the government is to regulate the private sector, but if governments increase their market power, the development of the financial sector will be limited, rent-seeking and the alternative effect on investment will increase. For example, the provision of private credit by the banking system can be reduced due to increased government spending, inefficient legal systems and corrupt bureaucracies.

The estimated elasticity for the Financial Globalization Index variable is 0.71. This indicates that with a 1% increase (decrease) in the financial globalization index, financial development increases (decreases) by 0.71%. There is a positive relationship between financial globalization and financial development in that the more dynamic the country's economy is in relation to other countries, while increasing economic exchanges, benefiting from the acquisition of technology and creativity of other countries, and increasing productivity increases motivation and Provides an incentive for investment that leads to financial development.

The estimated elasticity for the variable of quality index of legal institutions is equal to 0.04. This shows that with a 1% decrease (decrease) in the quality index of legal institutions, financial development increases (decreases) by 0.04%. The development of the financial sector allows entrepreneurs to easily receive financial resources to realize their ideas and contribute to economic growth. Therefore, the importance of the developed financial sector dictates that the exact influencing factors be identified. Due to the characteristics of financial contracts, one of the most important factors determining the performance of the financial sector is the existence of appropriate institutional contexts. Therefore, the quality of legal institutions will have a positive and effective impact on financial development.

It should be noted that the estimated coefficient of determination of the model is equal to 0.92. This indicates that the independent variables of the present study have been able to gain high explanatory power. D-W 1.7 also indicates the lack of autocorrelation between model variables.

5. Conclusion

One of the factors that play a key role in achieving the goal of rapid and continuous economic growth is the development of the financial sector of each country, because it can be said that the development of the financial and banking sector in the economy is one of the requirements for growth and economic development. Financial development is a criterion for assessing the strength of the financial market in a country is the ratio of the value of the shares of listed companies to the total GDP of that country. Such an indicator shows what part of the country's investments are bought and sold in markets with high liquidity. Other common ratios are the volume of shares traded on the stock market, the share of loans to the private sector in the economy, and the share of loans and credits granted through private banks to the proportion of loans directed through the central bank and state-owned banks. The larger the ratio, the stronger the credit to the private sector, which is more sensitive to the quality of investment in the economy. The starting point for researchers focusing on the relationship between financial sector quality and growth is that the financial sector ultimately promotes savings, capital accumulation, technology growth, and economic growth by reducing transaction costs and information asymmetries in the economy. The experience of many developing countries reflects a reformist approach to the structure of the financial system and the improvement of the banking system to boost the economy to address investment deficits. The present study examined the factors affecting financial development by emphasizing the degree of openness of the economy using the data panel model in the period 2008 to 2018 among 17 selected developing countries. The coefficients obtained from the variables were economically and statistically significant. The estimated coefficients for the variables of information and communication technology, economy openness, financial globalization and quality index of legal institutions were positive and the size of government was negative.

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