

KEY DRIVERS FOR SOUNDNESS OF THE BANKING SECTOR: LESSONS FOR DEVELOPING COUNTRIES

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ABSTRACT

Soundness of banks is important for the economic development of a country. In this paper we empirically examine the impact of key factors such as Infrastructure (ICT infrastructure), Intellectual Capital, Institutions, Integrity (Governance), Interaction (Strategic Partnership) and Innovation (henceforth will be referred to as the 6I's) on the soundness of the banks in developed, developing and under-developed countries. The study was conducted for the year 2004. The empirical results showed the developments of the 6I's in developing and underdeveloped countries were significantly lower than that in developed countries. The study also showed that well developed institutions, good integrity system and high innovative capacity contribute positively to the soundness of the banks. Key policies and strategies to facilitate the banking sector in developing and under-developed countries to leapfrog to higher stages of financial soundness are discussed in this paper.

INTRODUCTION

The banking sector is an integral part of the economy. Hence this sector plays a key role in the well-being of the economy. A weak banking sector not only jeopardizes the long-term sustainability of an economy, it can also be a trigger for a financial crisis which can lead to economic crises. As such developing countries should take cognition of the lessons learned from the financial crisis that plagued the Nordic countries in the early 1990s, Mexico in 1994, the Asian financial crisis in 1997-98, Russia in 1998 and Argentina in the year 2001 among others, which had an impact on the stability of the financial systems. In most of these cases the crises had left an impact on the credit portfolios of many countries and had caused a slow down in the economic activities in these countries with a contagion effect on countries in the region. The adverse outcomes of weak financial systems and their impact on economic well-being brought about renewed interest within the international financial community.

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Most studies have argued that the financial sector is vital for the socioeconomic development of a country. For example studies by De Gregario and Guidotti (1995), Levine and Zervos (1998), Rousseau and Wachtel (1998), Beck et.al. (2000) and Levine (2003) among others, suggests that a well developed and sound financial system can contribute significantly to economic growth by recognizing the important role financial intermediaries play in bridging the disequilibrium between savings and investment needs within an economy. These authors argued that economic growth can be sustained only if scarce resources are mobilized efficiently and transformed effectively into productive investments and this function is efficiently conducted by the financial intermediaries. Most of these studies were conducted for developed countries where significant reforms were undertaken over the last two decades to enhance the efficiency and competition of the financial sector. While the financial sector is a key catalyst for sustainable development of a country, much of the developing and under-developed countries are grappling to keep up with the forces of globalization and liberalization that are transforming the global financial architecture.

The primary objective of this paper is to examine the key drivers for enhancing the soundness of the banking sector. This study will use a general framework to assess key factors such as Infrastructure, Intellectual Capital, Institutions, Integrity, Interaction and Innovation on the soundness of the banking sector. This study is different from other studies in the literature in that it incorporates a broader set of factors that enhances the soundness of the banking ecosystem. From the empirical analysis, to advocate information, key policies and strategies to enhance the soundness in the banking sector to the developing and the less developed countries so as to 'catch up' with the developed nations.

The rest of this paper is organized as follows. It begins with a brief review of the literature followed by the empirical methodology. Then the empirical results are presented. This is followed by the policy implications in the next section and in the final section conclusions and future directions are discussed.

LITERATURE REVIEW

The role of banks in an economy has received attention since the 18th century (see for example Smith (1776), Bagehot (1873) and Schumpeter (1912, 1934)). More recent works include Rousseau and Wachtel (1998), Beck et.al. (2000) and Levine (2003) among others. From the outset, it can be noted that the focus of the literature is on the importance of the financial sector to the growth of the economy. Hence it is crucial to identify the factors that determine the soundness of the financial sector. This study is linked to several aspects of the literature and to this end, a brief review of the literature beginning with the law and finance aspect is undertaken. In this context, La Porta et.al. (1998, 2000) examined the legal determinants of financial development namely shareholder and creditor rights indices for 49 countries. The authors concluded that better protection of creditor rights has a positive and significant effect on the financial development by constraining the extent to which insiders namely managers and controlling shareholders can expropriate external investors who are instrumental in providing the finance. La Porta et. al. (2000) also argued that the differences in the contracting environment that is the recognition of the origins of laws namely common law and civil law traditions affect the borrowing of firms. Their findings showed that common law countries tend to emphasize on the rights of the minority shareholders thus favoring to the capital market environment as opposed to civil law traditions which tend to focus on bank dominated financial system. For a detailed discussion on institutions for financial development, refer to Fergusson (2006). Contrary to the main strand of literature, Padilla and Requejo (2000) are of the opinion that strict protection of creditor rights by exercising the right to repossess the collateral pledged could hinder the completion of efficient projects. Although their main concern was not to overemphasis on laws relating to creditors, they do stress that efficient enforcement of laws and regulation is crucial. Hence an institutional characteristic which include judicial independence, efficiency of the legal framework and effectiveness of law making bodies of a country does give rise to a better developed financial sector.

In recent decades, the financial service industry had been subjected to various major transformations due to computers and telecommunications. Information and communication technologies (ICT) infrastructure are rapidly emerging as a vital factor in socioeconomic development and hence have a crucial role to play in

addressing development challenges. However, according to Wijkman and Afifi(2002) only 7 percent of the world's population is connected to the internet. This shows that billions of people are still not connected through the internet mostly from the under-developed and developing countries, causing the digital divide to widen. This is attributable to lack of proper ICT infrastructure and the development of human capital to adapt to this new mode of communication. For example, Amoaka (1998) highlighted that in Africa only one in thousand Africans enjoy internet connectivity due to lack of infrastructure. Corrocher (2002) adopted a perspective that focuses on the complementary role between traditional banking activities and internet banking and considers them two separate but incompatible systems of providing financial services.

Although universities have been touted to have a history of contributing to the needs of the industry and the economy, very little attention has been directed to studies relating to the interaction between universities and the industry. Only recently however, attention has been directed in this area by the National Academy of Engineering (2003) on the impact of academic research on industrial performance. According to this report, academic research has played an important role in innovation in the financial services industry. However, negative trends were also noted in some cases and have been attributed to innovations having a destabilizing effect on the markets resulting in industry failures, not only financially but also loss of public trust. To this end, a gap between research and applied research in this industry is apparent and remains a challenge. The study recommended that *"to bridge the gap between theory and practice in experimental economics, economic theories should be tested in real markets and the structures analyzed before new (potentially destabilizing) products are introduced"*. There have been some recent studies (Gulbrandsen and Smerby, 2002 and Ranga, 2003) that have analyzed the impact on European academic research which is funded largely by the industry. These studies argued that the imperfect intellectual property rights coupled with low marginal cost of reproducing the results from research could actually have a negative impact on the industry as technologies developed for this sector through imitation and reverse engineering may be used by other sectors, resulting in competition.

Lastly, the improvement in information and communication technology (ICT) has enhanced the creation of new business models and has revolutionized the distribution channels of financial systems resulting in not only a reduction in the transaction costs but also has improved the convenience and accessibility for the customers (Devlin, 1995). According to Norton (1992) and Mishkin and Strahan (1999) this is a key factor that is transforming the financial system. On the same note, improvement in information technology also makes it easier for investors to monitor corporations, thus reducing asymmetric information (Mishkin and Strahan, 1999). As such, banks which have not invested significant amounts in technology have consequently faced an erosion of their market shares to other non-banking institutions. Technological advances facilitate the rapid transmission of digitized information within and across borders, which is becoming increasingly important for successful banking transactions as financial services are largely informational in nature (Bradley and Steward, 2002). In another recent study, Berger (2003) identified the changes in the use of selected banking technologies, indicating a significant growth in the use of new IT and financial technologies. To this extent the impact of new technology on the financial sector needs to be addressed (Suoranta and Mattila, 2003), as ICT is radically changing the financial sector landscape.

Thus far the literature does not appear to have paid much attention to the drivers that contribute to the soundness of the banking sector in a holistic approach rather much of the literature have examined only a subset of the factors that are important for the soundness of the banks. As such this study is drawn from work which attempts to integrate the factors considered in the literature by examining the key drivers that contribute significantly to the soundness of the banking sector and hence the health and stability of the banks.

EMPIRICAL METHODOLOGY

In this section, an outline of the theoretical framework for capturing the soundness of the banking sector dynamics in a sample of developed, developing and underdeveloped countries is undertaken. This is then followed by a discussion of the econometric method employed to examine the relationship between the key drivers and the soundness of the banking sector in these sampled countries.

In this paper, it is assumed that the soundness of the banking sector which can be a proxy for financial development of a country is composed of three stages of development namely Stage 1: Slow growth; Stage 2: Rapid growth; Stage 3: Diminishing Returns.

The first stage of the financial development is characterized by much greater investment in the key drivers of the soundness of banks with insignificant increase in financial development. In this stage of development, the drivers of the soundness of banks namely Infrastructure, Intellectual Capital, Institutions, Integrity, Interaction and Innovation are usually poorly defined. Investments in the inputs are low to result in significant development in the banking sector. The second stage is characterized by rapid growth in financial development, where superior products and services in the financial sector materialize. Improvements in the key drivers tend to increase the marginal contribution to the development and growth of the financial sector. New innovation and new financial instruments spur market growth and the soundness of the financial sector. Lastly in the third stage, the financial sector achieves a high level of maturity and products and services become highly standardized and established in the market place. To this end, the financial sector reaches a steady state of financial development.

The dynamic development of the financial sector can be modeled using the logistic function:

$$Y_t = \frac{Y_s}{1 + ae^{-x\beta+u}} \quad (1)$$

where Y_t is the soundness of the banks, Y_s is the upper limit of Y_t . The drivers for the soundness of banks is denoted by the design matrix where $x = [I_1, I_2, I_3, I_4, I_5, I_6]'$. Equation (1) can be re-written as:

$$y^* = x'\beta + u \quad (2)$$

where $y^* = \ln\left[\frac{Y_t}{Y_s - Y_t}\right]$ and u is the residual. An important assumption underlying the use of OLS is that

the residuals of the model are normally distribution with mean 0 and variance $\sigma^2 I_T$ (homoskedastic), that is $\mu \sim N(0, \sigma^2 I_T)$. Equation (2) can be estimated using ordinary least squares (OLS) and the OLS estimator is given by:

$$\hat{\beta}_{OLS} = (x'x)^{-1} x'y^* \quad (3)$$

If the residuals are heteroskedastic, the $\hat{\beta}_{OLS}$ will be an inefficient estimator. In this case, the Generalised Least Squares Estimator (GLS) (The White-Estimator) is used where the GLS estimator is given as

$$\hat{\beta}_{GLS} = (x'\Omega^{-1}x)^{-1} x'\Omega^{-1}y^* \quad (4)$$

Where $\Omega \neq \sigma^2 I_T$ is a the variance-covariance matrix.

To ensure the model is correctly specified, the stability of the estimator parameters were tested using the Recursive Coefficient Estimate test. The two standard error confidence bands around the $\hat{\beta}$ were computed. If the estimated $\hat{\beta}$ path is within the two-standard error bands, the model is said to be correctly specified.

In this study, secondary data is collected for 104 under-developed, developing and developed countries (Appendix A) for the period 2004 from The Global Competitiveness Report 2004-2005. The key drivers that influence the soundness of banks will be examined and are classified as the 6i factors (Table 1 below) following an Innovation model developed by Nair and Kuppasamy (2005).

THE EMPIRICAL RESULTS

In this section, the trends in developed, developing and under-developed countries pertaining to the soundness of the banking sector, infrastructure, intellectual capital, Institutions, Integrity, Interaction and Innovation will be examined. This is then followed by a report of the empirical results for the estimated model as given in (2).

From Figure 1, it can be noted that the infrastructure gap between developed, developing and under-developed countries are large, with both developing and under-developed countries having significantly lower number of Internet users than developed countries. Similar pattern exists for intellectual capital, institutional development, integrity systems, interaction (industry-government-university collaboration) and innovation as depicted in Figure 2. It is also observed that the soundness-gap in the banking sector between developed, developing and under-developed countries are also wide. The banking sector in developed countries is more resilient than that found in developing and under-developed countries.

Table 1: Variable Description

The 6i factors include:

Variables	Description	Proxy
Infrastructure (I ₁)	facilitate connectivity to the global economy that is access to ICT facilities	Number of internet users.
Intellectual Capital (I ₂)	knowledge workers'	Quality of the educational system
Institutions (I ₃)	legal and regulatory framework that facilitate the knowledge economy	Effectiveness of Bankruptcy Law, Judicial Independence, Efficiency of Legal Framework, Intellectual Property Protection, Effectiveness of Law-making Bodies, Effectiveness of Anti-trust Policy, Presence of Demanding Regulatory Standards, Strength of Auditing and Accounting Standards
Integrity (I ₄)	governance systems (corporate and public sector governance)	Pervasiveness of Money Laundering Through Banks
Interaction (I ₅)	smart partnerships between economic agents in the economy	University/Industry Research Collaboration
Innovation (I ₆)	R&Dand newproduct development	Financial Market Sophistication, Quality of Scientific Research Institutions, Sophistication of Local Buyers' Products
Soundness of banks (y)	Banks in a country are (1=insolvent and may require government bailout, 7=generally healthy with sound balance sheets)	Soundness of banks

Figure 1: Infrastructure Development in Developed, Developing and Under-developed Countries

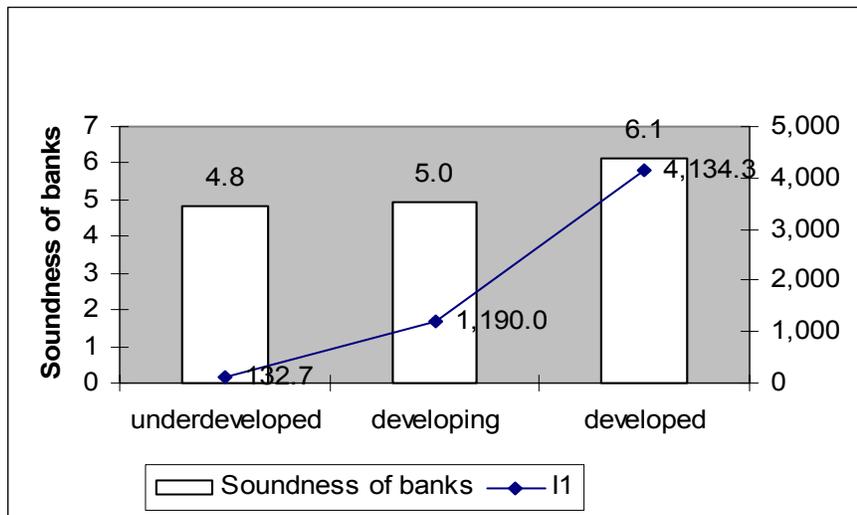
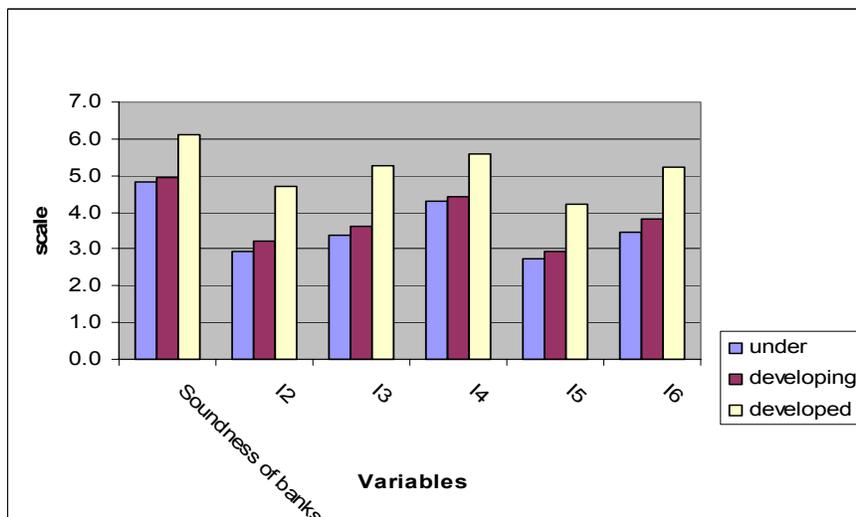


Figure 2: Developments in Intellectual Capital, Institutions, Integrity, Interaction, Innovation and Soundness of the Banks in Developed, Developing and Under-developed countries



Next the impact of infrastructure, intellectual capital, institutions, integrity, interaction and innovation on the soundness of the banks in the sample countries will be reported. To determine if the ordinary least squares (OLS) or the generalized least squares (GLS) method should be employed, the White's Heteroscedasticity test was conducted on residual of the OLS estimation. The White's Heteroskedasticity test showed that the residuals were not heteroscedasticity. Hence, the impact of the explanatory variables on the soundness of the banks was tested using OLS.

Table 2 presents the empirical findings of the regression using ordinary least squares method on the soundness of the banks (Y^*) with respect to Infrastructure (I_1), Intellectual Capital (I_2), Institutions (I_3), Integrity (I_4), Interaction (I_5) and Innovation (I_6). In addition, recursive residuals were used to assess the parameter stability of the estimated model. It is evident that the plots¹ are within the two standard error band.

¹ The recursive plots are not provided in this paper but can be obtained from the author upon request

This suggests that the model is correctly specified. Based on the Durbin-Watson test, Lagrange Multiplier (LM) test for serial correlation and Autoregressive Conditional Heteroskedastic (ARCH) test for normality, the residuals satisfy standard regularity conditions.

Table 2: The Estimated OLS results for the Soundness of Banks:

Variables:	Coefficients:	Std. Error:	t-Statistics:
Constant	-2.412	0.514	-4.689
I ₁	1.26E-05	5.93E-05	0.213
I ₂	0.005	0.102	0.0527
I ₃	0.554	0.205	2.699*
I ₄	0.227	0.127	1.796***
I ₅	-0.508	0.135	-3.754*
I ₆	0.496	0.197	2.521**

Dependent Variable: y*

*, ** and *** are significant at the 1%, 5% and 10% significance levels respectively based on the student's t-values

Diagnostic Analysis

R-squared	0.689	Durbin-Watson	1.842
Adjusted R-squared	0.670	Sum Squared Residual	33.282
AIC	1.833	Schwarz Criterion	2.011
F-statistic	35.842 (0.000)	LM	0.780 (0.4613)
ARCH	0.024 (0.8780)		

The empirical results show that infrastructure (I₁) and intellectual capital (I₂) have a positive but a insignificant effect on the soundness of banks. The insignificance of I₁ which is proxied by the number of internet users was due to the fact that internet banking and bank branches have complementary roles to play. Thus, recent development in the Internet cannot be conceived as an alternative technology that replaces bank branches. It can also be argued that although there is a demand for convenience by consumers, these consumers may favor the customer relationship approach over the usage of electronic medium. While the electronic medium, especially the Internet may be an efficient way to undertake financial transactions, this medium is also prone to fraud and breach in the protection of individual privacy. Due to lack of security and privacy, especially in the developing and under-developed countries, there is reluctance among the general population to use the digital medium to conduct their financial transactions. The insignificance of intellectual capital (I₂) on the soundness of banks could be attributed to the fact that most of the front-end financial transactions are user-friendly technology and transparent processes and systems. Thus, all citizens have the opportunity to use the financial services irrespective of the intellectual capital.

Institutions (I₃) and integrity (I₄) have a positive and significant effect on the soundness of banks at the 1% and 10% level of significance respectively. The results are consistent with those obtained by previous studies. A broad variety of institutions, ranging from legal framework to the strength of auditing and accounting standards has been used as a proxy for institutions (I₃). The empirical analysis showed that differences in the institutional characteristics (legal architecture and auditing & accounting standards) among the countries contribute to the varying financial sector development. The empirical model also suggests that banks soundness is dependent on the measures taken to limit illicit financial activities such as money laundering and terrorist financing.

With regards to interaction (I₅), that is the University/Industry collaboration, it was found to have a negative and significant effect on the soundness of banks at the 1% level. The findings suggest that strong collaboration between university, industry, government and financial institutions may lead to *market failures* such as *collusive-behaviour*, *grabbing-hands*, *tunneling* and *moral-hazard*. These market failures will have an adverse impact on the soundness of the banking sector.

The empirical analysis also showed that innovation (I₆) had a positive and significant impact on the soundness of banks at the 5% level. This suggests that countries that invest in enhancing innovation can increase the soundness of the financial sector. For example, new technological innovation in ICT has increased

the market reach of financial institutions from developed countries. Hence, these financial institutions are able to pursue economies of scale. Innovations on new financial instruments and products have allowed banks from more developed countries to tailor-make new products and services for a broader segment of the population. These institutions are able to pursue economies of scope. Innovation in digital technology has also increased transparency among and within financial institutions in more developed economies. These factors have contributed positively to the soundness of banks in more advanced countries.

POLICY IMPLICATIONS: LESSONS FOR DEVELOPING COUNTRIES

The health of the banking sector is vital for enhancing the competitiveness of an economy. The empirical analysis in the previous section showed that there is a wide gap in the key drivers for the soundness of the banking sector between developed, developing and under-developed economies. The different level of soundness of the banking sectors in these sample countries can be attributed to the varying levels of development in the 6I's. The concerning trend is that the level of soundness of the banking sector in the developing and under-developed world is significantly lower than that in developed countries. A weak banking sector in developing and under-developed countries will jeopardize the socioeconomic development of these nations. In this section, key policies and strategies to enhance the soundness in the banking sector in developing and under-developed countries will be discussed.

In most of the developed economies, ICT have a played a major role in enhancing productivity and efficiency in the banking sector. However, much of the digitization of the banking sector in the developing and under-developed countries is at an infant stage. Further, due to low ICT adoption rate among the general population in the developing and under-developed economies, financial institutions are unable to realize higher return on investment on their infrastructure. Financial service providers are linked nationally and globally through ICT, in particular the Internet. To increase the return on infrastructure investment (increase soundness of the banking sector), government and banks should play a key role in enhancing not only the infrastructure, but also put in place various incentives to encourage people to use this medium of financial transaction. One of the incentives could be in the form of providing a PC and free access to the Internet if the customers were willing to use the e-banking services for a stipulated time period. Financial institutions should also develop new user friendly systems and applications for the general population.

Intellectual capital play an important role in the well being of the financial sector and the socioeconomic development of a country. The empirical results showed that the intellectual capacity in developing and under-developed countries were much lower than that of developed countries. To 'catch-up' with more developed economies, developing and under-developed economies should put in place a human development strategy to not only increase the number of skilled workers in the country, but also retain these valuable human resources in their countries. The financial institutions can play a key role in increasing the supply of highly skilled human capital for the financial sector. This can be done in several ways. First, financial institutions can increase the number of scholarships for the undergraduate and postgraduate studies. Second, senior members from the financial community should be on the education committee of tertiary institutions, providing relevant advice on the education, training and R&D requirements of the financial sector.

In many developing and under-developed countries, despite large investment in infrastructure and technology, the supporting pillars (institutions) such as the legal framework have not kept up with the technological changes. This has contributed to the lack of transparency, accountability and quality of service, thus increasing the probability of money laundering and other negative externalities. Evidence from more developed countries suggests that greater transparency and governance levels in the financial sector will not only raise the soundness of the banking sector, but also the overall competitiveness of the economy, as Tapscott and Ticoll (2003) aptly describes "transparency is a new power, which pays off when harnessed". To increase the soundness of the banking sector, developing and under-developed countries should consider the following strategies:

- Speeding up the electronic delivery systems in the financial sector and benchmark the systems to global standards;
- Increasing the flow of information across all the stake-holders in the financial sector;
- Upgrading the legal architecture to meet the needs of the new economy; and,
- Strengthening the internal and external institutions of governance in the banking sector to stem out above-mentioned market failures and corruption, including e-corruption.

Strategic linkages and partnerships within the banking sector can increase the soundness of the sector, provided collusive behavior and other market failures are prevented. As mentioned earlier these negative externalities can be prevented if the institutions of governance in the financial sector are strong and independent of political influence and interference. Soundness of the banking sector can be enhanced if there was greater collaboration among all the stakeholders in the banking community in improving the financial education and innovation. The financial institutions can work closely with institutions of higher learning to develop new curriculum that will enhance the performance of employees in the sector. Joint collaboration on research projects between government, financial institutions and institutions of higher learning can reduce the burden of financial institutions undertaking expensive and long-term R&D projects of the sector. Research collaboration will also increase the probability of success of the projects.

Innovation is an important driver for increasing the competitiveness and soundness of the banking sector. The empirical evidence suggests that financial institutions in developed countries invest heavily in R&D with both the quantum and quality of R&D being higher than that in developing and under-developed countries. New innovations in the financial sector have increased market reach, enhanced product quality, improved communication flows and transparency within the banks and across the banking community. To increase the return on innovation, developing and developed countries should strengthen technology transfer within the banking community and across other industries.

CONCLUSION AND FUTURE DIRECTIONS

In this paper, we empirically examined the impact of key factors such as infrastructure, intellectual capital, institutions, integrity, interaction and innovation [6I's] on the soundness of the banks in developed, developing and under-developed countries. The empirical analysis showed that well developed institutions (institutions that facilitate efficient and effective functioning in the new economy), good integrity systems (governance) and high innovative capacity contribute positively to the soundness of the banking sector.

The empirical analysis also showed that the developments of the 6I's and the soundness of the banking sector in developing and under-developed countries were significantly lower than that in developed countries. Strategies and policies for the soundness-gap of the banking sector between developed, developing and under-developed countries were discussed in this paper.

This research provides insights into the key drivers for the soundness of the banking sector and examined policies that will help banks from developing and under-developed countries to leapfrog to a higher level of financial soundness and competitiveness. This research can be further improved in two directions. Firstly, to include a broader set of variables for each of the 6I's to capture the impact of the 6I's on the soundness of the banks more accurately. Second, the dynamics between bank soundness and the 6I's can be modeled using a cross-sectional time-series model (panel data analysis). This will provide a more robust estimation of the relationship between soundness of the banking sector and the 6I's, thus enhancing the formulation of policies that will facilitate banks from developing and under-developed countries to catch-up with that from more developed countries.

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APPENDIX A

Sample Countries : Algeria, Angola, Argentina, Australia, Austria, Bahrain, Bangladesh, Belgium, Bolivia, Bosnia and Hercegovina, Botswana, Brazil, Bulgaria, Canada, Chad, Chile, China, Colombia, Costa Rica, Croatia, Cyprus, Czech Republic, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Estonia, Ethiopia, Finland, France, Gambia, Georgia, Germany, Ghana, Greece, Guatemala, Honduras, Hong Kong SAR, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Jamaica, Japan, Jordan, Kenya, Korea, Latvia, Lithuania, Luxembourg, Macedonia FYR, Madagascar, Malawi, Malaysia, Mali, Malta, Mauritius, Mexico, Morocco, Mozambique, Namibia, Netherlands, New Zealand, Nicaragua, Nigeria, Norway, Pakistan, Panama, Paraguay, Peru, Philippines, Poland, Portugal, Romania, Russian Federation, Serbia and Montenegro, Singapore, Slovak Republic, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Taiwan, Tanzania, Thailand, Tinidad and Tobago, Tunisia, Turkey, Uganda, Ukraine, United Arab Emirates, United Kingdom, United States, Uruguay, Venezuela, Vietnam, Zambia, Zimbabwe.

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