2019 BOK Knowledge Partnership Program

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Nepal

Financial Inclusion and Literacy, Policies and Programs

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2019 BOK Knowledge Partnership Program

with Nepal

Financial Inclusion and Literacy, Policies and Programs in Nepal

2019 BOK Knowledge Partnership Program with Nepal

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2019 BOK Knowledge Partnership Program with Nepal

Financial Inclusion and Literacy, Policies and Programs in Nepal

BANK OF KOREA KOREA UNIVERSITY NEPAL RASTRA BANK

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Executive Summary

Nepal is one of the low-income countries in South Asia with a per capita income of US$1000 in 2018. It has an agricultural-based economic structure with less importance on manufacturing and service sectors. Remittance income of overseas Nepali workers amounts as high as 30 percent of GDP, which is quite unique.

Nepal Rastra Bank (NRB), the central bank of Nepal, has actively worked to develop its financial sector as well as maintain its stability. NRB clearly indicated the importance of financial inclusion in transforming its agricultural-based economy to a modern developed economy in the Third Strategic Plan (2017–2021) for the financial sector. Moreover, NRB emphasized to help raise the efficiency of the financial sector and increase the living condition of the people.

This paper is a policy consultation report to assist NRB in improving the financial inclusion of Nepal. It extensively studies the following three major topics: (i) proposal to improve the financial inclusion and financial literacy program in Nepal; (ii) analysis of FinTech's role in improving the financial inclusion; and (iii) estimation of a financial inclusion index for Nepal in establishing the financial inclusion improvement policy and evaluating them.

Chapter 2, “The financial inclusion and financial literacy program in Nepal: begins with a review of some theoretical parts of financial inclusion. It presents the definitions made by major international financial institutions such as the IMF and World Bank. Then, it explains how the degree of financial inclusion is measured by integrating three dimensions of financial inclusion, namely, access to financial services, usage of financial services, and ICT readiness for financial services. Finally, the relationship between financial inclusion and economic development is discussed.

The second part of Chapter 2 is an explanation of the recent development of Nepal's and NRB's policy on financial inclusion. This review is divided into five categories: (1) legal basis, (2) resources, (3) environment, (4) human resource, and (5) system. It concludes that Nepal currently has a good strategic plan, and NRB policies are successfully implemented. However, it also suggests several policy recommendations for the further development of financial inclusion of Nepal as follows: first, an average size of microfinance institutes of Nepal is too small; consequently, expanding the infrastructure by investing in ICT or FinTech is very difficult. Moreover, the small average size of Nepal’s microfinance institutes can be a barrier to increasing accessibility to the remote area. Second, MFIs in Nepal are using group lending technique for securing their loans in rural area. Although it has been working well now, the system is expected to be unstable in the future. In particular, if Nepal reaches a more individual-based society, it may not work properly. Therefore, a credit-rate-based lending system should fully be developed and be

applied to the case of microfinance. Third, more financial infrastructures should be equipped with. NRB should make a plan to establish an appropriate credit rating system in the future. Furthermore, Deposit and Credit Guarantee Fund, which was set up in 2010, should be fully active to provide the service of the deposit guarantee. Finally, the interest rates of MFIs should be lower than the current rate. They are quite high compared with those of commercial banks.

The third part of this chapter is the review of the financial inclusion policy of Korea. It provides the historical summary and examples of successful financial inclusion policies such as the Saemaeul Undong (새마을운동; new village movement) of Korea. It also illustrates the transformation of the 1970s two-track model into a one-track model and the recent universal model. Finally, cases of financial literacy policies in Korea conducted by supervisory agencies such as The Bank of Korea or Financial Supervisory Agency in Korea are highlighted.

Chapter 3, "FinTech and Financial Inclusion," mainly explains the relationship between FinTech and financial inclusion and provides policy recommendations on how to utilize the Fintech to improve financial inclusion. It begins with the definition of FinTech and illustrates its importance in improving the financial inclusion in Nepal by comparing it with previous financial inclusion. In particular, it explains several recently developed FinTech products such as mobile money and mobile banking to improve the financial inclusion in Nepal.

The important parts of this chapter highlight some examples of successful FinTech products such as M-pesa in Kenya and other West African countries and Ali-pay in China that helped improve the financial inclusion of developing countries. The next part of this chapter is the review of the development experience of FinTech in Korea, which demonstrates “simple payment,” P2P lending, crowd-funding, internet-only bank, and so on. Although it may be difficult for Nepal to adopt these new instruments soon, a review may be meaningful to see the recent change of FinTech development frontier. The final section of this chapter is the policy recommendations. It raises several issues to consider in building Nepal's FinTech promotion policy such as (1) choice of mobile financial service and (2) FinTech policy in long term view.

I. Introduction

Nepal is one of the low-income countries in South Asia with an agricultural-based economic structure. Its per capita income remains at US$1000 in 2018, and the ratio of the production of agriculture, forestry, and fishing industry takes as high as 25 percent of GDP. It is quite surprising that the manufacturing industry amounts only 4.8 percent of GDP. An important characteristic of Nepal economy is that the remittance income of overseas Nepali workers amounts as high as 30 percent of GDP.

Recently, Nepal begins to show a good economic performance. For example, it recorded 8.2 percent and 6.7 percent of GDP rates for 2017 and 2018 under 4.4 percent and 4.1 percent of low inflation rate, respectively. Nepal succeeded in the establishment of new constitutions in 2015 and formulated a new government accordingly in 2016 after long years of civil war and political instability. Since then, Nepal government has been trying to actively promote its economy and finally succeeded in some senses. In particular, the National Planning Commission of Nepal ambitiously announced new vision for the future economy with the 14th three-year development plan of 2018–2021 and launched several new nationwide economic development plans.

Nepal Rastra Bank (NRB), the central bank of Nepal, which is responsible for the development of its financial sector, also has been actively engaged in the designing of the plan and its implementation for years. It has announced the five-year development strategies since 2007 and implemented them continuously. Moreover, NRB has guided and supervised the commercial bank activities in a systematic and planned manner, as well as delivered its services effectively to the

stakeholders. In the recent Third Strategic Plan (2017–2021), NRB has set up its vision, “A Modern, Dynamic, Credible and Effective Central Bank,” and mission “Maintaining Macroeconomic and Financial Stability for Sustainable and Inclusive Economic Growth through Proactive and Effective Monetary and Financial Policies.” This plan is composed of seven important pillars: (1) macroeconomic stability, (2) financial sector stability, (3) foreign exchange management, (4) payment systems and mechanisms, (5) human resources management and capacity development, (6) infrastructure development, corporate governance and customer services, and (7) information and communications technology (ICT).

NRB has recognized for years that financial inclusion is essential in transforming its agricultural-based economy to a modern developed one. It understood that financial inclusion would raise the efficiency of the financial sector and improve the living condition of poor people. As a result, it explicitly indicated that financial inclusion should be one of the important elements in the second strategic pillars of financial sector stability of the Third Strategic Plan.

This book is a policy consultation report to assist NRB in its aim to improve the financial inclusion of Nepal. It extensively studies on three major topics that were initially requested by NRB. The first topic is ”a proposal for financial inclusion and financial literacy program in Nepal.” It reviews the recent development of financial inclusion of Nepal and the policies of NRB on financial inclusion. Then, it examines Korea's experience on financial inclusion, and finally, it derives the policy implications for Nepal.

The second topic is titled as a FinTech and financial inclusion. It aims to show how to utilize the FinTech or modern ICT to improve the financial inclusion in Nepal. It illustrates how the recent

development ICT has been applied to improve the financial inclusion around the world. In particular, it provides some successful examples including that of Korea.

The third one is the estimation of a financial inclusion index for Nepal. The financial inclusion index is a statistical index representing the degree of financial inclusion of a particular country or region. It explains how to estimate the financial inclusion index of Nepal and those of other countries and derive some policy implications. This new index will help NRB to evaluate Nepal's current position by comparing the degree of financial inclusion of Nepal with those of other countries. It also compels NRB to check its weak points and strong points of its financial inclusion policy.

This report is an outcome of active collaborations among Korean scholars and NRB staffs. At the beginning of this project, an extensive discussion was made to select the sub-topics and derive the research direction. Afterward, NRB staffs actively assisted Korean researchers in understanding the current status and development experience on Nepal's financial inclusion. In particular, the members of both teams visited the people in rural area and checked the actual performance of financial inclusion in Nepal. Without the help of NRB staffs, it will be difficult for Korean research team to make any practical policy suggestions.

II. Financial Inclusion and Financial Literacy Program in Nepal

1. Introduction

Financial inclusion and financial literacy have been major issues in Nepal similar to any other low income countries in the world. Many people of rural area do not have bank accounts and they cannot approach the financial resources now. Some of them have to rely on traditional financial service charging the high interest rate.

It is not an unique problem of Nepal. As the latest Findex data of world bank indicates, one-third of adults in the world are still unbanked, which in turn makes many low income people of developing countries difficult to get out of poverty. About half of unbanked people include women poor households in rural areas or out of the workforce.

Republic of Korea has shown a very good economic performance of the past six decade. It GDP per capita has increased from US$100 in 1960s to US$30,000 in 2019. Korea has addressed the financial inclusion for a long time since the early stage of development and finally succeeded in reaching to the mostly well developed one today. almost every body has a bank account and various kind of financial products are provided to people.

Its experience may give a very important implication for the developing countries because the details of the policy and its implementation have changed quite substantially. In particular, it designed and implemented different financial inclusion polices, as its economy grows. For example, the early stage of the policy focused on

financial education and financial inclusion to accelerate capital accumulation. It even included the macroeconomic policy conducted by The Bank of Korea. For example, in 1961, the Bank of Korea raised the interest rate for time deposit substantial and lowered the reserve requirement ratio to pomp up the economic growth.[1] This policy increased the incentive for people to have a bank account and to save money. At the same time, the Bank of Korea reduced the finance cost for bank loans by lowering the reserve requirement ratio. At that time, several financial inclusion policy were implemented. For example, every elementary student was required to open a bank account as a way of increasing financial literacy. School teachers checked the balances of student accounts regularly.

It is not always good that more and more people were able to approach the financial resource. In fact, the more people accessed to finance, the more problems occurred. Improved access to financial resource might bring the side effects. Some people misused the financial resource or some people lost their money involved in financial scandal. As a result, the financial literacy became getting more importance to prevent its misuse. Even now the financial literacy and financial education attract more attention.

Korea's experiences will benefit Nepal because it give some good examples of failures and successes occurred in the policies. Even though there are huge differences in the environment where the two countries have faced, still some lessons can be given.

NRB addressed financial inclusion and financial literacy quite importantly and actively adopted effective policies for years. The current policy needs can be identified as follows:

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1) The Bank of Korea(2010), p. 166.

- To reduce the cost of finance in the low-income families through micro-finance institutions.
- To provide the contents of the financial literacy programs in cooperation with the appropriate agencies
- To expand finance outreach over the provinces including the underdeveloped regions such as provinces 6 and 7.
- To maintain substantiality and the soundness of both financial institutions and people.

These issues are very difficult to address in a short period because of the complexity of the solution. As we know, the financial cost and the financial inclusion are determined by the aggregate interactions in the economy. Moreover, the changes in the management strategy of institutes and agents, as well as the change in the policy, are essential to determine the financial cost.

This chapter will address the issues related with “Financial Inclusion and Financial Literacy, Policies and Programs.” It includes the issues related with the channels of financial inclusion and literacy such as FinTech and measurement of the effectiveness of monitoring and evaluation such as surveys.

To draw the relevant lessons of this study, this chapter compares the experience of Korea with that of Nepal in financial inclusions. By focusing the success stories of two countries, this study provides the guide for financial inclusion and financial literacy.

2. The Complexity of Financial Inclusion and Financial Literacy

A. The Definition of Financial Inclusion

What is financial inclusion? Is it the opposite of financial exclusion? Defining financial inclusion seems easy; however, there are various definitions of this term, depending on the environment where it is used. For example, Pant in NRB (2016) argued that "greater financial inclusion is achieved when all economic activities and segments of the society have access to financial services with ease and at minimum cost."[2] Meanwhile, IMF defines "financial inclusion as access to and use of formal financial services by households and firms."[3] It also added the definition of the Indian government's "Committee on Financial Inclusion," which recognized both an affordable cost and the disadvantaged and low-income groups as the main focuses of financial inclusion. Tp[4] argued that "financial inclusion is delivery of banking services at an affordable cost to the vast sections of disadvantaged and low-income groups." He defined financial inclusion as the opposite of financial exclusion and he emphasized that the disadvantaged group is more in need than the other groups of the financial service at the early stage of financial development and the economic developing stage.

World Bank defines financial inclusion as follows: "Financial inclusion means that individuals and businesses have access to useful and affordable financial products and services that meet their needs –

2) B. Pant (2016, pp. 1-19).
3) IMF (2018, *No. 18/17).*
4) S. M. Tp (2014, pp. 28-35).

transactions, payments, savings, credit and insurance – delivered in a responsible and sustainable way."[5)]

The definition of the World Bank added another element, namely, provision of financial services. Financial service should be provided in a responsible and sustainable manner; otherwise, it may destroy the financial situation. Financial inclusion can simply be defined to provide more formal financial services to people to meet their demand responsibly and sustainably at lesser financial transaction costs. This definition may include all the dimensions relevant to this study.

<Table 2-1>

Definition of Financial Inclusion

Dimension	IMF*	World Bank**
Formal financial service	√	
Scope of financial service		√
Scale of financial service (demand of financial service)		√
Targeted Group	√	
Financial cost	√	√
Responsibility and sustainability		√

Source: *) Asia and Pacific Department, IMF, "Financial Inclusion in Asia-Pacific, prepared by a staff team comprising Elena Loukoianova and Yongzheng Yang, leads," International Monetary Fund. Asia and Pacific Department (Series) No. 18/17, 2018.
**) The World Bank, "Financial Inclusion Home," 2019. [Online]. Available: https://www.worldbank.org/en/topic/financialinclusion/overview. [Accessed: August 2019]

B. The Measurement of Financial Inclusion

IMF itemized the dimensions in measuring financial inclusion, which are (1) access to financial services, (2) usage of financial services, and

5) The World Bank(2019), Financial Inclusion Home (Accessed 2019.8.14.)

(3) the quality of financial products and service delivery.

In defining financial inclusion, many dimensions are used to measure the degree of financial inclusion. Our definition involves multidimensional concepts. The core concepts related with the financial inclusion are (1) the degree of the financial cost, (2) regional and other differences in accessibility including the accessibility of persons with lower credit scores, (3) scale and scope of the credits provided, (4) stability (responsibility and sustainability) of the financial system, and (5) the system of financial services to all.

<Table 2-2>

Concepts and Dimensions of Financial Inclusion

Dimension	Core concept	Indicators
Access of financial services	Financial infrastructure	Financial institutions penetration
		Fintech and Mobile technology
	Regional difference	Regional difference in financial institutions
Usage of financial services	Disadvantaged peoples	Bank accounts and credits for women for example
	Lower credit grades	Bias in credit grading practices
Quality of financial services	Financial cost	Interest rate of loans
	Stability (responsible and sustainable)	Credit default ratio
		Non-performing loans
	Financial system	Products diversities

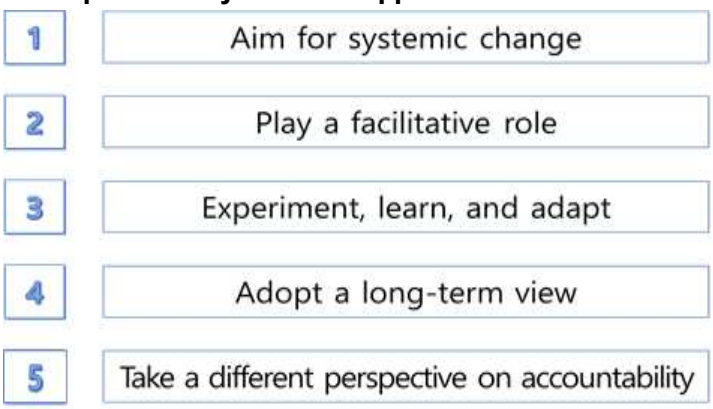
Pham[6] argued that the competition promoted financial inclusion after he reviewed 93 countries. Intuitively the more competitive the financial

6) T. T. T. Pham, T. V. H. Nguyen and K. Nguyen(2019, pp. 1133-1137).

markets are, the more banks are willing to lend to more people, which is financial inclusion. Therefore, the competition may additionally be put as one of the categories in Table 2-2. The number of banks is correlated with the competition so that the number of banks can be a proxy for competition rather than Herfindahl- Hirschman index.

The World Bank[7] provides a very useful and comprehensive guideline for measuring financial inclusion. It provides five principles for a systematic approach toward financial inclusion and argues that the measurement should indicate the systematic changes.

<Figure 2-1>
Five Principles for Systematic Approach and Its Measurement



Source: K. B. Nielsen and P. J. Spaven(2017), Measuring market development : a handbook for funders and implementers of financial inclusion programs (Accessed:2019.8.15.)

The proposed five principles can overcome the shortcomings of the conventional approach that may fall into the trap of short-termism. Without the change in the financial system, the government subsidy may increase the outcomes. For example, the policy may address the

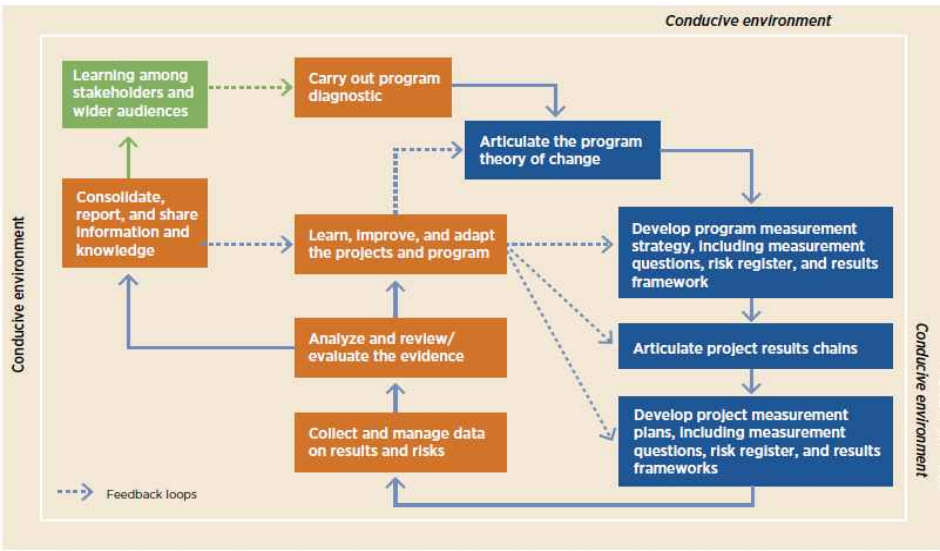
7) K. B. Nielsen and P. J. Spaven (2017). *Measuring market development: a handbook for funders and implementers of financial inclusion programs* (Accessed: 2019.8.15.)

target group and provide the credit guarantee scheme only for this group. This policy may improve financial inclusion for a particularly targeted group, but the fund may shortly be exhausted. Hence, the situation may return to the previous situation if this kind of policy is terminated, and the malfunctioning system will remain the same. Chami et al.[8] illustrate a framework of this systematic approach. The development framework includes the incentive mechanism of stakeholders and the path for the market development.

Recognizing the importance of the systematic change, the policy-makers should adopt measurement tools for systematic changes in financial inclusion. In Figure 2-1, the measurement concepts are related with the systematic changes.

<Figure 2-2>

Measurement System Components and Cycle



Source: K. B. Nielsen and P. J. Spaven(2017), *Measuring market development : a handbook for funders and implementers of financial inclusion programs* (Accessed:2019.8.15.)

8) R. Chami, C. Fullenkamp and S. Sharma(2010, pp. 107-135).

Figure 2-2 conceptualizes the measurement system components. World Bank's scheme described how to measure systematically and how to improve the program based on the diagnostics. The starting point is the program's details essential for developing measurement strategies. The specific projects of the program should fully be articulated in terms of their outputs. After reviewing the chains of outputs, policymakers should develop project measurement plans. After they have obtained the entire procedures of the programs, data are collected and analyzed, and the projects and programs are learned and improved. These activities are reported to stakeholders who will in return give feedback, which will help policymakers to analyze the programs comprehensively.

Even though the task for financial inclusion needs a long-term view, the policy-makers are under the pressure of showing the outcomes shortly for many reasons. It is practical and convincing behaviors of policy-makers to present a road map and intermediate targets to avoid mistakes and short-termism.

Figure 2-3 shows the conceptual framework for financial inclusion. According to the World Bank, the procedure of the program can conceptually be divided into intervention, intermediate outcome, systematic change, inclusive financial system, and development outcomes.

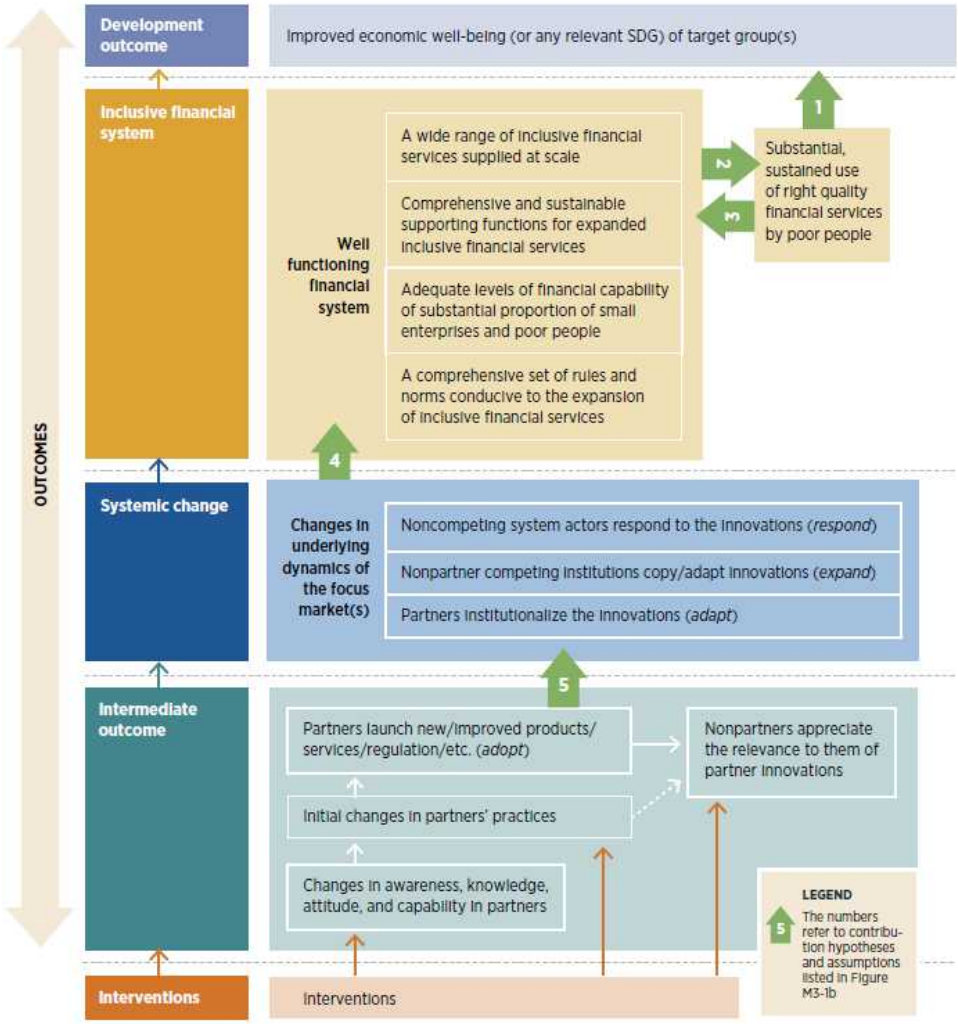
Considering the World Bank's frame, we can argue that the measurement can be categorized into indicators of the following: instrument or direct outcomes, intermediate outcomes, system changes, inclusive financial system improvement, and final goals.

These categories can differ from projects to projects. Table 2-3 shows an example for the measurement of financial inclusion. These indicators can show the snapshot of the development of financial

inclusion. After comparing the aforementioned indicators in the time domain, we can trace the development path and adjust the policies and the indicators.

<Figure 2-3>

A Conceptual Theory of Change for Financial Inclusion



Source: K. B. Nielsen and P. J. Spaven(2017), Measuring market development : a handbook for funders and implementers of financial inclusion programs (Accessed:2019.8.15.)

<Table 2-3>

Measurement of Financial Inclusion

Category	Indicators
Instrument/direct outcomes	○ Size of public funds for financial inclusion (lending and credit guarantee) ○ Rediscount rate for financial inclusion ○ Interest rate for financial inclusion ○ Interest rate spread for financial inclusion
Intermediate outcomes	○ The number of BFI's ○ The regional difference in the number of BFI's ○ Interest rate of loans for the disadvantaged. ○ The number of bank accounts for the target group ○ The availability of Fintech or mobile financial service ○ The size of credit to the target group ○ The financial diversity for the target group
Systematic change in the system	○ The non-performing loan of the target group ○ Interest rate and interest spread of BFI ○ The financial product diversities and their growth (deposit, loan, credit management, risk managemen etc.)
Inclusive financial improvement	○ The comprehensive review of financial inclusive system ○ The target group's satisfaction on the financial service

Once the measurement is established, we can have another question for the effectiveness. The cost effectiveness measures the outcome per dollar and is needed when the policymakers use public funds to improve the intermediate outcomes.

The cost‐benefit analysis is more difficult to handle with financial inclusion. The benefits from financial inclusion are diverse. At the individual level, the credit opportunity itself benefits the borrowers so that an increase in the loan for the target group will also increase the benefit. However, measuring the total benefit received is difficult.

At the country level, the credit opportunity for one group increases as the lending interest rate decreases. However, the decrease in the

lending rate affects the lenders. Therefore, at the country level, the improvement of the whole financial system is more important than the simple transfer of income.

To derive the most effective program, the outcomes and benefits of the alternative programs should be compared, which requires time and efforts. In this sense, this report will provide theoretical discussion and explanation of Korea's experience to derive the effective and efficient programs.

C. Why We Need Financial Inclusion Policy

Financial inclusion has been a long-standing issue in the finance policy. Probably, it may be regarded as the next one after the financial crisis. It should be one of the important assignment for government to in the field of financial policy.

There are several reasons for it. The first rationale for government intervention or the central bank's involvement in financial inclusion is based on the concept of market failure correction. Equal opportunity in the accessibility to financing is necessary for the efficiency of capital allocation for the best result. Under the asymmetric information and uncertainty, the market forces may not correct the distortion and guarantee the efficient allocation of financial resources.

Second, it has been traditional wisdom that the accumulation of capital is necessary for economic growth. The credit allocation has not gained the attention as much as the capital. Saving is the most important factor for economic growth. Even though this argument is still valid for economic growth, some economist like Stiglitz[9] suggested another view on the factors for economic growth. He

9) J. E. Stiglitz (1989, pp. 55-68).

emphasized the allocation instead of the accumulation of capital. Kamath[10] argued that it is essential to gain the full potential to achieve balanced economic growth. In this discussion, inclusive finance is important to give more equal opportunity for all so that the efficiency of financial allocation can be achieved. Kamath also emphasized the importance of inclusive finance, especially in the rural economy from Indian Experience.

Finally. it is very important to assure the economic equality. In the early stage of economic development or recession, the financial opportunity for the disadvantaged or the poor generally becomes more limited than the rich or ordinary people. As a result, it accelerates the income inequality.

There are caveats in this intervention. For example, the government intervenes because of the fear of a market failure, but sometimes the its outcome may be as bad as the market failure. As shown in Figure 2.4, the public expenditure to rescue the disadvantaged sometimes created moral hazard, and the money might go to the hand of the persons who do not need it. From the banking side, the default risk assessment is no longer necessary if the government will compensate for the loss of the borrowers' bankruptcy. Banks can select the wrong persons without any screen of default possibility, or they can actively pursue lending money to anyone who ask loans.

Therefore, the default risk assessment is essential, and the tools of preventing the moral hazard should be ready. Korea has relied on the personal credit grading system to avoid this moral hazard.

10) K. Kamath (2009). Microfinance and Economic Growth – Reflections on Indian Experience (Accessed: 2019.8.19.)

<Figure 2-4>

Intervention and the Vicious Cycle

Source: Author's own picture

D. The Policies and Their Complexity

Mostly, financial inclusion policy focuses on the poor, the disadvantaged and the rural residents. The rationale behind this phenomenon is that the rich and city dwellers have easy access and are handled by the market force, whereas the poor and the disadvantaged may have difficulties in accessing the financial services. Their hurdles include the risks and the cost associated with the risks as well as the physical transaction cost and the insufficient infrastructure.

The complexity comes from the interactions of the financial system, the economy, and people's behavior and attitude. Financial literacy is also an essential tool for improving financial inclusion. By the definition, financial literacy will change people's behavior and attitude

toward financial services. Those changes are needed to expand the financial service outreach to people in need.

Morawczynski et al.[11] reviewed the Indian strategy for financial inclusion. They found out that even though the Indian government made efforts to pursue the financial inclusion strategy of branchless banking initiatives, most bank accounts were not utilized at all. The more discouraging finding is that the target group such as the poor tended to show the lower utilization rate. They also suggested that financial education and technology knowledge should be given more attention.

The regional difference in financial inclusion is also an issue. Financial access of the people in the remote area is important for economic growth because the latent demand for finance in the under-developed area may be huge. Anson et al.[12] suggested the post office might play a role to improve financial access. They analyzed the performance of post office in terms of financial inclusion. By controlling the cohort characteristics, they found out that the owners of post office accounts tended to be more financially vulnerable to financial exclusion, which means that the post office might play a greater role than commercial banks for the poor, the less educated or those residing in rural areas. The government intervention by using the post office's financial network may work for financial inclusion.[13]

Mutsune[14] suggested mobile banking as a tool for improving

11) O. Morawczynski, D. Hutchful, E. Cutrell and N. Rangaswamy (2010). The bank account is not enough: examining strategies for financial inclusion in India (Accessed: 2019.8.19.)

12) J. Anson et. al. (2013). Financial Inclusion and the Role of the Post Office (Accessed: 2019.8.).

13) The post office played an important role in Korea's economic development and financial inclusion, even though there have been some problems handling the financial services and related oversight governance.

financial inclusion, especially in rural and semi-urban areas. The development of financial system is important in meeting the demand of customers. ICT development enables banks to provide payment and other banking services to the people in remote areas where banks' branches are not available.

The discussion of financial inclusion includes the method of using advanced technology available to policymakers. In a country where old technology was already established, the change to the new technology suffers from knock-in barriers such as stakeholder conflicts and the difference in cost and benefit of such changes. If the country does not have those difficulties, then the new technology can be utilized. Moreover, they can skip the outdated and less competitive intermediate stages and jump directly to the competitive financial service infrastructure.

The World Bank[15] shows the dimensions of financial inclusion policy. As seen in Figure 2.5, poverty, education, characteristic of areas, marital condition, economic condition, and the size of household are effective in determining the ownership of bank accounts.

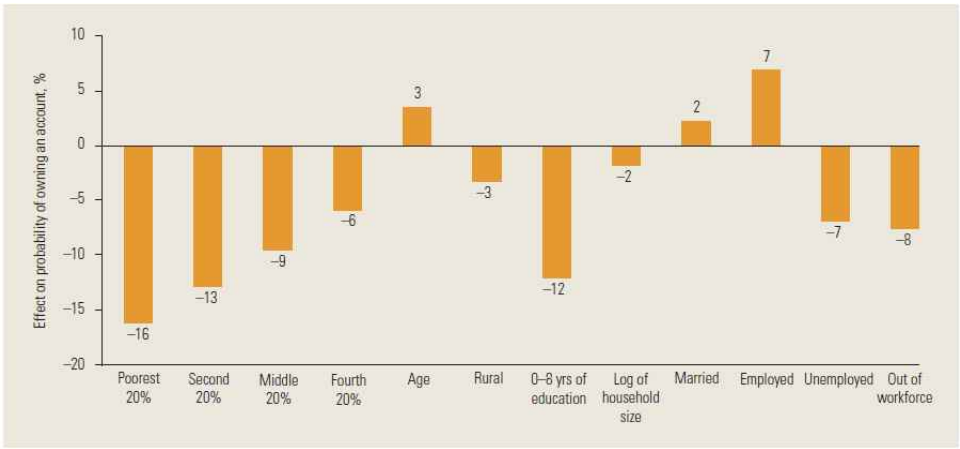
To improve the financial inclusion situation, the government should take systematic approaches. The aforementioned barriers cannot easily be eradicated without the improvement of the whole economic situation.

14) T. Mutsune (2015, pp. 35−43).
15) The World Bank (2013, pp. 43−44, 115).

<Figure 2-5>

Correlates of Financial Inclusion: Effect on Probability of Owning an Account

(Unit: %)



Source: The World Bank, (recitation) Based on Allen, Demirguc-Kunt, and others 2012.

Note: The figure shows probit regression results of a financial inclusion indicator on country fixed effects and a set of individual characteristics, for 124,334 adults (15 years and older) covered by the Global Financial Inclusion (Global Findex) Database (http://www.worldbank.org/globalfindex) in 2011. The financial inclusion indicator is a 0/1 variable indicating whether a person had an account at a formal financial institution in 2011. See Allen, Demirguc-Kunt, and others (2012) for definitions, data sources, standard errors of the parameter estimates, additional estimation methods, and additional regressions for other dependent variables (savings and the frequency of use of accounts).

3. Financial Inclusion and Financial Literacy in Nepal

A. Financial Inclusion

Nepal Rastra Bank has pursued financial inclusion policies for years while securing financial stability and pursuing financial sector development. In particular, it utilized them to reduce the development gap among regions.

There are substantial regional differences in the degree of economic development in Nepal. After examining the relationship between

financial development and economic growth for the periods 1975 and 2012 in Nepal, Gautam[16] argued that financial development is essential for economic growth. It is natural to address inequality issues by adopting financial inclusion policies. To secure the financial accessibility in remote rural area is essential for the balanced economic growth in Nepal.

Financial literacy is also important to make people utilized financial opportunity in the new environment of the increased financial inclusion. To improve the financial inclusion in local area, the financial literacy should be guaranteed.

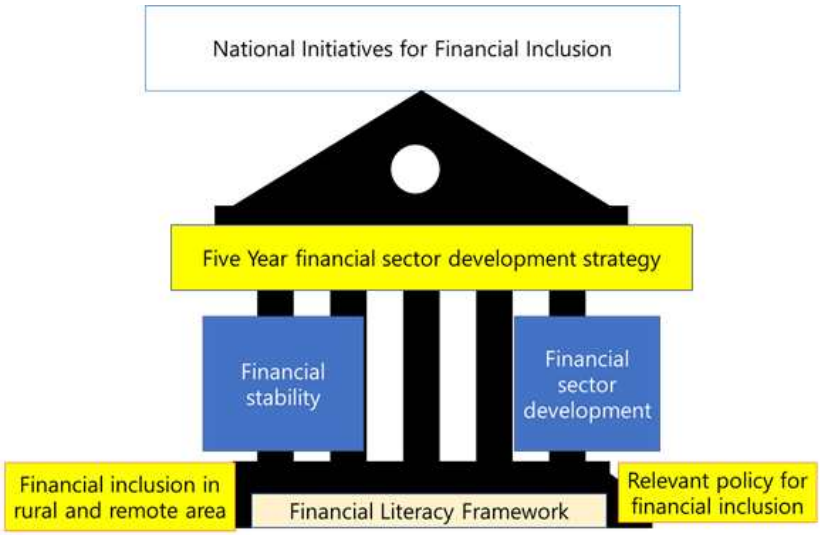
Figure 2-6 gives the overall frame work for financial inclusion of NRB. At the top, there are national initiatives for financial inclusion, under which “five-year financial sector development strategy” has been designed and implemented. NRB is one of the major institutes to implement the practical financial implication policies.

This section reviews that financial inclusion policy of Nepal in terms of five different categories of (1) legal basis, (2) resources, (3) environment, (4) human resource and (5) system and shows its summary in Table 2-4. Financial inclusion policies in Nepal is very effective because they have a firm legal basis. As seen in Table 2-4, several laws support the financial inclusion policy. It is because government of Nepal already recognized the importance of financial inclusion to reduce the development gap and to raise the living standard of the people in remote area.

16) B. P. Gautam (2013), Financial Development and Economic Growth in Nepal (Accessed:2019.10.9.).

<Figure 2-6>

The Overview of Financial Inclusion in Nepal



NRB uses various kind of financial resources to support the financial inclusion program. Most developing countries have difficulties raising financial resources to encourage financial access to the disadvantaged. Their major concern is how to provide the private financial institutes with appropriate economic incentives when they take their business in remote rural areas. Hence, policy authority should have enough resource to fill the gap between private incentive and public needs.

Nepal Rastra Bank has a legal basis for the refinance with the concessional interest rate to sectors that have higher policy priority. There are pros and cons in using central bank money for public policy rather than using fiscal money. Banking sectors are involved in providing the channels for financing the disadvantaged; therefore, it will be more efficient to use the central bank money for reducing the risks and lowering the cost of the projects in the early stage of economic development.

Several funds are available to enforce this policy such as Rural Self Reliance Fund (RSRF), Youth & Small Entrepreneur Self- Employment Fund (YSESEF), Poverty Alleviation Fund (PAF). These funds can be used for the disadvantaged to approach the financial service at a lower cost offered by the formal financial market. With the refinance facility, these funds can make the policy for financial inclusion easier. In addition to these funds, NRB has a policy to treat favorably those microfinance institutions that open branches in the remote area.

In addition, there is another fiscal subsidy opportunity. For example, five percent rate of interest of government subsidy is available for commercial agriculture credit to youth and small entrepreneurs. Some other funds may be utilized indirectly to talk this purpose. For example, government of Nepal addressed the issue of the business equality of women, and in alleviating the inequality of women, it provides Production Credit for Rural Woman (PCRW) & Micro-Credit Project For Women (MCPW), and project loan up to Rs. 0.5 million extended by banks and financial institutions to enterprises run by women entrepreneurs. Since they have been allocated to the woman in the rural area, it may be used to reduce the financial inclusion. As a result, we may conclude that the tremendous efforts have been made by NRB and other financial institutions for years.

<Table 2-4>

Financial Inclusion Policies in Nepal

Criteria	Contents
1. Legal basis	○ Nepal Rastra Bank Act, 2058 ○ Bank and Financial Institutions Act, 2073 ○ Banking Offence and punishment Act, 2064 ○ Negotiable Instrument Act, 2034 ○ Foreign Exchange Regulation Act, 2019 ○ Asset (Money) Laundering Prevention Act, 2008
2. Resources	○ Refinance facilities by NRB with concessional interest rate to productive sector, special refinance, export refinance, SME refinance, agriculture refinance. ○ Rural Self Reliance Fund(RSRF), Youth & Small Entrepreneur Self- Employment Fund (YSESEF), Poverty Alleviation Fund (PAF). ○ Zero interest rate loan by NRB for opening branches of MFIs in remote less-banked/unbanked 22 districts. (repealed) ○ 5 percent interest rate government subsidy on commercial agriculture credit to youth and small entrepreneurs. ○ Gender Based- Production Credit For Rural Woman (PCRW) & Micro-Credit Project For Women(MCPW). ○ Project loan up to Rs. 0.5 million extended by banks and financial institutions to enterprises run by women entrepreneurs
3. Environment	○ Directives on consumer protection to enhance pricing transparency, directives on branchless banking, E-banking and mobile banking services have been issued to enhance financial literacy and access. ○ E-payment
4. Manpower	○ Financial literacy programs
5. System	○ Formulate policies for increasing access to finance and inclusion. ○ Develop financial inclusion indicators. ○ Encourage different modes of digital financing. ○ Encourage BFIs to develop people friendly instruments for unbaked population. ○ Update E- mapping mechanism. ○ Undertake a Geo-spatial mapping of financial services access points. ○ Establish the national taskforce to formulate & implement national financial inclusion strategy.

Note: BFI means banks and financial institutions

It is also very important that the policy authorities are fully aware of the current situation of ICT infrastructure and its state-of-the-art technology. Recently, it is well known that good ICT infrastructure should enable more people to access the financial service with less cost.[17] Figure 2-7 shows ICT development index of the world in a single map. The dark area represents the countries with high ranked ICT development index and the bright one does those with low ranked one. It is clearly seen that high income countries in North America and Western Europe ranked high in ICT development index and vise versa. As a result, it is natural to expect a positive performance of Nepal's policy of financial inclusion with ICT.

<Figure 2-7>

ICT Development Index in 2017

Source: ITU, http://www.itu.int/net4/ITU-D/idi/2017/index.html#idi2017map-tab

It is quite promising that Nepal's ICT environment for financial inclusion has improved for years. For example, the remittance from workers abroad can reach the relatively remote area without any

17) The role of Fintech will be explained in more detail in the next chapter.

problem and several banks has already provided the mobile banking service to the people in the remote area. Despite recent development in ICT and its application on financial inclusion, still Nepal's ICT environment and related indicator are pretty low. According to recent survey of ITU, ICT development index of Nepal was only 2.88, ranked in 140th in 2017.[18] Still the fixed-telephone subscription index per 100 inhabitants is only 2.98 and the percentage of households with computer is 11.15. No doubt that more improvement should be made on the ICT infrastructure.

However, there are some positive signs for Nepal because the recently developed Fintech opens a new way of business. It may show several different ways to utilize ICT to improve the financial inclusion of developing countries. In particular, the experiences of India and Kenya clearly shows that a relatively poor and old ICT infrastructure may be taken advantage to enforce the financial inclusion. Although India and Kenya rank as the 134th and the 138th in ICT development index in 2017 respectively, they succeeded in launching and expanding the mobile payment service over the country. Arun[19] studied the role of ICT in financial inclusion and economic growth in India. Nyagilo et al.[20]

We may say that mobile-cellular telephone subscription index per 100 inhabitants of 111.70 and the percentage of individuals using the internet of 70 percent in 2018 provide more favorable conditions to introduce the new financial inclusion program in Nepal.

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18) ITU (2019), (Accessed: 2019.10.10.).

19) G. S. Arun (2013), Understanding Financial Inclusion in India and Role of ICT in ICT

20) V. Nyagilo, M. Sakwa, and G. S. Namusonge (2019), Efficiency of Mobile Led Financial Services and Its Effect on Financial Inclusion in Kenya (Accessed: 2019.10.10).

Financial inclusion can be achieved more efficiently when the policy authorities adopt the systematic approach. Usually, it takes a quite a long time for the regulatory agency to make people in remote area to contact with the financial institutions and to utilize their services. First, it has to persuade the private financial institute to open its branch in the remote area and second, it has to advise the people in this area to do his business with this new institute. It is not easy for local residents living in remote area to work with staffs of commercial bank from urban area, either.

Nepal took a very systematic approach to achieve the goal of financial inclusion. The government recognized that balanced economic growth across the countries was one of the most important policy agendas and expansion of financial inclusion should contribute to it. For example, NRB formulated overall framework of financial inclusion and financial literacy and implemented the policies for increasing access to finance in the strategic five-year plan in Figure 2-6. Moreover, Nepal established the national task-force to formulate and implement national financial inclusion strategy. NRB utilized some financial inclusion indicators to understand the current situation and to evaluate policy effectiveness. Even it tried to apply the e-mapping mechanism and a geo-spatial mapping of financial services access points. It encouraged commercial banks and microfinance institutes to apply different modes of digital finance, and to develop local people-friendly instruments for un-banked population.

All these policy and government efforts gave a very positive outcome. For example, the amount of microenterprises loan of MFIs has grown by 83 percent in 2018 alone. Figure 2-8 indicates that the loan size for micro enterprise by microfinance institutions was 7,156.69 million Nepal rupees as of July 2016, but it increased to 22,662.34

million Nepal rupees by January 2019.

This increase in loans signifies the increase in the size of microfinance institution industry. The MFI industry has employed a total of 226,623 persons. Table 2-5 shows that MFIs have over 3 million clients, and especially, over 75,541 microenterprise received loans whose average amount per microenterprise is 0.3 million Nepal rupees. All these statistics show that Nepal currently has a good strategic plan, and NRB policies turn out to be successfully implemented.

<Figure 2-8>

Micro Enterprise Loan by MFI

(Unit: NPR million)

Source: NRB internal presentation August 2019

<Table 2-5>

Impact of MFIs Financed MEs in the Economy

Key Indicators	Number
Total Clients	3,357,867
Total no of ME financed	75,541
Total ME loan " in NPR million"	22,662
Average ME loan “in NPR million”	0.3
Total employment	226,623
Total income generated" in NPR million"*	11,331
* Professional assumptions/ Jan 2019	

Source: NRB internal presentation August 2019

B. Financial Literacy

It is well known that financial inclusion will be achieved based on the firm financial literacy ground of people. Securing financial literacy is one of the most important policy targets even in developed countries. Nepal's policy authority has actively provided financial literacy programs that are appropriate under the circumstance. Currently, NRB is utilizing almost all the available tools. The tools are categorically well-prepared. For example, the mass media such as radio and television, leaflets, booklets and brochures are traditional methods of delivering financial education. Web-based tools are also essential in the digital economy. TV drama is also an effective delivery tool for financial education. Target agents of the policy are also various; general public, students, potential borrowers. There are many programs that include financial institutions' mandatory program, academic seminar, and training programs. NRB is working as a facilitator and is responsible for governing financial literacy by harnessing all the

available institutions and its oversight responsibility.

Currently, MFIs in Nepal are using Self Help Groups lending model (SHG model) or simple group lending model with group credit guarantee scheme. It works very efficiently for the woman in the traditional agricultural villages. Most of them have been working cooperatively to raise the rise or to livestock and they know their neighborhood very well.[21] Nepal, as in other countries like India, managed this group lending practice reasonably well.

While this finance technique is good to monitor the people in the traditional villages, it may not be applicable to those of urban borrowers. For example, the people living in urban do not know their neighborhoods. The member of group lending may pass his default to the other members of the group. In this case, financial literacy is very essential. Everyone in the group should understand his responsibility and its default risk. If not, financial ignorance of one member may cause the collapse of the group.

Korea's experience of transforming from group lending to individual lending may be one of the interesting example for NRB to notice. In the early 1960s in Korea, the government and community heavily intervened and picked a leader in the small group or a village. The village or group leader acted as a facilitator and an educator of farming and finance for the village. At the same time, he or she was responsible for borrowing the funds from local financial institutions. In this group lending model, the monitoring and control over the moral hazard were very effective. From 1990s, Korean authority tried to reduce the case of group credit guarantee scheme and instead began to apply individual credit grading system to all loans. More people lived

21) Pro and cons of Self Help Groups lending model (SHG) are explained in Lipishree (2012).

in the urban area and individual economic activities were getting more importance. The ratio of agricultural and farming industry became less than those of manufacturing and service industry. Korean authority began to prevent the compensating balances and to emphasize the personal credit rating and credit guarantee system.

<Table 2-6>

Financial Literacy Programs in Nepal

Category	Contents
1. Tools	○ Radio & television ○ Leaflets, booklets & brochures ○ Web based tools ○ Drama
2. Target	○ General public ○ NRB with students ○ Potential borrowers
3. Program	○ Mandatory program of FIs ○ Seminar programs ○ Training programs
4. Facilitators	○ NRB ○ Financial institutions
5. Governance of financial literacy	○ NRB

MFIs and commercial banks are participating in financial literacy programs because they have very strong incentives to do it. They recognized that financial literacy program turns out to be very effective to reduce the non-performing loan. Currently, the non-performing loan ratios of major MFIs in rural area are below 1% in most cases while that of urban one is a little bit higher.

Figure 2-9 shows the homepage of Nirdhan Utthan Laghubitta Bittiya

Sanstha Limited (NULBSL), which is established as a microfinance bank in November 1998 under “Company Act of Nepal 1997” and now “Company Act 2006.” NULBSL has 125.37 billion NPR as total loan amount disbursed. The number of branch offices is 181, and loan outstanding is 19.92 billion NPR. Moreover, saving and deposit amounts to 11.30 billion NPR (Currency Conversion 1 USD = 114.56 NPR). The numbers of centers and active clients are 18,979 and 362,448, respectively.

NULBSL covers 77 districts, and the number of regional offices is 10. The number of local bodies outreach is 526, whereas the total number of staff including trainees is 1139, and the number of loan clients is 223,748.

As in Table 2-6, NULBSL is one of the most important MFIs in Nepal and the most active institutions operating across the country. It covers 66.8% local bodies out of all bodies covered by MFI.

NULBSL provides savings, loans, micro-insurance, and remittance service like other MFIs across the country. NULBSL also provided several financial literacy programs that, in turn, allowed customers to prosper by saving and lending.

Financial literacy program in Nepal mainly focuses on those improving the literacy of the basic personal finance. For example, NULBSL provides a good financial education program for people in need of basic knowledge partly. NULSBL has an incentive to provide effective and practical education that the customers need because the high literacy reduces the default ratio. However, this education on the basic personal finance should be included in the formal education program. It should be taught from elementary schools to universities. The financial literacy can be achieved through a life-long learning process.

<Figure 2-9>

Nirdhan Utthan Laghubitta Bittiya Sanstha Limited Homepage

Source: https://www.nirdhan.com.np/

<Table 2-7>

An Example of Financial Education: The Case of Nirdhan Utthan Laghubitta Bittiya Sanstha Limited

S.N.	Particulars	Nirdhan	MFI Industry Total	Nirdhan Contribution
1	Coverage Districts	77	77	100.00%
2	Cover. Local Bodies	503	753	66.80%
3	Total Staff	1,056	14,083	7.50%
4	No of Branches	181	2,961	6.11%
5	No of Centers	17,348	209,613	8.28%
6	No Of Groups	43,404	684,155	6.34%
7	Loan Clients	213,818	2,109,607	10.14%
8	Active Clients	347,530	3,357,867	10.35%
9	Loan Outstanding (NPR '000)	17,091,769	175,465,984	9.74%
10	Saving & Deposits (NPR '000)	9,687,424	60,625,312	15.98%
11	Loan Client/Client Ratio	61.53%	62.83%	-
12	Deposit/Loan Ratio	56.68%	34.55%	-

Source: Internal document of Nirdhan Utthan Laghubitta Bittiya Sanstha Limited

C. Major Issues

(1) The Plan

Nepal has pursued financial inclusion and literacy policies as important long-standing issues. For example, NRB unveiled the second five-year strategic plan for the period 2012 – 2016 setting its strategic priorities, objectives, and action plans for these years. Addressing the senior officials of NRB at a launching program, Governor Yuba Raj Khatiwada highlighted the importance of the strategic plan and urged all officials to carry on its implementation by adopting proper integration, synergy, and coordination among the departments. Governor Khatiwada added that NRB needed to be responsive to the challenges created by global integration, financial volatility, and uncertainty in the international markets, which directly or indirectly influenced the Nepalese banking environment. In this complex environment, attaining the objectives of financial and macroeconomic stability was a growing challenge for NRB. The governor stressed the need for formulating annual programs and allocating budget in line with the Strategic Plan. Moreover, Governor Khatiwada appraised that with the implementation of this Strategic Plan, NRB would better serve the financial market and contribute in achieving the objectives enshrined in the NRB Act.

Moreover, Deputy Governor Gopal Prasad Kaphle praised the work done by the officials involved in establishing this plan and urged them to be proactive in the implementation. Similarly, Deputy Governor Maha Prasad Adhikari noted that the plan was an outcome of consultative process involving the board members, stakeholders, and senior officials of NRB. Their contributions were recognized. At that time, the challenge was to ensure that all tasks should be carried out

as planned in which all officials are expected to work together.

NRB launched more effective strategic plans in 2017 which describes the direction to take in the next five years. The strategic priorities, objectives, and action plans were clustered into the following seven pillars: (1) Macroeconomic Stability, (2) Financial Sector Stability, (3) Foreign Exchange Management, (4) Payment System and Mechanisms, (5) Human Resources Management and Capacity Development, (6) Infrastructure Development, Corporate governance and Customer Services, and (7) Information and Communications Technology.

There were some important changes in the policy implementation of financial inclusion and literacy. First, the governance structure changed. According to the plan, an NRB governor has been designated as the coordinator of the implementation committee for the effective implementation of Financial Sector Development Strategy as approved by the Government of Nepal, Council of Ministers, on January 6, 2017. The implementation would be carried out in the five-year period from FY2016/17 to FY2020/21. The secretariat for this committee has been placed at this Bank's Corporate Planning Department. This new strategy has now been implemented.

Second, NRB planed to pursue financial inclusion and literacy promotion policies, utilizing improved infrastructure of ICT. Obviously, the economic and financial conditions for financial inclusion in Nepal have improved for the past years. For example, commercial banking network reached only 297 local level out of 753 local level in seven states as of mid-July 2017. Now, it is time to apply the modern ICT to financial inclusion. Already, some developing countries such as Kenya and India showed a very substantial progress of financial inclusion by applying ICT. Furthermore, FinTech has been getting more important to expand the financial inclusion in recent years.

These strategies will be effective in the longer term if not penalizing the stability of the financing sector. It is well known that the deterioration of financial stability may bring a very large damage to national economy. Many developing countries experienced crisis and recession caused by the financial instability. Managing financial stability should be considered as a precondition to implement any new financial inclusion policy.

(2) MFIs and Their Capacity

As the strategic plan states, the infrastructure has been important to implement the financial inclusion and literacy programs in the remote rural area. In particular, being equipped with appropriate ICT infrastructure was crucial to apply any FinTech instrument for financial inclusion. One of the obstacles making difficult to improve the financial inclusion is that its MFIs, the major players, are not well equipped with appropriate amount of capital.

Figure 2-10 shows the distribution of MFI's paid-in capital. It tells that the average amount of capital of 91 MFIs is 16.8 million rupees and its median is 70 million rupees. The largest and the smallest MFI capitals are 1.2 billion rupees and 11 million rupees, respectively. The relatively small capital of MFI creates a problem in expanding its infrastructure on ICT or FinTech or it can also be a barrier in increasing accessibility to the remote area.

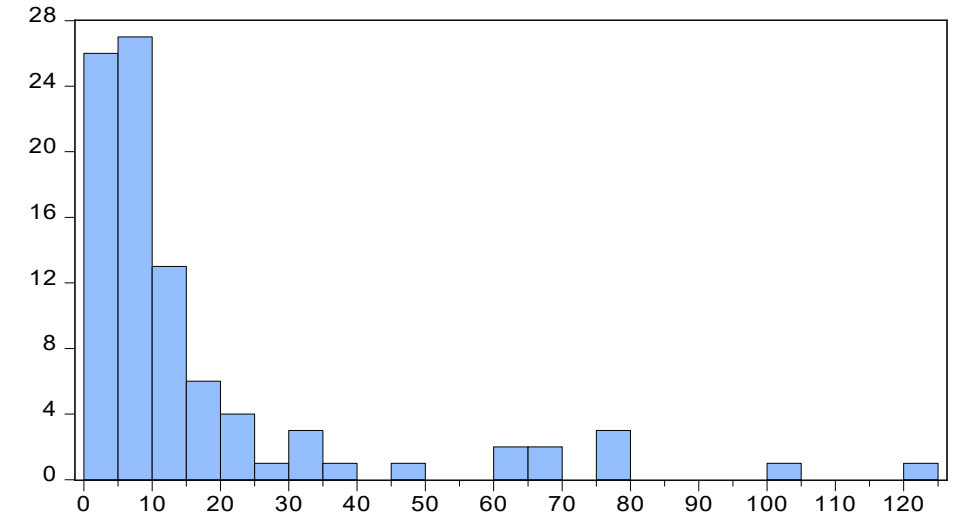
There are many ways to increase the capital of MFIs, but it needs a longer time in practice than in theory to avoid market turmoil. For example, changing the regulation to raise the paid-in capital may be a very straight and direct way. However, it may bring other problems. Many MFIs which are currently suffering the shortages of capital may

have difficulty to meet the new requirement within a short period. Therefore, increasing the MFI's paid-in capital is a very difficult task and it should be pursuit in the long run.

<Figure 2-10>

The Distribution of MFI's Paid-In Capital

(Unit: crore, ten million Rs.)



Source: NRB

Another policy option may be to raise the size of MFI through the M&A among MFI's, meaning that some of the MFIs of the regions are merged into a bigger one. In this case, government or financial supervisory agency may give some incentives for those who takes this action. Without them, there is no reasons for the local ones to merge. The financial market in Nepal is very competitive even though there are differences across the provinces. Consequently, the market structure cannot be an issue for encouraging MFI's M&A.

<Table 2-8>

Saving Accounts and Value Across the Local Body Types as of 2018/2019

(Unit: case, Rs.)

Local body type	Total number of saving accounts	Total value of saving accounts	Average deposit per saving account
Metropolitan City	8,097,062	511,854,959,176.80	63,214.90
Municipality	10,307,129	342,910,834,500.36	33,269.29
National Park or Reserve	8,254	183,234,999.29	22,199.54
Rural Municipality	1,721,172	44,312,374,697.75	25,745.47
Sub-Metropolitan City	2,923,610	113,346,726,821.30	38,769.44

Source: emap, NRB

Another way to overcome the shortage of capital is to organize the association which installs the basic ICT infrastructure used for the members of the association with the intervention of the government. Each member only pays the cost for its own ICT system. For example, the association has the main servers and programs for the members and each member only pay its cost of using this system. The associations of many small finance companies and credit unions can play an important role to improve the infrastructure of the individual MFIs. They may provide payment and settlement system connecting the MFIs across the countries. Currently, there has been an association of MFIs in Nepal, but it does not have enough resources to invest in the infrastructure of FinTech that its member MFIs can use. In this case, the government or regulatory agency should be very active to do it.

Another important issue is to provide the appropriate education program for the staffs of the MFIs. It is very difficult for each individual MFI to provide the good education and training program for

its staffs. It may take a substantial cost to design a good training program and to provide it. If the association takes this activity, it may reduce the financial burden on the individual MFI.

(3) Credit Rating System and Soundness of Banking

Until now, MFIs of Nepal have maintained their financial soundness quite well. According to the statistics given by NRB, they have succeeded in keeping non-performing loan ratio under 1 percent mostly. There have been no bankrupted banks and MFIs even though most MFIs have relatively small capital. According to studied of Saxena[22] and Nair[23] taking the case of the state of Andhra Pradesh in India, several private MFIs were forced to stop in 2010 because of their poor management performances. So far, in Nepal, most MFIs are managing their bad loans appropriately and their financial statements look relatively very sound.

Nepal recently introduced a credit rating system and agencies to secure the soundness of financial sector. With respect to the Monetary Policy for FY 2018–19, NRB published Circular 01 dated July 18, 2018, saying "While sanctioning new loan or renewal of existing loan for 500 million NPR or more to a borrower, banks and financial institutions (BFI, Class A, B and C) should consider rating of borrower by licensed rating agency as base for loan appraisal." It is one step advance to take advantage of the credit rating system.

The Bank Line of Credit Rating service from ICRA Nepal evaluates an issuer (borrowing firm/company) on a specific credit obligation, that

22) S. Saxena (2014), "The 2010 Microfinance Crisis in Andhra Pradesh, India and its Implications for Microfinance in India" (Accessed: 2019.10.10).

23) T. S. Nair (2011), "Microfinance: Lessons from a Crisis," *Economic and Political Weekly.*

is, whether an issuer can timely meet his or her debt obligations under the relevant terms, conditions, and covenants.[24)]

The useful credit rating system cannot be established in a day or it may take a very long time. There are several reasons for it. First, its success and usefulness depends on data accumulation. The data includes both quantitative and qualitative ones such as the present and future cash flow of individual company and household, industry characteristics, government regulation and policy environment, firm's operation and management and many others. Second, it may take long time to have capable human resource to utilize efficiently these data. It is required to have technique and human talents for this job. FinTech may provide an efficient and necessary tool to analyze the data for the credit rating. The credit rating system should be fully developed for all the economic entities. The personal credit rating system may be developed by each bank in the house. Such a credit rating system should be checked by financial authority. The bond rating system should also be recognized as an appropriate system and provide the public secure credibility.

Deposit and Credit Guarantee Fund was set up in 2010, and it has provided the service of the deposit guarantee on the depositors of BFIs such aa commercial banks, development banks, finance companies, and microcredit development banks. This scheme in Nepal is important in securing the financial system against the shocks from abroad and the

24) ICRA Nepal Limited (ICRA Nepal), the first Credit Rating Agency in Nepal, is a Subsidiary of ICRA Limited (ICRA) of India which is a Moody's Investors Service Company, set up in 1991 by leading financial/investment institutions, commercial banks and financial services companies as an independent and professional Investment Information and Credit Rating Agency in India. ICRA Nepal Limited (ICRA Nepal) was incorporated on November 11, 2011 and granted license by the Securities Board of Nepal (SEBON) on October 3, 2012. More explanations are in https://www.icranepal.com/aboutus-php/.

shocks from inside. Currently, the premium rate is 0.16 percent on guaranteed deposit to all BFIs member institutions and the amount that the deposit guarantee can cover is up to Rs 3,00,000 per personal depositors per member institution. The limit is for the total sum of savings and fixed deposits. These measures are timely and necessary to expand the financial inclusion. Credit guarantee funds are also very efficient tools for handling the gap between theory and practice. MFIs in Nepal are dealing with the credit and soundness of banking to the disadvantaged. As the government funds and interest rate gap subsidies increase, the moral hazard can increase too.

Financial inclusion does not mean "give-away policy" and financial inclusion programs should not be interpreted as easy money for subsidy hunters. Financial inclusion means opportunity for the poor to survive. It is based on the concept that the poor should have equal opportunity, and that once they are given equal opportunity, they can overcome their poverty. If credit assessment turns out to be wrong and the financial resources are distributed to those who should not be entitled, then the right people will suffer the loss, and the poor will lose their opportunity. The buffer role can be played by guarantee schemes, in which the public will take a risk burden of the credit rating.

In Nepal, the following six guarantee schemes exist for financial inclusion: Livestock Credit Guarantee, Deprived Sector Credit Guarantee, SME Credit Guarantee, Agriculture Credit Guarantee, Education Credit Guarantee, and Benefits to BFIs.

Livestock Credit Guarantee is for those who want to loan for livestock. It enables the member institutions to secure their loans. Deprived Sector Credit Guarantee is solely for the micro-finance and deprived sector. MFIs can secure their loans through this guarantee

scheme. Meanwhile, SME Credit Guarantee is for SME in service sectors and industries. Agriculture Credit Guarantee is made for agricultural sector, and Education Credit Guarantee enables students to secure educational loans up to 1 million rupees in each member institute.

These measures will make the financial system sound and provide more financial resources to the disadvantaged. Financing to the poor is not the end of story, instead it is just a beginning. Credit-rate-based loan to the poor will basically benefit the poor, because it will keep them out of a situation where they could be debt-stricken.

(4) Major Barriers

There are many barriers to design and to implement the good and effective financial inclusion policy. Economists and policy makers listed them as inadequate infrastructure, incapable human capacity, low financial support, lack of trust, high costs of financial services and lack of documentations etc. Nepal is not an exception.

This section takes some of them such as (1) group lending practice, (2) relatively high interest rate and (3) balanced growth between rural area and urban area. These three barriers may be discussed together.

Currently, MFIs are taking group lending or joint liability technique for securing their loans. It assumes that all members monitor each other and that monitoring efforts of members are equal. However in reality, one of the members of the group is appointed as a group leader while others follows it.[25] It is well known that the group

25) The group leader usually takes the following activities such as chairing group meetings, collecting the installment payments from group members and transferring them to the credit officer by visiting group members regularly and irregularly.

lending is good and effective way to take care of the credit risk and reduce the monitoring cost in the rural area. There are several reasons for it. First, this group can equally share with the associated risks together. Members of the group usually live in a same village and are taking the group production activity or same business activities together. Sometimes, groups are made of family members and relatives. Second, it is relatively cheap to check the financial statement of all members if utilizing the group lending program. Usually, they live in a remote area together and as a result, it is very difficult for staffs of MFIs to check individual risk of the borrowers. Finally, it may reduce the other administrative cost such as making document and signing the contract etc.

However, in the urban area, this group lending practice should be reviewed carefully because these advantage may disappear. First, the risk of each member may vary among them. The job of the member of the group may be different although they live in a close area. Or each member may not know other members very well although they live in a close neighborhood. Finally, the leader of each group does not have a strong authority on the members like the one in the local area. In this case, the moral hazard problem may occurs in the group lending program. In particular, if government subsidies and guarantee schemes are applied for the loan, this problem may get worse. Furthermore, as more people move to the urban area if the economic structure changed from agricultural base one to manufacturing and service based ones, it will be more evident.

As a result, individual lending system based upon his or her credit rating should be developed and be applied to the microfinance industry in the near future.

It is rational that the interest rates that the borrows should pay to

MFIs are a little bit high, compared to those of commercial banks. Most borrowers of the MFIs are low income and low credited people. However, if it is too high, it may bring problems. NRB already took policy measures to handle this. The major measures are for example central bank's rediscount policies and government subsidy policies as well as compulsory policies such as interest rate limits and margin controls etc.

Even though these policies are effective, the level of interest rate charged by MFIs is still high. In addition, MFIs require compulsory savings for securing their loans. As a result, the effective loan interest rate gets higher than official rate due to compulsory saving. One of the main reasons for the high gap is that MFIs are small in capital and the business in the remote area is costly to run. This cannot easily be eradicated in a short period, but the system should change.

The relationship between financial inclusion and economic growth is complex. While financial inclusion is necessary for economic growth, it does not necessarily guarantee economic growth. To take care of this problem, it is worthwhile to look at the case of Korea explained in the next section. Korea's model is very important because it has implemented income generating policies as well as financial inclusion together, in particular, in the rural area. For example, the income-generating policies such as the Saemaeul Undong (or the New Village Movement) done in 1970-80s reduced the possibility of bankruptcy of farmers substantially, and consequently reduced the risks of default of the loan under the group lending scheme.[26)]

Nepal pursued financial inclusion for improving its balanced

26) The Saemaeul Undong or the New Village Movement in Korea is explained in note 37 in the next section of "The Experience of the Republic of Korea in Financial Inclusion and Literacy."

economic growth. It targeted remote rural areas, where other barriers to improving financial inclusion existed. Considering current Nepal's economic and social environment, its government should put more emphasis on economic growth both in the rural and urban areas. Sometimes, financial inclusion may bring high and sustainable economic growth to people both in rural area and urban area. But in some other cases, they may not share the benefits of economic growth together. For example, poverty trap may occur if economy remains retarded. In this case, any new injection of financial resource on the poor or the people in remote area may not bring any positive outcome. On the other hand, if any new assistance is not given to the poor or the people in remote area during national economic boom, they may not take any crops from the growth. In this case, the policy to raise the economic growth rate and to improve financial inclusion in the remote area should be prepared.

Currently, too many barriers still exist to making the financial inclusion policy a main driver for the national economic growth. As a result, NRB should design and implement various financial inclusion policies very actively and consistently to take care of thess barriers. It should apply policy tools based on the firm legal base and design a very precise strategic plan.

(5) Providing ICT infrastructure

Recently, ICT infrastructure of Nepal has substantially improves. The numbers of mobile phone subscription and internet user have very rapidly increased.[27] It gives a very positive sign to improve the

27) More explanation on ICT infrastructure or FinTech will be covered in the Chapter 3 of “FinTech and Financial Inclusion”.

financial inclusion.

Despite of these improvements, still the rank of ICT development index of Nepal is still very low as shown in the above section and so many things should be done. More infrastructure should be installed and more people should be able to the high speen internet. More bank should provide the internet payment system and other non-financial company and nonbank financial institution should challenge the business of commercial bank. Furthermore, microfinance institutes should be actively involved in FinTech, too. For example, a common mobile platform for the MFIs should be developed and used for the local people. The data used for the MFIs over the country should be accumulated and analyzed to raise the efficiency of the MFIs.

4. The Experience of the Republic of Korea in Financial Inclusion and Literacy

A. Financial Inclusion Policies in Korea

For a long time, Korean government has made efforts to improve financial inclusion across regions and help the disadvantaged, the poor, the farmers or the residents in the rural area, etc. Currently, there is no severe problem of physical financial access in Korea. Almost everybody is able to approach the bank branch without any major problem. He/she may utilize his electronic device such as PC or mobile phone to do his banking business.

As a result, the improvement of financial access in Korea does not means to enable people to access the financial institutions but to provide the adequate financial service or credit to the people with lower credit rating. It is because all the banks and financial institutions

are using credit grading system based on the personal credit rating and some people with low credit score or grade are having difficulty to use financial services. The disadvantaged or the poor tends to have lower credit grade so that their access to financial system may be limited. So it become issues to provide the necessary financial resource to those who have a lower credit grade.

Korea's financial inclusion policies have been implanted upon a special legal base, namely, the “microfinance support act” as shown in Table 2-9. The idea of “microfinance support act” is that a special treatment for the disadvantaged is needed even though well-developed general banking and finance legal framework exits and financial accessibility for individual are guaranteed. By the law, the Korea Inclusive Finance Agency (서민금융진흥원) was established in September, 2016 and works as a major agency for financial inclusio n.[28)]

The Korea Inclusive Finance Agency[29)] and the Credit Counseling and Recovery Service is in charge of various small or micro-loan support activities such as supporting self-recovery including comprehensive counseling; searching financial instruments; linking with public debt settlement; other supports linked with employment, welfare, and housing, as well as low interest rate loans, credit guarantees and support for debt settlement (agreement methods and factoring methods). Korea Inclusive Finance Agency provides with various kinds of loans including the Sunshine loans, saehuimangholssi loans (새희망홀씨대출) and other small loans.[30)] In addition, it established and operated a

28) It replaced the microfinance credit institute established in 2008 which provided the micro-credit for the low income people for year.

29) Its paid-in capital amounts to 1 trillion Won, equivalent to about 1 bullion US$.

30) These are the loans given to the low income people or low income working class who may need financial resource. They are different in terms of requirements or the conditions of payment etc.

customized small-loan support system for those in need. It attempts to provide a one-stop service for the people who is in need of finance and credit recovery.

To perform financial inclusion, the law opened the possibility of using the dormant deposit. It allows the bank to transfer the dormant deposit to a special fund in the banking system and later provide it to the disadvantaged with a lower interest rate.

B. Financial Literacy Policies in Korea

Many financial literacy programs have been designed and implemented in Korea to improve the financial knowledge of the public and to raise the efficiency of financial system and institutions. It can be classified into two categories by the trainee as (1) financial literacy program for public and (2) financial literacy program for staffs on financial institutions.

Financial literacy policies in Korea on general public are briefly described in Figure 2-11. These policies have a long history and have been shared with by both the Bank of Korea and the ministries in Korean government.

The Bank of Korea holds the office of economic education in communication department. Its main function is to provide the diverse and effective financial education programs. The goal of economic education in the Bank of Korea is to help all citizens maintain the financial soundness of individuals. Consumers' protection is also an important issue for maintaining the soundness of the system and economic growth. Financial Supervisory Service is responsible for promoting financial literacy, protecting consumers, and maintaining the soundness of financial market.

<Table 2-9>

Financial Inclusion Policy in Korea

Category	Contents
1. Legal basis	○ MICROFINANCE SUPPORT ACT
2. Resources	○ Dormant Deposit
3. Environment	○ Credit grading system
4. Manpower	○ Financial literacy programs ○ Training programs ○ Certificate programs
5. System	○ the Korea Inclusive Finance Agency(paid in capital: 1 trillion Won) and the Credit Counseling and Recovery Service. 1. Counseling, education, and provision of information concerning the financial life of ordinary people; 2. Recommendation of employment, financial products, etc. for supporting the economic independence of ordinary people; 3. Investigation, research, and foreign exchange and cooperation concerning the financial life of ordinary people; 4. Credit guarantees and fund loans to ordinary people; 5. Contribution and investment pursuant to the performance of duties of the Agency; 6. Contribution to and investment in financial companies on the condition of support for microfinance; 7. Contribution to and investment in financial companies with excellent results of support for microfinance; 8. Funding for the Small-Loan Financial Support Center determined by President Decree, operated by the local government; 9. Support and supervision for a business execution organization; 10. Loaning and contributing funds pursuant to the execution of duties 11. Operating office of the Microfinance Committee 12. Management and operation of the dormant deposit the financial company has contributed to the dormant deposit control account; 13. Payment of the amount in substitution for the dormant deposit for the original dormant deposit 14. Business commissioned by the Credit Counseling and Recovery Service 15. Establishment and operation of the total information system for microfinance; 16. Other duties prescribed by Presidential Decree, necessary for supporting the financial life of ordinary people.

<Figure 2-11>

Financial Literacy Policies in Korea

Each financial institution is responsible for selling the financial products according to the regulation. The regulation clearly indicated that each financial institution must explain the details of their financial product and contract to its consumers before selling and must take consumer consent based on the understanding on them.

Like other developed countries of the UK and the USA, the Republic of Korea established financial education council that consists of representatives of many public institutions and government offices.[31)]

31) Financial Services Commission, Ministry of Finance, Ministry of Education, Ministry of the Interior and Safety, Financial Supervisory Service, Federal Deposit Insurance Corporation (FDIC), Korea Inclusive Finance Agency, Credit Counseling & Recovery Service, FQ financial education council, Korea Council for Investor Education, Korea Financial Investors Protection Foundation, Korea Federation of Banks (KFB), Korea Financial Investment Association (KOFIA), Korea life insurance association, General insurance association of Korea, Credit

Several programs have been designed and implemented to educate and train the staffs of the financial institutions in Korea. In Korea, associations covering financial institutions on each sector runs their own education and training program for the staffs of member institutions. For example, the Korea Banking Institute (KBI) was established in 1976 to contribute to the development of the financial industry by improving the skills and technical know-how of those working in the financial industry through training, certification and publications. While it covers the training for the banking industry, it also provides various training courses for other financial industries such as stocks and bond industry and nonbank financial industry. Currently, it offers more than 700 courses in 10 financial business and activity categories and also provides customized programs as well to satisfy needs of staffs of financial institution. KBI also grants certificates to foster financial specialists in accordance with pre-set standards and procedures.[32] Major financial institutes which are in charge of microfinance or local cooperatives such as MG Community Credit Cooperatives (or MG Saemaeul Geumgo) or National Credit Union Federation of Korea also manage their own education and training programs. In particular, they focus on the training for the community leaders over the country.

Table 2-10 compares the financial literacy policy between two countries of Korea and Nepal.

Finance Association of Korea (CREFIA), Korea Federation of Savings Banks, National Credit Union Federation of Korea (NCUFK), Korea Consumer Agency, Korea Association of Financial Education, Korea Institute of Finance, and YWCA are included.

32) More detailed explanation in KBI are in its website: http://www.kbi.or.kr/platformWeb/engkbi.do?cmd=about&sub=20

<Table 2-10>

Financial Literacy Policies in Both Countries

Category	Republic of Korea	Nepal
1. Principle	Market failure/ need base	Balanced growth
2. Target group	Groups based on credit grade	Rural area and the poor
3. Resources	Dormant account & funds	Funds & NRB
4. Delivery	Personal counseling	Group education
5. Facilitators	Credit counseling and recovery service	All financial institutions
6. Governance	Government	NRB
7. Legal base	Special Acts	Various Acts
8. Comprehensive Plan	Financial education council	Third Strategic Plan (2017-2021)

C. The Legacy of Financial Inclusion Policies

(1) Overview

The Republic of Korea has a successful economic growth story that provided many effective solutions for many agendas in Korean society. The Republic of Korea was established in August 15, 1948 and experienced three years of the Korean War lasted from June 25, 1950, to July 27, 1953. In 1953, the GDP was US$1.3 billion, but in 2018, it grows to US$1720.8 billion. In 1953, the agriculture, fishery, and forestry sector amounted 47.3 percent of total GDP, which has been a major sector before the five-year economic development program in

1962. In 1963, as high as 63 percent of the population were engaged in the agricultural sector.

Financial inclusion was an very important issue to ensure the economic growth for years. Several policies had been implemented to promote the financial inclusion.

Firstly, financial inclusion had been a way of encouraging the national savings for years. In the early stages of economic growth, it is a major policy agenda to increase the savings of the private sector because it can be used to finance the infrastructure. As a result, The Bank of Korea had to consider it when to take a monetary policy.

This fact is well-described in the Lee and Kim[33]. They reviewed the monetary policy of The Bank of Korea for the past years and showed that there are four phases in monetary policy of Korea such as (1) war and its aftermath (1950–1962/1965), (2) Big Push (1962/1965–1983/1985), (3) liberalization (1983/1985–1998), and (4) open macro-economy (since 1999). They argued that during the "Big Push" period of 1960s to early 1980s that the Bank of Korea kept raising the interest rate at the early stage of development. It wanted to make the real interest rate to be positive despite the high inflation rate in order to give people an incentive to save.

In 1945, the lending interest rate and deposit rate of commercial banks were about 6.6 percent and 3.4 percent, respectively. As the inflation rate and economic growth rate increased during the 1970s and 1980s, the interest rate also rose proportionally. In the 1970s, the average lending rate and the average deposit rate were 24.0 percent and 22.8 percent, respectively.

This increase in saving incentive was effective to increase the

33) Kim, Kyungsoo and Jaewoo Lee (2011), Monetary Policy of the Bank of Korea During the First 60 Years (Accessed: 2019.10.12.)

national saving and financial inclusion together with the successful income-generating policies such as the Saemaeul Undong in the 1970s.

Second, financial inclusion was used to promote the incomes of the people in the rural area and Agricultural Bank took a very important roles.

After Korean War, Korea had to finance long term projects of building infrastructure and to meet the demand for loans. As a result, Korean government established Korea Development Bank at the 1st, April 1954 and the Bank of Korea bought a government bond to finance the money to be needed to establish Korea Development Bank based on the specialized law for this operation.[34] This transaction was controversial but eventually connived by the public because the economic situation at that time was too bad due to the Korean War. At that time, the Korea Development Bank had also been in charge of providing funds to agricultural sector.

In May 1956, the Agricultural Bank was established as a commercial bank based on the credit union of farmers, etc. While it was the main conduit for government financial resources to farmers, its commercial bank typed management practice had brought a limitation to provide an appropriate financial service to farmers. In April 1958, Agricultural Bank Law was to establish to make the agricultural bank be a specialized bank for farmers. Afterward, Agricultural Bank was not a commercial bank anymore. The role of providing funds to agricultural sector conducted by the Korea Development Bank was transferred to

34) Special banks or specialized banks are the banks which specialize in financing certain economic sectors. The most important types of specialized banks are industrial banks, agricultural banks and banks of real estate, foreign trade bank etc. They are usually, established under a special act rather than the Banking Act. In Korea, there are several specialized banks such as the Korea Development Bank, the Export-Import Bank of Korea (Korea Eximbank), the Industrial Bank of Korea, Nonghyup Bank, Suhyup Bank and others.

the Agricultural Bank.

At the same time, Korean government recognized that farmers needed their own cooperatives. On February 1, 1957, the National Agricultural Cooperatives Federation Act was prepared in National Assemble after years of discussion. By this law, the National Agricultural Cooperatives Federation (NongHyup or NH) could perform economic business operation and credit it without deposit operation. In 1969, Agriculture Cooperatives law allows 150 branches out of credit cooperatives to practice financial businesses. This is a new chapter for financing farmers. Before this, there existed two channels to help farmers such as a providing the policy finance and assisting farming activity from an agricultural industry perspective but later, these are integrated into one.

In the 1960s and 1970s, other financial institutions for microfinance for special groups were established as national ones such as the Fishery Cooperatives (1974), National Association of Credit Union (1972), the Korean Federation of Community Credit Cooperatives (1973). Before their establishments, they were separate local institutes working for local farmers and fishermen, and the urban poor. But afterwards, they are reorganized as national structures.

The Bank of Korea has also changed its organization for microfinance according to the needs. On February 22, 1968, savings office of the operation department expanded to savings department and in 1993, savings department changed its name to the payment and settlement department.

Up until 1960s, financial inclusion was a very big issue. Even though the financial environment for farmer and other people in rural area were continuously improving during 1960s, it was not good enough to provide the appropriate finance resource to farmers. Table

2-11 shows the poor financial situation of the farmers in Korea by the data.[35] It tells that up to 1960, most farmers had to rely on the informal financial market to approach any financial resource. As a result, Korean government had to regard the inclusion of farmers in the formal financial system as one of the important agendas, which provides the financial resource at a relatively lower cost than the traditional informal finance.

<Table 2-11>

Financial Source of Farmers Debt

Source	May-1953	Oct-1956	Dec-1959
Agricultural Cooperative or Agricultural Bank	19.20%	17.80%	37.80%
Other Financial Institutions		0.30%	0.20%
Gyeo (Traditional Credit Club)	7.90%	6.20%	6.00%
Individual or Consumer Loan Finance	72.90%	75.70%	54.00%

Source: National Agricultural Cooperative Federation Annual Report
(한국은행, 숫자로 본 광복 60년, 2005.8, 내부자료)

President Jeong Hee Park and series of five year economic development plan initiated by his administration were regime changers for economic development strategies in 1960s.[36] In 1960s, Agricultural Cooperatives were established in county level (이동(里洞)농업협동조

35) In 1960, the farmer took about 60 percent of the work force.

36) Park Chung-hee was a president of Korea from 1963 to 1979. He succeeded in the military coup d'état in 1961 and then became the president of the country until his assassination in 1979. Seeking to bring South Korea into the developed world, Park began a series of economic policies that brought rapid economic growth and industrialization to the nation that eventually became known as the Miracle on the Han River. During his time, South Korea became one of the fastest growing nations during the 60s and 70s. (https://en.wikipedia.org/wiki/Park_Chung-hee)

합), state level (시군협동조합), and national level (농업협동조합중앙회). This organization was effective in dealing with farmers' economic situation. In 1961, the government introduced the system of agricultural community leaders who were responsible to guide and teach management skill for farmers.

In February 1969, Korean government took a step for the credit union function in rural areas, and in July 1969, agricultural cooperatives began to function as a credit union. Afterwards, agricultural cooperatives became the main and sole facilitator in the economic development of the rural area. At that time, Korean government initiated a new economic and social movement of the Samaeul Undong, which transformed the Korean rural society into a modern one.[37] At that time, traditional moral practices remained in the rural area at that time. The new movement changed this by supporting rural areas according to their performances regardless of political backlash. The community leaders changed from the old to the woman and the young. Then agricultural cooperatives became the facilitators by providing credit, material, and skills for developing the rural area under the new leadership.

On April, 22, 1970, new “village environment improvement” was launched as a national policy for rehabilitating the rural areas. In 1970

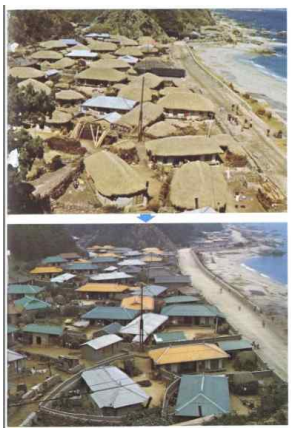
37) The Saemaeul-ho Undong (the New Community Movement, New Village Movement, Saemaeul-ho Movement or Saema'eul Movement) was a political initiative launched on April 22, 1970 by South Korean president Park Chung Hee to modernize the rural South Korean economy. The idea was based on the Korean traditional communalism called Hyangyak (향약, 鄕約) and Doorae (두레), which provided the rules for self-governance and cooperation in traditional Korean communities. The movement promoted self-help and collaboration among the people during its first phase, as the central government provided a fixed amount of raw materials to each of the participating villages free of charge and entrusted the locals to build whatever they wished with them. (https://en.wikipedia.org/wiki/Saemaul_Undong)

- 1971, the government provided 336 bags of cement per village over 33,267 villages all over the country. The government stood by the rule of merit base support. According to community performance, some can get the government supports up to 500 bags in addition to 1 ton of steel. In 1972, new village environment improvement projects were upgraded to “rural new village movement.”

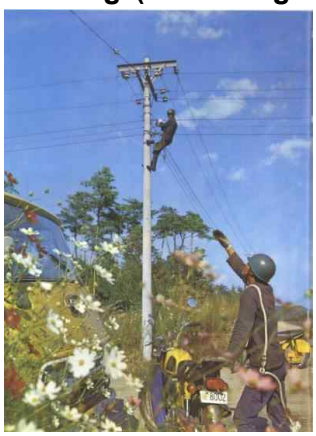
In 1973, the government funded an international study by David Apter et al. comparing India, Tanzania, China, and Korea. Even though Korean government lacked fiscal money at that time, it funded the research to check whether this kind of policy will work or not in Korea. In 1974, the “Factory new village movement” was launched, followed by the “Urban new village movement” in 1976.

<Figure 2-12>

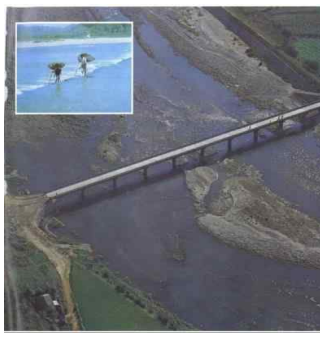
Saemaeul Undong (New Village Movement)



Environment



Electricification



Infrastructure

Source: Korean government archives

<Figure 2-13>

Combining Finance and New Village Movement

Source: Pictures are from Korean Government Archives

The Saemaeul Undong is composed of three stages: base establishment stage (1971 – 1973), self-help development stage (1974 – 1976), and independent development stage (1976). Through these stages, the Saemaeul Undong changes the country and the rural area very substantially. In particular, people achieved the so called change of awareness or change of consciousness such as “can-do-spirit,” “economic will,” and “social responsibilities”.

The movement had three core concepts: diligence, self-help, and cooperation. These concepts change lots of things in rural areas. Farmers had seen the improvements in rural life, infrastructure, and amenity. Moreover, they enjoyed the income and community improvement. These changes would not be a success without the National Agricultural Cooperative Federation (NongHyup or NH) being the main facilitator.

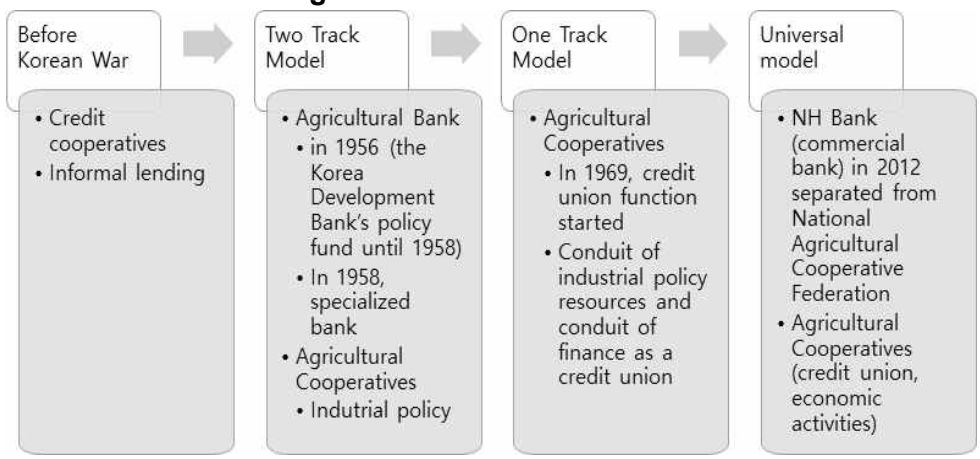
In 2012, NH Bank was separated from the National Agricultural

Cooperatives Federation and started its banking business as a commercial bank. Other credit unions of agricultural cooperatives remained as credit unions. National Agricultural Cooperative Federation and another level of agricultural cooperative works as farmers organizations without financial services.

Figure 2-14 gives a brief explanation for a change of financing activity for farmers for the past sixty years.

<Figure 2-14>

Financing Farmers in Korea: an Overview



(2) Financial Inclusion and Income Generation

It took a long time to modernize the rural area and to improve farmers' income in Korea. The financial situation of the rural area was so bad that most farmers had to depend on an informal finance. The economic policy for increasing the income of the agricultural sector was effective for financial inclusion too.

The Saemaeul Undong was very effective to improve the rural community and financial situation for example. Since 1969, one-track

model combining both financial inclusion and economic development in the rural area turned out to be very effective to improve the living condition and to raise the income of the farmers.

Self-help group model (SHG model) in Nepal and other developing countries is similar to the community building in the Saemaeul Undong, wherein their sprit was based on three concepts: diligence, self-help, and cooperation. The Saemaeul Undong was driven by the villagers, of the villagers, and for the villagers.

The Republic of Korea did not follow the joint liability group model, even though loans with joint liability prevailed in the rural area due to bad credit. The loan for individual based on his or her credit record has been implemented. This is how the Republic of Korea still uses credit rating system for individual loans.

The main lesson from Korea's experience is that Korea pursued the combined model with income-generating policy and financial inclusion and the major facilitator was the "National Agricultural Cooperative Federation."

The roles of the National Agricultural Cooperative Federation were as followed:

- Supply fertilizer and farm machinery
- Provide farming skills and learning opportunities for farmers
- Play as a facilitator for the Saemaeul Undong
- Provide distribution centers and channels for agricultural products
- Play as a price stabilizer by buying and selling agricultural products at the target prices
- Improve agricultural products by processing, standardization, and packaging of farming products
- Provide lending and saving opportunities for farmers as a policy bank

In these activities, the role of risk reduction in farming was essential in financial inclusion. The government adopted the one-track model combining financial inclusion and income-generating policies, which required a strong facilitator.

Meanwhile, agricultural banks provide the following financial resource to the farmers as followed: (1) short term lending for farming financed by BOK lending in the early 1970s, Grain Management Fund, fiscal surplus, national agricultural cooperative federation fund and other and (2) mid and long-term lending for agricultural development financed by farm-price-safety fund (direction of reforms in laws, enforced ordinances, and enforcement regulations), foreign Debt (convertible local currency credit) and credit guarantee fund (credit guarantee for farmers and fishermen).

The Saemaeul Undong provided various practical actions with the help of agricultural cooperatives (credit and skills), government support, and new community leaders. The business risk of farming and selling farmer's the product had been reduced tremendously due to the National Agricultural Cooperative Federation; hence, the default risks of farmers were also reduced substantially. The Saemaeul Undong put more emphasis on saving rather than spending, which is essential for farmers to get out of poverty.

5. Lessons From This Study

A. Comparisons of The Experiences

Korea and Nepal are different from each other. Their political and economic systems or historical and cultural backgrounds are substantially different. They did not have almost any direct trade and

cultural exchanges for centuries. As a result, we cannot compare the experiences of development or financial inclusion policy directly. However, we may do it in terms of several categories based upon the economic theory as below.

First, we may say that the perspective of Korea for financial inclusion is different from that of Nepal. Korea tried to minimize the market failure when it took the financial inclusion policy while of Nepal did to pursue balanced economic growth. As shown in Table 2-12, the target groups and the resources for the policy are different. Nepal is well equipped with many models for alleviating the poverty.

<Table 2-12>

Comparison of Two Countries

Category	Republic of Korea	Nepal
1. Principle	Market failure/ need base	Balanced growth
2. Target group	Groups based on credit grade	Rural area and the poor
3. Resources	Dormant account & funds	Funds & NRB
4. Delivery	Personal counseling	Group education
5. Facilitators	Credit counseling and recovery service	All financial institutions
6. Governance	government	NRB
7. Legal base	Special Acts	Various Acts
8. Comprehensive plan	Financial education council	Third Strategic Plan (2017-2021)

Source: Author

When Korean government started the Saemaeul Undong, Korea's economic and financial conditions were much worse than those of Nepal. For example, Nepal has many tools to choose from. Therefore, the following questions may arise: Which is the best model for financial inclusion? Which group should be targeted? What is the economic growth model? How can Nepal deal with financial literacy?

Those question cannot easily be solved, but Korea's experiences explained in Table 2-13 showed one effective element: combining the income-generating model and finance inclusion model may give more effective and efficient way to improve the living condition of local farmers. In Nepal, self-help group model work for now, but it may not in the future. In particular, as the economy grows and more people move into urban city, the advantage of self-help group model may decrease. Consequently, Nepal should be ready for personal lending based on individual credit grading.

How then can financial inclusion deal with the disadvantaged, such as the poor, the young, and the women group? Korea solved this problem through the following: the Saemaeul Undong changed the community leadership because the government used the merit base supports. Without effective leadership, whether the leader is young or women, the village could not survive the competition due to the government's merit-based supports. Now Korea deals with this problem by checking whether there is a systematic bias toward the disadvantaged. Korean government tries to provide equal opportunities for financial inclusion of the disadvantaged.

Korea, like the USA, still has disadvantaged problems, but Korea can take care of it by credit grading system. The disadvantaged tend to have lower credit grade due to the records of business failures. The financial inclusion program of Korea includes the program that the

lower credit graded person can get access to financial service more easily than before. Counseling becomes an essential tool as well as preferential treatment for the disadvantaged.

For financial literacy, Korea created a new business opportunity for educating professionals and financial consumers. The related agencies offer certificates that are needed when the persons work in banks and financial institutions.

<Table 2-13>

Challenges and Korea's Experience

Questions	Korea's Experience
The best model for financial inclusion	Long term view: credit grading agencies development
Financial inclusion and economic growth	National Agricultural Cooperation Federation: economic program + financial program
Financial resource gap	Dormant accounts/ public funds / associations
Happy, Healthy, Creative population	Comprehensive tailored program by one stop service Tailored Counseling and Credit Recovery Virtuous Cycle: economic growth and Finance
Economic growth	Saving promotion program of BOK
Financial literacy	Tailored programs Certificates Training for teachers, staffs etc.

Source: author

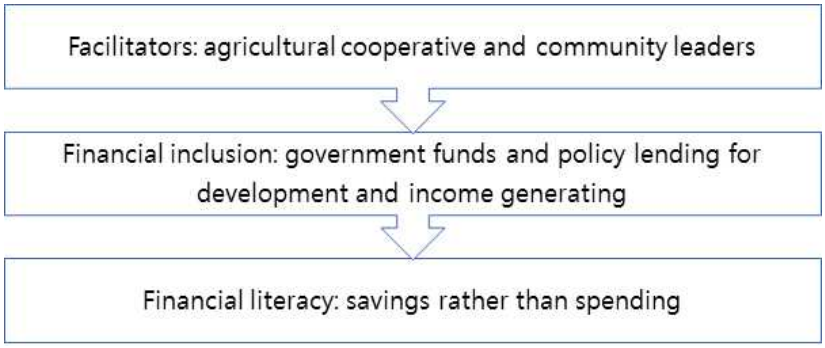
B. Additional Factors for Financial Inclusion Model

Financial inclusion policy and financial literacy programs are well known subjects and most developing countries and international

organization tried to tackle them for years. Both Nepal and Korea have pursued these policies systematically for a long time. This study, after reviewing the policies of both countries, puts more emphasis on the facilitators and the general direction of financial inclusion. It recognized that the current programs in both countries are appropriate and well-functioning in reality.

<Figure 2-15>

Financial Inclusion and Literacy Policy Framework



Source: author

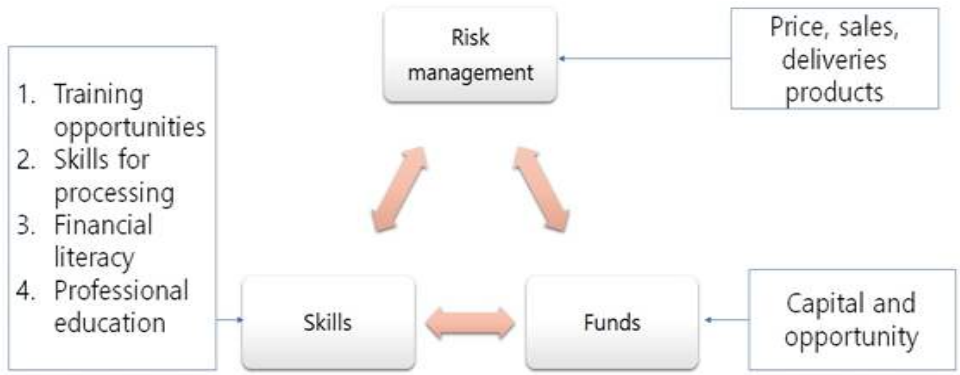
From the experience of Korea, it is said that selecting good facilitators are the most important factors to determine the success of the policy and program. As seen in framework of financial inclusion and literacy policy of Figure 2-15, Korea was able to make its own one. The community leader and the lending group leader should work together to improve the economic situation and to generate income.

Financial inclusion should not be a gift to the poor. It should an opportunity for success. Performance-based lending and support are necessary to prohibit the moral hazard of the participants.

During a long discussion with participants and experts of microfinance and its practitioners both in Korea and Nepal, it is

recognized that still many problems are unsolved. For example, there are wrong perceptions that credit is a grant among the users and they did not have a meaning of credit. Even though there has been an effort to improve financial infrastructure and other conditions, still formal credit is difficult to get in the rural areas. MFIs are still complaining the lack collaterals. They ask high interest rate and compensating balances to the users. Although there are many success stories in Nepal, gaps between the argument of the financial institutions and local people and the real situation are still huge. These are another task to solve.

<Figure 2-16>
Necessary Conditions for the Success of Financial Inclusion and Economic Growth



Source: author

Figure 2-16 illustrates the necessary conditions for success of the financial inclusion policy of developing countries. It tells that strong and concrete national strategy and programs such as the Saemaeul Undong should be established, and more attention should be given to savings. Farmers in the rural area cannot take care of sales, adopting new productions techniques, and risks of the agricultural business by

themselves. They are not good in financing their business either.: hence, a very comprehensive and concrete plan should be designed to take care of these problems. Korean government used National Agricultural Cooperative Federation and government funding and community participation efforts. In addition, there are risk management plans and agencies that managed risks for farmers.

The new model seen in Figure 2-17 may be called as a combination of SHG-lending model and Korean "the Saemaeul Undong model (or the new village movement model)." Nepal may pursue its own new village movement. In particular, more remote and underdeveloped areas of Nepal such as provinces 6 and 7 may need more government involvement by considering the Saemaeul Undong.

<Figure 2-17>

New Model for Financial Inclusion Policy

Source: author

C. What Are Korea's Experience

When the financial regulators build up the financial literacy model, they consider the two goals to achieve such as (1) financial market

stability and (2) consumer protection as shown in Figure 2-18. In many cases, these two agendas are correlated with each other. Generally, the central banks are more interested in market stability rather than consumer protection. It emphasizes that each institution should maintain its own soundness mainly by controlling its own non-performing loan. As a result, it should screen the credit risk of its financial customers.

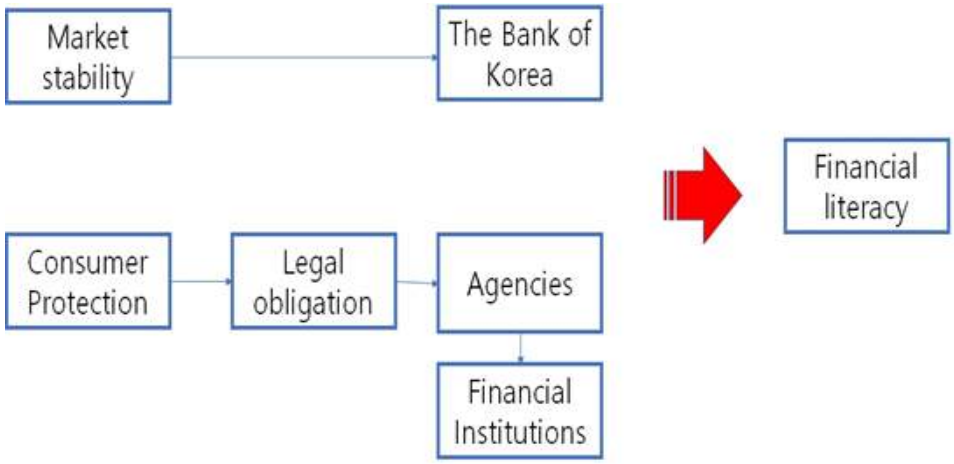
When to improve the financial inclusion, there is a risk to expand loans to persons whose default risk is high and becomes higher. In this case, both customers and financial institutions tend to suffer in the future. At this time, the financial literacy will alleviate the risk by educating financial customers.

Consumer protection is also important in other senses. In the financial market, there may exist asymmetric information between financial institution and financial consumers and financial institution may take. In particular, it can be worse in the developing countries. According to World Bank (2017), “a strong consumer protection regime is key to ensuring that expanded access to financial services benefits consumers, enabling them to make well-informed decisions on how best to use financial services, building trust in the formal financial sector, and contributing to healthy and competitive financial markets.”

To solve this problem, Korea puts more burdens on financial institutions. Korean regulatory agency makes financial institutions in Korea take the major responsibility for financial customers to fully understand the risks and facts related to loans and financial products. It prevent financial institutions from exploiting customers' ignorance.

<Figure 2-18>

Concept and Framework for Financial Literacy Policy



Source: author

D. More Tailored Financial Inclusion Model

This section explained the experience of financial inclusion of Korea and suggested the usefulness of Korea's own model for farmers, which combines the income-generating and risk-reducing policy and financial inclusion. In this model, saving is more emphasized than providing loans for spending.

However, the financial and economic conditions for farmers or people in local area in the modern ear of Nepal may be quite different from those in the 1970s of Korea. As a result, best model for each society or country may be different from that of Korea of 1970s and 1980s.

<Figure 2-19>

Tailored Recommendation for Financial Inclusion: an Example

Source: author

As a result, it may be concluded that there is no one-fit-all policy model. This paper only suggests one of examples for policy recommendations as shown Figure 2-19. The basic model for Korea's economic success was the model of combining income-generating policy and financial inclusion. However, this model had brought many problems in approaching the wide range of issues related with financial inclusion. As a result, we may say that provinces 6 and 7 may takes the combined model but the urban area may take different one which emphasize counseling and helping the lower credit group including a refinance opportunity to lower interest rate loans.

E. FinTech

Recently, some economists including Arjunwadkar[38] showed various ways to improve financial inclusion applying FinTech. Nepal and Korea have a good FinTech environment. For example, Nepal already

38) P. Y. Arjunwadkar (2018) (Accessed: 2019.10.10.).

established a good mobile payment infrastructure as shown in the next chapter.

FinTech and development of ICT will help to improve the financial inclusion because it reduces the cost of the transaction between financial institution and customers and cost of financial service. In addition, it expands the opportunities to access the market. Some of major hurdles that Nepal should meet especially in remote areas can be overcome by applying them. It is extensively studied in the next chapter.

F. Caveats

After reviewing the research agendas, the research team investigates Korea's success and failure experiences of microfinance. Then it suggested several policy recommendations on improving the financial inclusion and literacy programs.

The financial inclusion policies have two sides. The more the policies distorted the market, the more expensive the cost became. The team reviews the policies based on the market-oriented perspective.

In the future, more tailored policies for the target recipients should be provided based on the needs and the practical MFI's affordability. Korea's success did not come from financial inclusion only. There were other economic development policies as well as rural development. NH bank has shown a success story, but this success came from that of national economic development as a whole. The more economic success the industrial sectors enjoys, the more the country can afford to subsidize the agricultural activities and reduce the farming risk. Therefore, the comprehensive Korea's development plan should be reviewed in addition to financial inclusion plan.

III. FinTech and Financial Inclusion

1. Introduction

The previous chapter studies financial inclusion and financial literacy program in Nepal. It first gives the theoretical explanation of financial inclusion and financial literacy program and examines the experience of Korea in these fields. This chapter focuses on the role of FinTech to improve the financial inclusion.

According to the definition of financial inclusion given in Chapter 2, it involves delivering financial services at affordable cost to the people. It emphasizes that financial inclusion is crucial to improving the livelihoods of the poor and disadvantaged. This chapter takes the possibility that technology-driven innovation in financial services, or FinTech, providing people with access to financial services such as payments and credit, may help them manage their financial obligations and build better futures for them while also supporting economic development and poverty reduction. Emerging market economies (EMEs), many of which have underdeveloped financial market and a large share of are unbanked compared to advanced economies, have more scope to reap significant benefits from FinTech.

FinTech has brought a new paradigm to the design and implementation strategies for financial inclusion. FinTech firms currently represent a relatively small portion of the global financial market. However, some FinTech companies such as M-PESA in Kenya and Alipay in China have already provided a considerable part of local financial services.

Financial inclusion in Nepal is relatively low compared with the

global level. Would FinTech help improve the financial inclusion in Nepal? If so, what kind of FinTech is more relevant for Nepal?

To draw the answers to these inquiries, this chapter begins with the discussion of what FinTech is and the recent development in FinTech for emerging market economies. Then, two cases of FinTech innovation of mobile payment in Kenya and China and the other practices of FinTech developments in Korea will be introduced. Finally, it will bring a policy proposal for FinTech adoption of Nepal.

2. What is FinTech?

A. Definition

The term FinTech was once thrown around frequently without any commonly accepted definition. An observation was to designate an innovative service or business model that can be provided by a non-financial company, a start-up or an incumbent bank in the financial industry.

Financial Stability Board (FSB, 2017)[39] defines FinTech as technology-enabled innovation in financial services that could result in new business models, applications, processes or products with an associated material effect on the provision of financial services. Basel Committee on Banking Supervision (BCBS, 2018)[40] categorizes three product sectors and market support services, in addition to the FSB definition. Table 3-1 depicts three product sectors as well as market support services. The three sectors relate to core banking services,

39) FSB, “Financial Stability Implications from FinTech,” June 2017

40) BCBS, “Implications of FinTech developments for banks and bank supervisors,” BIS, February 2018.

while the market support services relate to innovations and new technologies that are not specific to the financial sector but also play a significant role in FinTech developments.

While the BCBS includes some electronic finance service such as high-frequency trading (HFT) in FinTech as in Table 3-1, many experts and general people do not consider HFT as a part of FinTech. Perhaps they thinks that it is not new enough or simply, it was an extension of the previous online trading service. Therefore, FinTech, a compound of finance and technology, may be described comprehensibly as a variety of innovative business models and emerging technologies that have the potential to transform the financial services industry.

B. Comparison with Past Waves of Financial Innovation

Some experts say that FinTech is nothing new. Historically, technology has played a significant role in financial innovations. An old example is the transatlantic cable laid in 1866, which provided the infrastructure for the financial globalization in the late 19th century. More recent financial innovations have included credit cards in the 1960s, automated teller machines (ATMs) and telephone banking in the 1970s and 1980s, and new financial products in the wake of the bond and capital market deregulation in the 1990s. At the turn of this century, internet banking brought non-face-to-face transaction between customers and banks. Although not all of the innovations may have been successful, they have progressively changed the face of financial industry. Compared with the late 1960s, for example, there are fewer branches, larger budgets for information and communication technology (ICT), shorter transaction times, and longer opening hours (even 24/7).

<Table 3-1>

BCBS's Categorization of FinTech

Product Sectors			
Credit, deposit, capital-raising	Payments, clearing and settlements		Investment management
Crowdfunding	**Retail**	**Wholesale**	High-frequency trading
Lending market places	Mobile wallets	Value transfer networks	Copy trading
Mobile banking	P2P transfers	FX wholesale	E-trading
Credit scoring	Digital currencies	Digital exchange platforms	Robo-advice
Market Support Services	▪ Portal and data aggregators ▪ Ecosystems (infrastructure, open source, application programming interfaces) ▪ Data applications (big data analysis, machine learning, predictive modelling) ▪ Distributed ledger technology (blockchain, smart contract) ▪ Security (customer identification and authentication) ▪ Cloud computing ▪ Internet of things / mobile technology ▪ Artificial intelligence (bots, automation in finance, algorithms)		

Source: BCBS(2018)

Technological innovations have tended to follow the hype cycle like the internet, which went through a boom and bust cycle around the turn of the century. When the dotcom bubble burst in 2001, the internet seemed to fade away in major marketplace. Today, it has become a crucial platform for business, and most people could not envisage their lives without it. Therefore, even though some FinTech may already enter the trough of disillusionment, this does not necessarily mean that FinTech will have no lasting effect on the

financial sector.

When comparing the recent impact of the application of new technologies into the financial industry with the previous waves, two factors are noticeable in terms of speed and size of expansion and way of expansion. First, the current pace of innovation lead by FinTech is far faster, and the pace of its adoption is far more comprehensive. For example, while ATM adoption occurred over two decades, internet banking and mobile banking have taken root over progressively shorter intervals. Furthermore, it would be expanded to a new digital-native generation with a technological proficiency. They will be the key drivers for changing customer behavior and demand for digital financial services. As the faster pace of change can make innovation and disruption more quickly than before, incumbents need to adjust faster.

Second, it may change the value chain of financial industry. The past waves of innovation were included in the value chain of conventional financial services. It usually served as a facilitator to enhance the efficiency of the services. That is, financial companies seeking automation of existing financial services are at the core of the value chain, and ICT companies have played a role in supporting them. On the other hand, FinTech has the property of a disrupter that can completely change the existing financial services delivery system. The ICT company may plays a key role in the value chain by providing innovative platforms while conventional financial company may not.

C. Features of FinTech

The nub of FinTech is ICT-based connection of multiple consumers and suppliers through a non-face-to-face process that allows them to

trust and trade with each other. The core technologies that drive FinTech innovation include distributed ledger technology, wireless communication and internet of things (IoT), big data and artificial intelligence (AI), and biometric authentication. These core technologies are applied to various forms of financial services, including crypto-asset, transaction information record, mobile payments, bio-certification, robo-advisors, peer-to-peer (P2P) lending, and crowdfunding. In addition, each technology is commonly closely linked to each other in the application process, so that technology and financial services correspond directly or indirectly in the form of 1: N ($N \neq 1$) or N: 1 ($N \neq 1$) rather than 1: 1 correspondence.

For example, the driving force behind building a platform for easy service depends on to the effective use of big data.[41] Google's FaceNet, a facial recognition technology, integrates an artificial intelligence (AI) system called deep learning[42] to perform speech or text recognition functions efficiently. The payment can be made through this system when a customer tells a clerk or point-of-sale (POS) device to "pay in Google." The payment is completed by mobile phone location information and voice and face recognition through machine learning based on big data.

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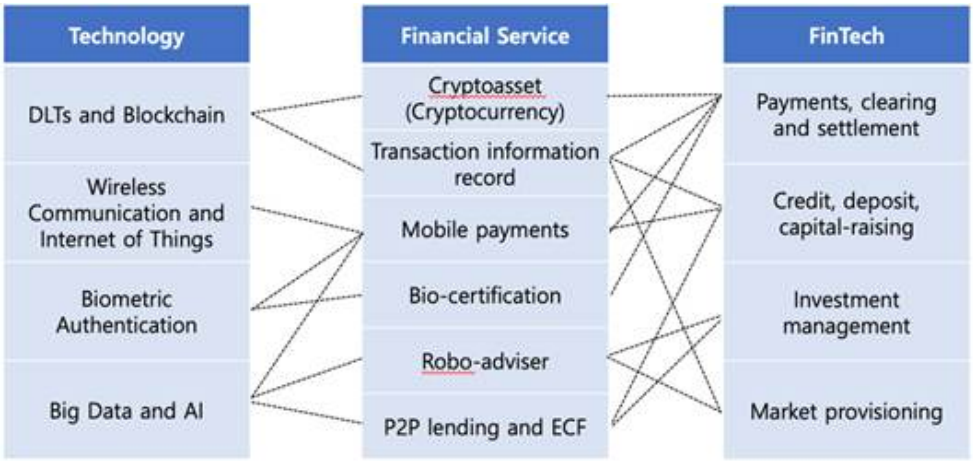
41) Big data usually includes data sets with sizes beyond the ability of commonly used software tools to capture, curate, manage, and process data within a tolerable elapsed time

42) Deep learning is part of a broader family of machine learning methods based on artificial neural networks. Machine learning is the scientific study of algorithms and statistical models that computer systems use to perform a specific task without using explicit instructions, relying on patterns and inference instead. It is seen as a subset of artificial intelligence

<Figure 3-1>

Relationship Between Technology and Financial Services



Source: Bank of Korea

3. Global FinTech Landscape

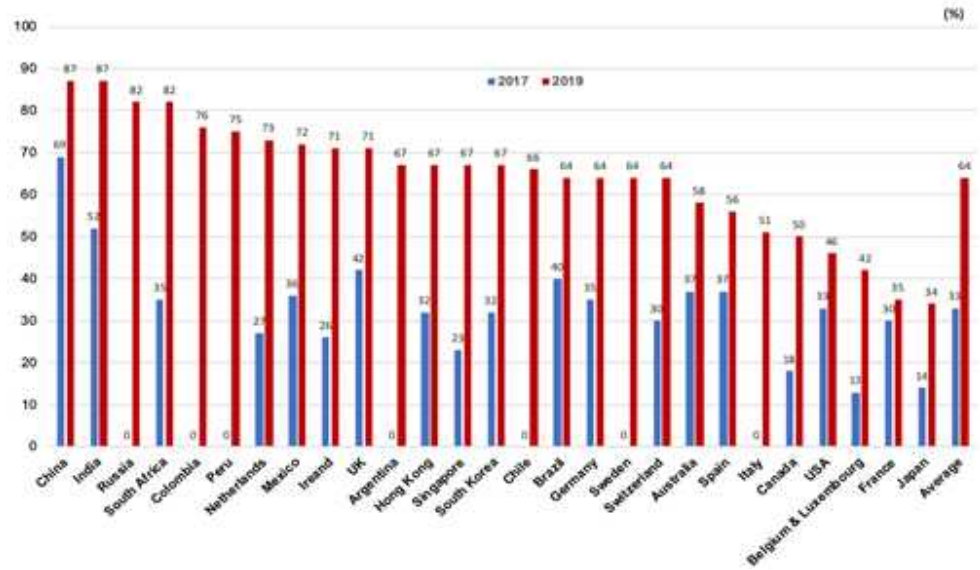
According to Ernst & Young (EY) Global FinTech adoption index 2019,[43] adoption of FinTech services has grown steadily from 16 percent in 2015 to 33 percent in 2017 and to 64 percent in 2019. EY's survey shows that FinTech has caught on globally and emerging market economies are leading the way. China and India are top with the adoption rate of 87 percent, and close behind are Russia and South Africa, both with 82 percent adoption. The potential for FinTech to leapfrog current technology due to the presence of fewer legacy systems, combined with the potential to bring about greater financial

43) The survey is based on 27,103 online interviews between 4 February and 11 March 2019 in 27 markets: Argentina, Australia, Belgium and Luxembourg (treated as one market), Brazil, Canada, Chile, China(Mainland), Colombia, France, Germany, Hong Kong, India, Ireland, Italy, Japan, Mexico, the Netherlands, Peru, Russia, Singapore, South Africa, South Korea, Spain, Sweden, Switzerland, the UK, and the US.

inclusion, access to capital and economic growth, have led many emerging markets to place significant emphasis on efforts to spur the developments. However, the extent of FinTech development across emerging markets differs significantly from country to country.

<Figure 3-2>

FinTech Adoption Rate of 27 Markets

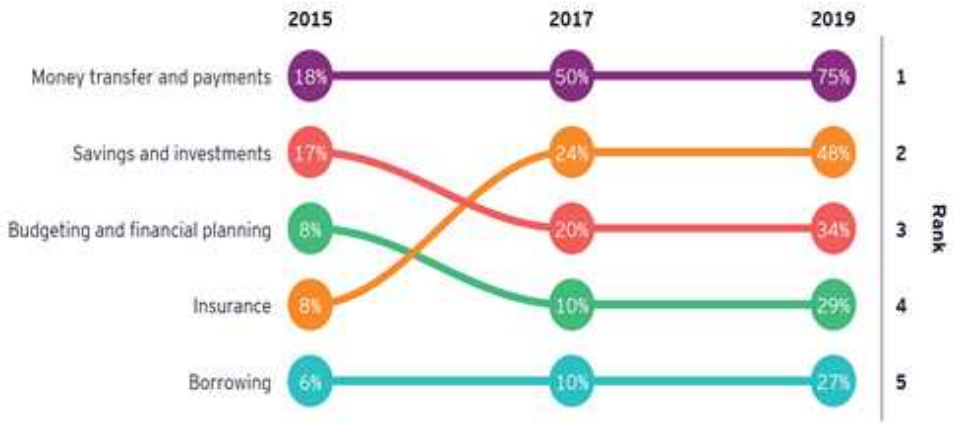


Source: EY, Global FinTech Adoption Index," 2017 & 2019

The most commonly used category is money transfer and payments, with 75 percent of consumers using at least one service in this category. In the case of China, where money transfer and payment apps are pervasive, the adoption rate is 95 percent. The popularity is due to the ease of setting up an account. However, the adoption of equity crowd-funding (ECF) and peer-to-peer (P2P) lending slowed down because of market restriction or regulation. Insurance continues to show strong adoption, with nearly half the consumers globally using a premium comparison site.

<Figure 3-3>

Comparison of FinTech Categories Ranked by Adoption Rate



Source: EY, Global FinTech Adoption Index," 2019

4. Relevant FinTech for Financial Inclusion in EMEs

Silva(2018)[44] claimed that the following three technologies for FinTech developments are more relevant for EMEs: mobile and internet, distributed ledger, and machine learning and big data. In real world, mobile money and simple payments have been driving FinTech innovations in some EMEs.

For these reason, this chapter begin the FinTech application with mobile payment systems will be discussed. Although the other technologies are applicable and have potential as new forms of financial inclusion and financing channel in EMEs, such as distributed ledger technology (DLT), internet technology, machine learning, and big data, they will be covered on lightly.

44) Luiz A. P. da Silva, "FinTech in EMEs: blessing or curse?" BIS, June 2018.

<Table 3-2>

FinTech with EME Interest

Technology / Service	Mobile and internet	Distributed ledger	Machine learning and big data
Payments, transfers, clearing and settlements	Mobile and online payments, Cross-border transfers	Remittances,	KYC applications, RegTech
Intermediation and direct finance	Mobile Banking, Agent-based banking, Peer-to-peer lending	Trade finance, Initial coin offering	Credit scoring, Risk management

Source: Silva(2018)

A. Mobile Money and Mobile Banking

Technological progress has enabled mobile handsets to support a new and viable channel for financial services. For example, bill payment and account transfers, domestic and international P2P transfers, proximity payments at the POS, and remote payments to purchase goods and services are carried out by the mobile devices in some countries.

Mobile-enabled financial transactions have been experiencing rapid adoption in many countries with the worldwide ubiquity of mobile-cellular phones. The global penetration rate of mobile phones has more than doubled from 41.7 percent in 2007 to 107.0 percent in 2018.[45] On average, every adult carries out his own mobile devices in the world.

The IMF differentiates mobile money, mobile banking and mobile wallet in mobile financial services.[46] The IMF defines mobile money

45) ITU, World Telecommunication/ICT Indicators database.

as a pay-as-you-go digital medium of exchange and store of value using mobile money accounts. It is typically offered by a mobile network operator (MNO) or another entity in partnership with an MNO. Mobile money is not linked to a bank account of the customer, whereas mobile banking and mobile wallet are linked to traditional bank accounts.

Mobile banking is the use of an application provided by customer's bank on a mobile device to access and execute banking services such as check deposits, balance inquiry, and payment transfers.

Mobile wallet consists mainly of an application installed on a mobile device that stores credit/debit card information, coupons, or bank account information and enables customers to make in-store purchases, online payments, and P2P transfers.

(1) Mobile Money

Mobile money was initially designed as a P2P payment system without a bank account. However later it has gone much beyond that basic idea to help utility bill payments, micro-savings, and microloans. It normally focuses on the unbanked to give financial inclusion for lower segments who cannot afford banks or been excluded by banks as their know-your-customer (KYC) or other business rules.

The mobile money ecosystem embraces a variety of stakeholders including MNOs, distribution channels (agents), financial institutions (banks), regulators and customers. The MNO takes a key role in the ecosystem of mobile money with its own assets and capabilities. First, it can provides its infrastructure and communication services with agent oversight and quality control. Second, MNO may utilize their huge

46) IMF, Mobile Money Note 2019

existing distribution channel used for the sale of subscription and prepaid credits. These channels are usually much broader than the branches of financial institutions. The ability of MNOs to reach customers across all income segments is what gives them the impetus to be a key player in the mobile money ecosystem.

Agents are non-bank entities such as retailers (either the MNOs own retail center or another retailer) that handle customer registration and the cash-in/cash-out[47] services on behalf of the MNO. In this role, the agents serve as branches for the MNOs and act as the primary contact point for the customer relationship. The agent, as the liaison between MNO and customer, bears responsibility for account opening as well as exercises customer due diligence and KYC program compliance.

Banks, of which primary function is to gather deposits for loans and other permissible investments, have dominated retail payment systems. Therefore, financial institutions play a role in the mobile ecosystem with their experience and customer trust in dealing with funds. Banks act as the intermediary between the MNOs and agents. They provide not only online banking integration to the mobile commerce[48] system of the MNOs in facilitating their operations but also financial regulatory advice to the MNOs.

Regulators take a crucial role in sustainability of the mobile money ecosystem. They work to strike a balance between providing prudential, risk-based oversight and encouraging innovation, efficiency, and financial inclusion through the imposition of regulations.

Customers are the final recipients to a mobile money service. The success or failure of the ecosystem depends on consumer behavior

47) The movement of funds to and from the customer's mobile handset.

48) Mobile commerce (m-commerce) is the use of wireless handheld devices like cellphones and tablets, to conduct commercial transactions online, including the purchase and sale of products, online banking and bill paying.

toward the mobile money services. Hence, it is crucial that consumer needs are met by the services and that they have good experience with the services. Customers should be able to appreciate that mobile money reduces the risk of carrying cash and increases access and affordability of various financial services.

(2) Mobile Banking

The earliest form of mobile banking services was a payment transfer done by a short message service (SMS). Some European banks started to offer mobile banking to their customers with the wireless application protocol (WAP) as early as that in 1999. It enabled bank customers to use a few simple service such as checking his balance or money transfer from one account to another one. However, its range of service was expanded quite substantially after smartphone or tablet became popular.

Today, mobile banking is a service provided by a bank or other financial institution that allows its customers to take many banking services. The Financial services through mobile banking depend on the features of the app provided by bank. Typically, they include check deposits, balance inquiry, P2P payments, P2P transfer, lists of past transactions, and bill payments. In general, the customer installs the software, called as an app provided by the financial institution in his mobile device and operate it. Mobile banking is basically available on a 24-hour basis, depending on the connectivity of mobile devices to the internet.

From the bank's point of view, mobile banking lowers the cost of handling transactions by reducing the need for customers to visit a bank branch. It also gives the bank customer the incentive to use it

because he may pay his bill without cash. A customer needs to visit an ATM or bank branch for cash transactions.

B. P2P Lending and ECF

The internet has been transformational for the financial industry. One of the notable developments in recent years is the emergence of online alternative financing platforms. Online alternative finance is characterized by innovative financial instruments and channels that fall outside the traditional capital raising and financial intermediation. It includes peer-to-peer consumer and business lending, also refers to as marketplace lending, equity crowdfunding, reward-based crowdfunding, and invoice trading. These online alternative finance activities are directly connecting lenders to consumer and small business borrowers, raising venture capital for start-ups, funding the creative industries and creating new ways for individuals and institutions to choose how and to whom money is distributed, lent and invested.

The novelty of P2P lending is that financing may be obtained from many different lenders or investors ranging from individuals to institutional investors. In exchange for funding part of a borrower's need for finance, lenders can earn interest as well as regain principal.

Equity crowdfunding (ECF) allows individuals to invest in a company, typically a start-up or early-stage business, in exchange for shares of that company. ECF has opened up equity investment in private companies to a much wider range of individual investors, which was traditionally limited to venture capitalists and angel investors. Investors may receive returns on their ECF investments from dividends or through the sale of shares if the company becomes listed on a stock exchange through an initial public offering (IPO).

C. Distributed Ledger Technology

A traditional ledger is a centralized database that is accessible by designated users and is overseen by one or more system notaries. A distributed ledger is a decentralized database accessible and collectively controlled by multiple users. It is a consensus of replicated, shared, and synchronized digital data geographically spread across multiple sites, countries, and institutions. distributed ledger technologies (DLTs) are technologies for implementing distributed ledgers.

A blockchain, one type of DLTs, provides a digitally signed time series of records, put together as blocks with the linkage also digitally signed, thereby making it hard to tamper with. The advantages of blockchain over a conventional centralized ledger are transparency, security, and efficiency.

The blockchain forms the basis of crypto-assets, such as Bitcoin, but could have much broader applications. The decentralized data storage inherent reduces the need for intermediaries or validators such as the central server of a credit card company. The availability of data records to all network participants, and the ability to verify transactions jointly, provide safeguards against fraud as there is no single point of vulnerability. Furthermore, record reliability is higher since any change requires validation collectively or by a subset of users responsible for the task.

Blockchain can help financial institutions to not only reduce the cost of processing payment but also create new products and services that may be a new cash cow. For example, cross-border remittances are an important source of income for some EMEs. However, these cross-border transfers are generally very costly, especially when the

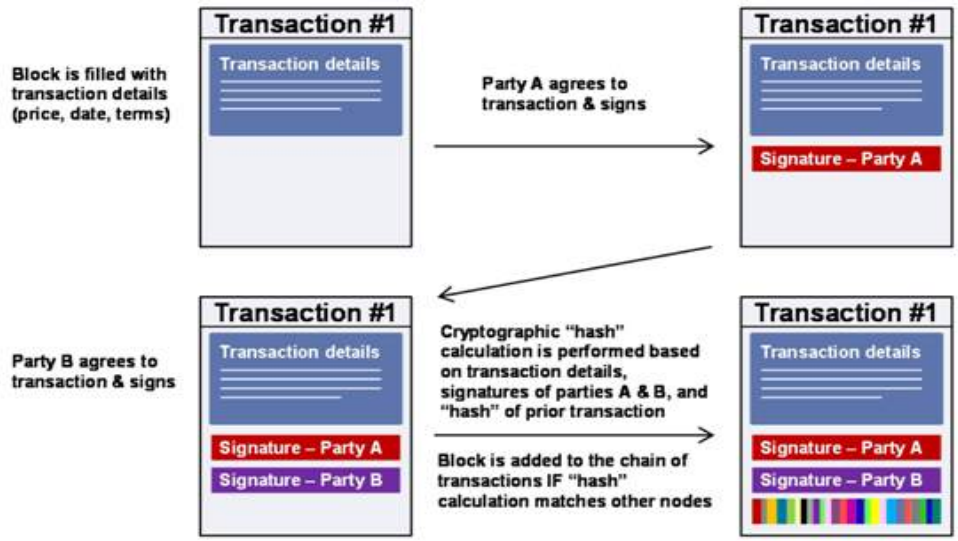
banks involved do not have a direct relationship and must work through correspondents. Blockchain might reduce the transaction costs involved by streamlining domestic and cross-border systems. Actually, most cross-border bank transfers go through SWIFT. This increases the required time and fees. By switching to a blockchain-based system, banks could potentially bypass the additional intermediaries and transact directly.

Goldman Sachs (2016)[49] explains the core concept of how the consensus mechanism functions in a blockchain.

Figure 3-4 shows the creation and validation of a block containing the details of a particular transaction. The cryptographic hash function is often employed for assuring the integrity of transmitted data such as authentication and encryption.

<Figure 3-4>

Building and Validating a Single Block in the Blockchain



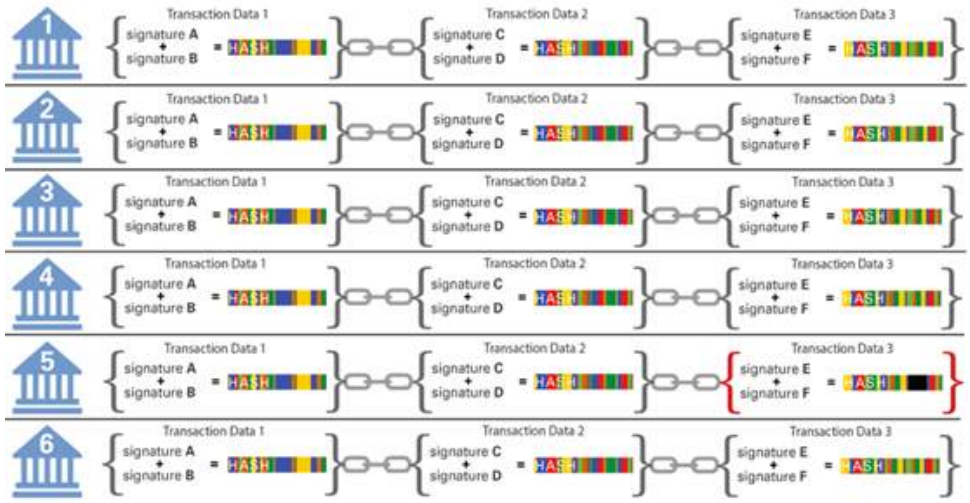
Source: Goldman Sachs(2016)

49) Goldman Sachs (2016), Blockchain – Putting Theory in Practice.

The blockchain ledger is replicated across multiple locations (just six is shown in Figure 3-5 for simplicity), and each maintains its own copy, which is separately updated based on new transaction data. Figure 3-5 shows a sequence of three transactions. In the first two transactions, data and signature information are properly validated by all six nodes with matching hash values. However, for Transaction #3 at Location #5, the hash does not match the others, and will be corrected by the others via "consensus".

<Figure 3-5>

Example of a Sequence of Three Transactions



Source: Goldman Sachs(2016)

D. Big Data Analytics and Machine Learning

Big data analytics is a broad category of tools that includes AI, machine learning and deep learning. AI can be defined as human intelligence exhibited by machines. Machine learning is a type of AI

that provides computers with the ability to learn without being explicitly programmed. And deep learning is a field of machine learning that uses many layers of learning algorithms to derive meaning out of large quantities of data.

AI and machine learning have already been applied to a broad range of financial services by both incumbents and third-party providers. AI is applied for anti-money laundering (AML) and fraud detection, and machine learning is used for credit monitoring, risk mitigation as well as fraud monitoring in banking. Some AI and machine-learning-enabled technologies can be applied to financial regulation, supervision, systemic risk surveillance, and oversight or audit functions. Examples include top-down stress-testing or methods for simplifying regulatory reporting by institutions.

5. Case Study of FinTech Innovation in EMEs

A. Kenya M-PESA

M-PESA[50] has revolutionized the payment by making it possible to settle low-value transaction without a bank account. It turned SIM cards and a mobile money account into a virtual wallet for peer-to-peer and customer-to-business (C2B) payments.

After the launch of the M-PESA in 2007 and its success, mobile money services have been growing rapidly worldwide, which has spread quickly to 24 countries.[51] Mobile money accounts surpassed half a billion in 2016, a mere ten years after M-PESA launched. In 2018, it records 866 million accounts with daily processing of US$1.3

50) PESA is Swahili for money.
51) https://www.vodafone.com/content/index/about/about-us/money_transfer.html

billion globally.[52)]

M-PESA allows users to deposit, withdraw, transfer money, and pay for goods and services easily with a mobile device. In Africa, M-PESA has played a critical role in promoting financial inclusion through mobile money accounts and various mobile-based investments. It also allows for widened retail access to a range of capital market products and services.

(1) Structure

The initial concept of M-PESA was to create a service that allowed microfinance borrowers to receive conveniently and to repay loans using the network of Safaricom airtime resellers. This would enable microfinance institutions (MFIs) to offer more competitive loan rates to their users, as costs are lower than when dealing in cash. As customers adopted the service for a variety of alternative uses during the pilot, M-PESA was re-focused and launched with different services such as sending remittances and making payments.

There are three basic transactions that customers conduct with M-PESA. Firstly, a customer may deposit money at an M-PESA outlet in return for e-float[53)], called a “cash-in” transaction. The customer is required to show a valid identification document. Upon receiving the cash, the agent gives credit on his/her mobile money account, topping up e-float, with a corresponding debit to the account held in trust with the MNO. The agent sends a confirmation to him/her via text messaging, and the transaction is complete.

Secondly, a customer may exchange e-float for cash at an M-PESA

52) GSMA, “State of the Industry Report on Mobile Money,” 2016, 2019.
53) The e-currency of M-PESA.

outlet, called a “cash-out” transaction. In a reverse sequence to cash-in, the agent purchase e-float from him/her after verifying the customer's identification and credentials for authority, and then debit the mobile account with a corresponding credit to the agent's account with the MNO. Upon receiving the confirmation message from MNO, the agent gives the appropriate amount of cash to the customer.

Finally, a user may transfer e-float from his/her phone to another phone, P2P transfer, even though one or both of the parties may be an institution or firm. The user enters the phone number of the recipient and the amount to be transferred on his/her cellphone. Both sender and recipient receive a text message stating that money has been transferred. The network operator performs clearing functions for the sender and recipient of the funds to complete the transaction. The MNO typically sends a text message back requesting the sender's personal identification number for authenticating his/her identity and confirm the transaction.

These three basic transactions can be combined in several ways. For example, a user may deposit cash and send the full amount deposited to another user, who can then withdraw the full amount transferred. Alternatively, a user who receives a transfer from one person may transfer the e-float to some other users instead of withdrawing cash. E-float could circulate in this manner indefinitely, like conventional cash.

M-PESA funds are safer than cash because a PIN is required to perform any transaction. Even if a phone is lost or stolen, it is safe unless the PIN has been compromised. All M-PESA e-float is backed 100 percent by deposits held at three commercial banks in Kenya. Interest earned on these deposits is donated to a charity, which allows Safaricom to avoid being regulated as a bank.

<Figure 3-6>

Safaricom's M-PESA Service Screen

Source: Google

(2) Pricing

A user must register with M-PESA at an agent location. This is a relatively short process and only requires a valid identification document such as a national ID or passport. Recipients of M-PESA need not be registered.

Transaction charges depend on the amount of money being transferred and whether the payee is a registered user of the service or not. The overall transaction fee is far lower for sending to a registered user than to a non-registered user. The smaller the transaction, the higher the charge rate, and the cash withdrawal charge is even higher than transfer.

For example, Safaricom charges up to KSH 45 (US$0.44) for a transaction to an unregistered user for transactions between KSH 101 – 500 (US$0.98 – 4.84) and KSH 11 (US$0.11) for a transfer to a registered user for the same amount. At the maximum transfer of KSH 50,001 – 70,000 (US$484.0 – 677.6), the fee for a transfer to a

registered user is KSHs 105 (US$1.02). The maximum amount that can be transferred to a non-registered user of the system is KSH 35,000 (US$338.8), with a fee of KSH 309 (US$2.99). Cash withdrawal fees are also charged, with a charge of KSH 10 (US$0.10) for a withdrawal of KSH 50 – 100, and KSH 300 (US$2.90) for a withdrawal of KSH 50,001 – 70,000.

<Table 3-3>

M-PESA's Customer Charges

Transaction range (KSH)		Transaction type and customer charges (KSH)			
Min	Max	Transfer to M-PESA users	Transfer to other m-money users	Transfer to unregistered users	Withdrawal form M-PESA agent
1	49	Free	N/A	N/A	N/A
50	100	Free	N/A	N/A	10
101	500	11	11	45	27
501	1,000	15	15	49	28
1,001	1,500	26	26	59	28
:	:	:	:	:	:
15,001	20,000	102	102	288	180
20,001	35,000	105	105	309	191
35,001	50,000	105	105	N/A	270
50,001	70,000	105	105	N/A	300

Source: https://informationcradle.com/kenya/M-PESA-charges-tariff/

(3) Implications from M-PESA Success

The factors of M-PESA success provides us with some implications. First of all, the relaxed and supportive regulatory stance of the Central Bank of Kenya as well as the reliability of the general public on reputation of Safaricom, MNO of M-PESA, led the successful results. Second, the societal patterns of close-knit family life and urban-rural

migration, as well as single-handed dominance of Safaricom in the mobile phone market and its giant network of resellers, were important in environmental considerations. Finally, the service was implemented in proper timing when the population was comfortable with the increasingly popular cellular phone technology.

B. Chinese Simple Payment

China, with its relatively less developed financial industry, has been growing as a strong player in FinTech centering on payments through policy efforts. The government implemented FinTech strategy to expand the credit for the financially vulnerable instead of improving the relatively underdeveloped financial infrastructure such as credit rating system. Moreover, given the rapid rise in internet and mobile penetration in China, FinTech was adopted as a means to replace scarce banks and payment infrastructures to provide financial services to customers in a wide range of regions. In addition, reflecting the market environment of little awareness of credit transactions, a policy of helping companies adopt a third-party online payment method was implemented to increase consumer convenience and to expand the market.

The simple payment has led the development of FinTech in China. Simple payment service refers to any electronic payment service that allows users to make payments on-line and off-line ‘simply’ and securely. It is a system that supports payments through simple methods such as pre-certification without complicated payment procedures.

The simple payment market in China was 98.7 trillion yuan in 2017, nearly 80 times that of the United States. Alibaba's Alipay, the leading companies of Chinese FinTech, occupies more than half of China's

simple payment market and has 430 million members, nearly triple the PayPal 160 million.

Alipay is a third-party mobile and online payment platform, established in 2004. Alipay is used in smartphones with the Alipay Wallet app. QR code payment codes are used for local in-store payments. The Alipay app also provides various services such as credit card bills payment, bank account management, P2P transfer, prepaid mobile phone top-up, bus and train ticket purchase, and insurance selection.

How did Alipay become the global leader in simple payment? First, Alipay understood Chinese payment practices very well and responded to it very effectively. For example, Chinese consumers have a strong disbelief on the online business and as a result they have been afraid of sending money first without receiving the products. To eliminate the weakness of e-commerce, Alibaba launched a system for accepting consumer money in the third-party settlement, Alipay account, and then paying the seller after confirming the goods. The following is a typical purchase process using Alipay:

① The buyer chooses a product and makes the payment to the seller via Alipay.
② Alipay, instead of transferring the money to the seller's Alipay account immediately, keeps the money as escrow and informs the seller that the buyer has made the payment. At the time the money is neither directly controlled by the buyer nor the seller.
③ The seller sends the product to the buyer.
④ The buyer receives the product, and makes confirmation in their Alipay account or Taobao[54)]

54) A Chinese online shopping website owned by Alibaba.

⑤ Alipay receives the buyer’s confirmation, and sends the money to the seller.

When the buyer does not confirm the receipt, Alipay or Taobao tracks the number of express delivery to monitor the delivery status of the product. If the buyer takes no actions in 7 days, or 14 days in some cases, since the delivery confirm document becomes signed and received, it transaction will be automatically confirmed by the system and the money will be sent to the seller's Alipay account.

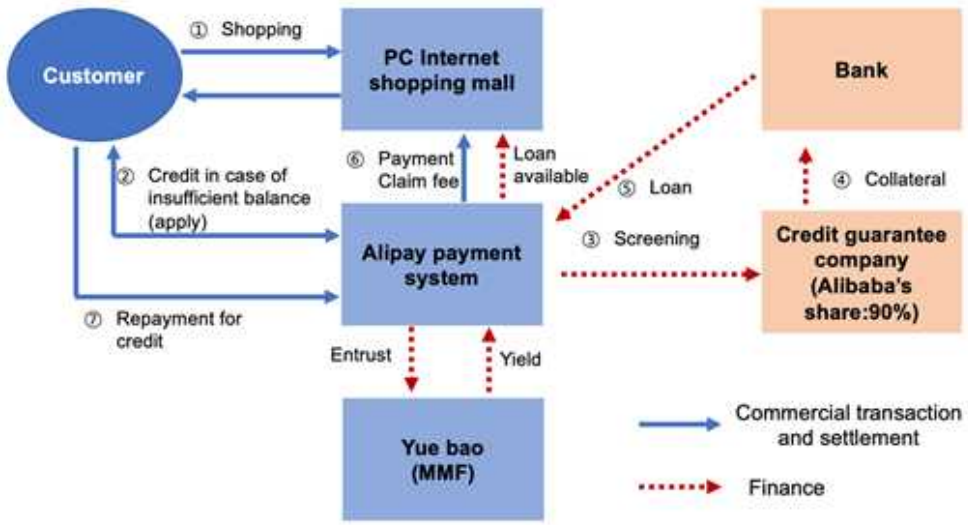
Second, Alipay took advantage of synergies with Alibaba Group. Alibaba is an e-commerce shopping mall that provides several kinds of online shopping service such as (1) business-to-consumer (B2C) service T-Mall, (2) consumer-to-consumer (C2C) service Taobao, and (3) business-to-business (B2B) service Alibaba.com. It also has subsidiaries such as AliExpress, which delivers the purchased items within a relatively short time, when a customer buys something and pays it. This kind of synergy effect can increase Alipay users.

Third, it managed its financial asset very efficiently throughout the short term money market. Alipay introduced a new a money market fund (MMF) called as Yuebao in 2013 and utilized it when to manage its money left over from online payments. the Yuebao bought high interest rate (13 to 14 percent) short-term instruments in financial markets and then it sold 7 to 8 percent interest rate MMF to the customer. It attracted large amount of money from customers because banks' deposit interest rates were only 3 to4 percent at that time. As a result, not only did Yuebao grow, but the number of transactions through Alipay also increased. In addition, Yuebao took the role in lowering market interest rates and make commercial banks to compete with other financial products developed by non-bank financial

institutions. As a result, the Chinese government has provided policy support for mobile simple payment and mobile asset management. Figure 3-7 shows Alipay's payment service in the context of above mentioned three factors.

<Figure 3-7>

Alipay's Payment Service Mechanism



6. FinTech Developments in Korea

The adoption of FinTech was relatively late in Korea compared with other countries such as China, India, and the USA. The establishment of financial infrastructure for financial informatization was relatively done early, and ICT-based financial services such as internet banking were already widely used in Korea. For example, in mid-2000s, on average three credit cards were issued to every adult and every merchant had to receive card payment by law. Using banking service

through internet banking and transaction through online shopping were quite popular. Therefore, the needs for new and other convenient financial services was relatively low, which resulted in later adoption of FinTech.

FinTech innovations were accelerated after the government initiated FinTech industry development policies in Mid-2010s. The government designated FinTech as one of the eight leading growth initiatives and implemented the plan to invest in and support FinTech industry in 2015. The Financial Services Commission (FSC) has been pursuing a FinTech vitalization policy along with deregulation and streamlining the registration process. In March 2018, the government reinforced FinTech innovation through additional policies. The FSC has pursued the enactment of the related laws for expanding the use of big data and blockchain, and further development of FinTech industry in various sectors such as open application program interface (API)[55] and cloud computing. Before the legislation, the FSC is supposed to promote the rollout of new FinTech services though regulatory sandbox, which refers to a mechanism for developing regulation that keeps up with the fast pace of innovation, in particular, of the FinTech industry. The Ministry of Science and ICT (MSIT) is contributing to the growth of FinTech companies through support projects such as funding and development of FinTech start-ups and support of new technology and service development.

As a result of these efforts, the number of members of the Korean FinTech Industry Association increased to 291 by February 2019, which is an increase of 70 from the previous year. Moreover, it has

55) In computer programming, an API is a set of subroutine definitions, protocols and tools for building software and applications. A good API makes it easier to develop a program by providing all the building blocks, which are then put together by the programmer.

been steadily increasing since the founding of the association in April 2016. The total number of FinTech companies in Korea is estimated to be around 500 according to related data. The adoption rate of FinTech in Korea has also jumped to 67 percent in 2019 among the 27 markets, from 32 percent in 2017 among 20 markets.

FinTech developments in Korea have been led by simple payment and transfer, P2P lending, ECF, blockchain technology, and robo-advisor. Internet-only banks, launched in 2017, are also providing financial services using FinTech.

A. Simple Payment and Transfer

Simple payment and simple transfer are the payment or transfer services using simple authentication methods after abolishing the mandatory use of accredited certificates. In March 2015, the government abolished its obligation to use accredited certificates, which must go through a complex certification process in electronic financial transactions. As a result, the use of much simpler payment and money transfer services using alternative authentication methods such as passwords, fingerprints, iris, and face have been spreading.

The daily averaged amount of simple payment service records KRW 126.0 billion (US$ 114.5 million) in 2018. This amount accounts for 30.6 percent of the total payment gateway (PG) service, which increased from 10.6 percent in 2016 and 20.7 percent in 2017. The daily averaged amount of simple money transfer is KRW 104.5 billion (US$ 95.0 million), which increased by 194.1 percent in 2018 followed by 397.3 percent in 2017.

<Table 3-4>

Simple Payment and Simple Transfer Service

(Unit: Daily average)

		2016	2017	2018
Simply payment (A)	billion won	26.0	67.7	126.0
	growth rate, %	..	(160.3)	(86.2)
Total PG payment (B)	billion won	245.0	327.7	412.3
	growth rate, %	(36.7)	(33.8)	(25.8)
A/B	%	10.6	20.7	30.6
Simple transfer	billion won	7.1	35.5	98.2
	growth rate, %	..	(397.3)	(194.1)

Source: Bank of Korea

Note: 1. Based on card (credit and debit), excluding prepaid electronic payment instruments

The simple payment services are led by distributors and manufacturers with offline distribution networks whose platforms are Samsung Pay, SSG Pay, L. Pay, and 11 Pay rather than ICT companies. On the other hand, the simple transfer services have been increased mainly by electronic financial companies classified as FinTech firms such as Kakao[56] and Naver corps[57] rather than

56) Kakao is a South Korean Internet company that was established in 2010. Kako has gained further prominence from KakaoTalk, a free mobile instant messaging application for smartphones with free text and free call features. After merge with Daum, a second largest internet portal in Korea, in 2014, it extended its business area. Currently it provides a diverse set of internet and mobile services such as community, entertainment, finance and others. Even it is involved in taxi-calling service.

57) Naver Corporation is a technical organization headquartered in South Korea that operates the Korean search engine Naver. Currently, it provides various portal entertainment service such as Naver TV, Naver Webtoon as well as financial service of Naver pay. In addition, it has Subsidiary companies as Line (mobile messenger program servicer) SNOW (a photo and video application provider) and Naver Labs (R&D subsidiary developing future technologies in areas such as autonomous driving and artificial intelligence) etc.

conventional financial institutions.

For the case study of simple payment in Korea, Samsung Pay is introduced briefly. Samsung Pay, a mobile payment with mobile wallet, provides a variety of services, including domestic and foreign remittance, foreign exchange, fund investments, and cash withdrawal on selected banks' ATMs as well as simple payments. Samsung Pay supports both NFC[58]-based mobile payment systems and those that only support magnetic stripes. As magnetic card terminals are much more widespread than those that accept NFC payments, Samsung Pay can be used in more than 90 percent of all POS units in the United States and more than 30 million retail locations worldwide.

The Samsung Pay menu starts by swiping from the bottom of screen. Different credit/debit and loyalty cards can be loaded into the app, and selected by swiping between them on-screen. The services of Samsung Pay are different in countries. For example, it can be used for online payments and to withdraw money on selected banks' ATMs in Korea. In China, Samsung Pay supports in-app payments, QR code payments (Alipay and WeChat Pay) and public transportation cards of Beijing, Shanghai, Guangzhou, Shenzhen, and other cities. In India, it supports the government's unified payment interface (UPI), an instant real-time payment system, and Bharat QR. It also supports bill payments via the Bharat Bill Payment System

B. P2P Lending

P2P lending is a transaction method in which loans and borrowings

58) NFC (Near-field communication) is a set of communication protocols that enable two electronic devices, one of which is usually a portable device such as a smartphone, to establish communication by bringing them within 4 cm of each other.

between individuals are made on an online platform without intermediation of incumbent banks. Domestic P2P lending has appeared in Korea since 2014 due to low interest rates after the 2008 global financial crisis. It has shown rapid growth since 2015 with the advantages of offering high return to investors and low loan rate for funds demanders. As of the end of September 2018, 205 companies were providing services, and cumulative loans and balance of loan recorded 4.3 trillion and 1.7 trillion won respectively.

However, the delinquency rate and bad debt rate of P2P loans have risen recently. In addition, the number of cases of fraud and bankruptcy of P2P lending companies also increased. To respond with those problems through strengthening investor protection, the FSC has revised the P2P lending guidelines in December 2018. In addition, the FSC has pursued legislation actively to ensure that P2P lending can be fostered into the FinTech industry. When the relevant law is enacted reflecting not only the experience of advanced P2P lending market countries but also the proposal from domestic P2P business, the P2P market can make significant development with venture companies and SMEs.

C. Equity Crowd-Funding

Equity crowdfunding (ECF) has established as a new source of financing for start-ups. It has been steadily expanding with the establishment of the institutional foundation through the revision of the Capital Market and Financial Investment Business Act in 2015. In 2017, a total of KRW 17.7 billion was raised through 183 ECFs. This is an increase of 59.1 percent in number and 59.7 percent in amount compared to 2016, the first year of implementation.

ECF not only makes it easy and quick to raise funds from many small investors, but also has the effect of securing customers in advance. Accordingly, it is widely used in industries such as IT, video, and manufacturing. In the early days of ECF, very strict regulations were applied due to concerns about information asymmetry. However, in recent years, related regulations have been gradually relaxed, such as expanding the target industry and investment limits to enlarge the incentives for investors and companies to participate in ECF market.

D. Internet-Only Bank

Two internet-only banks, launched in 2017, have shown positive effects of accelerating the innovations in the incumbent banking system. The convenience of non-face-to-face channels transaction and interest rate competitiveness by low-cost structures attract many young customers and as a result, the number of customers and their sizes of assets grew very rapidly. Still, the credit and deposit balance of internet-only banks accounted for a very small portion of the total banks' credit and deposit as of the end of March 2018. However, the share of new household loans has risen sharply during the first year after their opening, accounting for 13.6 percent of the total increase in household loan by domestic banks.

Internet-only banks have been operating mainly for high-credit and high-income earners, which has not met the initial expectations of revitalizing the medium-credit loan market. This may be attributable to the lack of credit information accumulation for medium-credit customers and the lack of an independent credit scoring system. Meanwhile, the FSC applies the same key soundness standards as the domestic commercial banks to internet-only banks, but applies

exceptions to certain soundness regulations such as the BIS capital ratio and liquidity coverage ratio (LCR)[59], which may act as excessive burdens at the beginning of its launch.

E. Blockchain and Initial Coin Offering

Blockchain, one type of DLT, is a technology that can radically improve banking, supply-chain and other transaction networks, giving them new opportunities for innovation and growth with reducing cost and risk.

Korean financial industry has made diverse use of blockchain. Securities companies implemented blockchain-based trading platforms and smart contracts. It is also widely applied to financial services such as P2P lending, ECF, settlement, and remittance. It is also utilized for trade finance to prevent forgery and alteration. Korea Federation of Bank (KFB) and Korea Financial Investment Association (KOFIA) applied blockchain to substitute for accredited certificates. In addition, the local cryptocurrency such as No-Won coin developed by a blockchain company (Glosfer) has been released and used.

An initial coin offering (ICO) is a type of funding using crypto-assets. In an ICO, a cryptocurrency is sold in the form of tokens to speculators or investors, in exchange for legal tender or other crypto-assets, such as Bitcoin or Ethereum. An ICO can be a source of capital for start-ups, which can avoid regulatory compliance and intermediaries such as venture capitalists, banks and stock exchanges.

ICOs increased in Korea in 2017 as the price of crypto-assets soared.

59) The liquidity coverage ratio refers to the proportion of highly liquid assets held by financial institutions, to ensure their ongoing ability to meet short-term obligations.

However, risks related to fraud and investor damage have increased due to growing concerns over overheating cryptocurrency markets. Financial regulators banned all types of ICOs in Korea in September 2017, following market movements. The regulation made some domestic companies have gone abroad for ICOs.

F. Robo-Advisor

A robo-advisor provides largely automated portfolio management advice, strategies and services for investors through AI and machine learning. The robo-advisor has the advantage of relatively lower consulting fee and the minimum investment amount, so that an individual can use the customized asset management service.

After Korean government allowed robo-advisor's investment advisory and discretionary investment in 2016, FinTech companies and financial institutions have been expanding the use of robo-advisors. The robo-advisors market is expanding centering on 30 – 40 generations who are familiar with ICT thanks to the trust in AI and algorithms using big data technology. However, the discretionary investment robo-advisors have grown slowly because non-face-to-face investment is not permitted due to concerns about incomplete sales that fail to properly inform investment risks.

7. FinTech Policy for Financial Inclusion in Nepal

A. Financial Inclusion and Environment in Nepal

Currently, many people in Nepal cannot approach the financial service yet and as a result, financial inclusion is relatively low from

the perspective of access and usage. According to the World Bank,[60] account ownership of Nepalese adults, aged above 15, has increased to 45.4 percent in 2017 from 33.8 percent in 2014. Despite this substantial improvement, the account ownership is still low compared with those of other countries as seen in Table 3-5. In the worldwide 68.5 percent of adults have an account, in developing economies 63.0 percent of adults do. The penetration rate of cards and credit and debit cards are 0.7 percent and 8.7 percent, respectively. Only 16.3 percent of adults made or received digital payment in a year. Furthermore, 31.9 percent of all accounts are inactive, meaning that no deposits or withdrawals were made during the past year.

<Table 3-5>

Indicators for Financial Inclusion and Digital Infrastructure

	Nepal	Kenya	India	China	Korea	World
Number of commercial bank[1] branches per 100,000 adults (2018)	15.4	5.3	14.6	8.9	15.5 (2017)	..
Account ownership rate[2] (Mobile Money account)	45.4 (..)	81.6 (72.9)	79.9 (2.4)	80.2 (..)	94.9 (..)	68.5 (4.4)
Debit card ownership rate[2]	8.7	37.6	32.7	66.8	75.3	47.7
Credit card ownership rate[2]	0.7	5.7	3.0	20.8	63.7	18.4
Made or received digital payment[2]	16.3	79.0	28.7	67.9	92.4	52.3
No deposit & withdrawal[2, 3]	31.9	16.2	48.5	15.0	2.1	20.4
Mobile penetration rate (2018)[4]	139.5	96.3	86.9	115.0	129.7	107.0
Internet penetration (June 2019)[5]	54.1	89.8	40.9	60.1	95.9	58.5

Source: 1. IMF, Financial Access Survey, 2. World Bank, Global Findex Database
4. https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx,
5. https://www.internetworldstats.com/stats.htm
Note: 2 Aged over 15. 3 By account owner

60) World Bank, “Global Findex Database 2017: Measuring financial inclusion and the FinTech revolution,” 2018

Despite these low penetration ratios on the banking service, there are some positive signs. The digital financial infrastructure such are mobile penetration is very high. It is quite surprising that mobile penetration rate of Nepal records 139.5 percent (139.5 persons per 100 inhabitants) in 2018, exceeding Korea's 129.7 percent record. The ratio of individual using internet is 54.1 percent, a little below the worldwide average of 58.8 percent in June 2019. Furthermore, commercial bank (class A) branches per 100 thousand people are 15.4 in Nepal, which is similar in Korea and higher in South and East Asian countries based on the data of the World Bank.[61] As a result, from the perspective of accessibility, Nepalese appear to have ample opportunities for obtaining financial services, except in remote rural areas.

The World Bank surveyed the reasons for unbanked in Nepal[62]: “Financial institutions are too far way” (35.4 percent), “financial services are too expensive” (30.4 percent), “lack of necessary documentation” (18.7 percent), “insufficient fund” (71.4 percent), “someone in the family has an account” (31.5 percent), “lack of trust in financial institutions” (13.6 percent), and “no need and religious reason” (6.4 percent).

Financial environment indicators imply that Nepal's low financial inclusion is due largely to the low-income segments in remote rural areas. Even though Nepal's low level of financial inclusion comes mainly from demand side like low income, the supply side barriers such as distance and inefficiency need to be addressed. FinTech may resolve most of the supply side issues because it can help reduce cost

61) https://datacatalog.worldbank.org/dataset/global-financial-development
62) Ibid at 22.

of the product and transaction, improve quality of the product, and enlarge choices and flexibility of customer.

B. Short-term Perspective Strategy

FinTech, in general, has already taken a deep root in many countries and has succeeded in bring a new paradigm to the design and implementation strategies for financial inclusion. For example, several impressive developments such as the progress in transferring money via mobile phone messages or the widespread usage of mobile payment services are observed globally.

Considering the current financial environment in Nepal, it appears that financial services through mobile banking or mobile money are the way of improving financial inclusion at first sight. However, there may exist a limitation in diffusing mobile banking service in Nepal and a challenge in deployment of mobile money.

(1) Potential Challenges from Deployment of Mobile Money

Although the mobile money has enjoyed a runaway success in a few countries such as Kenya or Uganda, low-income consumers in emerging economies still have limited access and low sustained usage of financial services. In some countries of Sub-Saharan Africa, despite the rate of access to financial services are amongst the highest in emerging markets, some obstacles lead to low rates of usage and dependence on cash in every day payment.

Institute for International Monetary Affairs (IIMA) pointed out the five significant challenges to FinTech development of Southern and East Africa in the policy brief to T20 Japan 2019[63]. The five

challenges are (i) high transaction costs for low-value transfer, (ii) inappropriate designed products, (iii) remaining financial literacy, (iv) regulatory environment, (v) unfair competition practice between small business and larger corporates.

It emphasizes that the affordability of financial service in Sub-Saharan Africa is the primary hurdle to usage amongst customers. For example, a Kenyan M-PESA user who transfers KSH 1,001 (equivalent to approximately US$10) to a registered user, pays KSH 26, about 2.6 percent transaction fee. The rate of charge for the same value cash withdrawal is approximately 2.8 percent. All the costs, including transaction fees along with prices of mobile devices and subscription fees, may make the low-income persons difficult to access the financial services through mobile money.

Despite of the success of M-PESA in Kenya, mobile money has not been consistently successful yet in other developing countries. Therefore, the deployment of M-PESA in Nepal may face some challenges pointed out by IIMA.

(2) Limitation in Diffusing Mobile Banking

The number of Mobile banking users in Nepal record 8.3 million in July 2019 amounting to 28.3 percent of the total population. It increased about fivefold during the past three years. Mobile internet has been increasingly popular since the deployment of 3G 3G telecommunication networks in 2010 and launching of 4G Long-Term Evolution (LTE) one in early 2017. These improvements of mobile

63) IIMA submitted “Review of FinTech Strategies for Financial Inclusion in Sub-Saharan Africa,” to T20, March 2019. T20 is a policy research group of the G20.

infrastructure may play a key role in a locomotive of mobile banking growth.

<Table 3-6>

Mobile Banking and Internet Banking in Nepal

(thousand, percent)

	Jul 2016 (A)	Jul 2017	Jul 2018	Jul 2019 (B)	B/A
Mobile banking users	1,755 (..)	2,670 (52.1)	5,088 (90.5)	8,347 (64.1)	4.8
Class A	1,605 (..)	2,438 (51.9)	4,711 (93.5)	7,407 (57.2)	4.6
Class B	134 (..)	217 (61.9)	352 (62.2)	910 (158.5)	6.8
Class C	16 (..)	14 (-14.3)	23 (64.6)	31 (33.2)	1.9
Internet banking users	515 (..)	784 (5.2)	834 (6.4)	917 (10.0)	1.8

Source: https://www.nrb.org.np/bfr/monthly_statistics.php?tp=Monthly_Statistics&&vw=15
Note: Figures in parentheses are year-on-year growth rate

Despite of its rapid expansion, it may be difficult for mobile banking to be spread widely to low-income segment who lives in remote areas. Several explanations can be given for it. First of all, mobile banking requires a bank account of customer, but most of the unbanked live in remote rural area such as Province 6 or 7. Second, 'there may be challenges to deploy urban level wireless communication infrastructures in mountainous terrain in the near future although Nepal government push to improve connectivity and strengthen the ICT to these people. Finally, financial literacy that is compounded with limited capabilities in literacy, numeracy, digital literacy, and general awareness of financial commodities also remains a challenge for the low-income bracket to make use of digital financial services.

(3) Alternative Mobile Payment Platform: UBpay

From the perspective point of financial inclusion, FinTech innovation should make financial and retail transactions convenient through easy payment and money transfer. UBpay is a user-centric open-typed universal shared platform, which allows a user to connect financial institution for financial services such as payment without an intermediary. It works on any type of smartphone, operating system, communication technology, which can be used for transactions with financial institutions, merchants and service providers. It offers a variety of payment, remittance and withdrawal services for online and offline transactions by almost any payment method through the one system. And any smartphone subscriber can use it anywhere in the world.

UBpay has been used in Korea after the implementation by HAREX InfoTech in 2007, and some countries like Indonesia, the Philippines, Guatemala began the preparation for adopting it in 2018. International payment and remittance are running by US-based global holding company with 16 joint venture company worldwide.

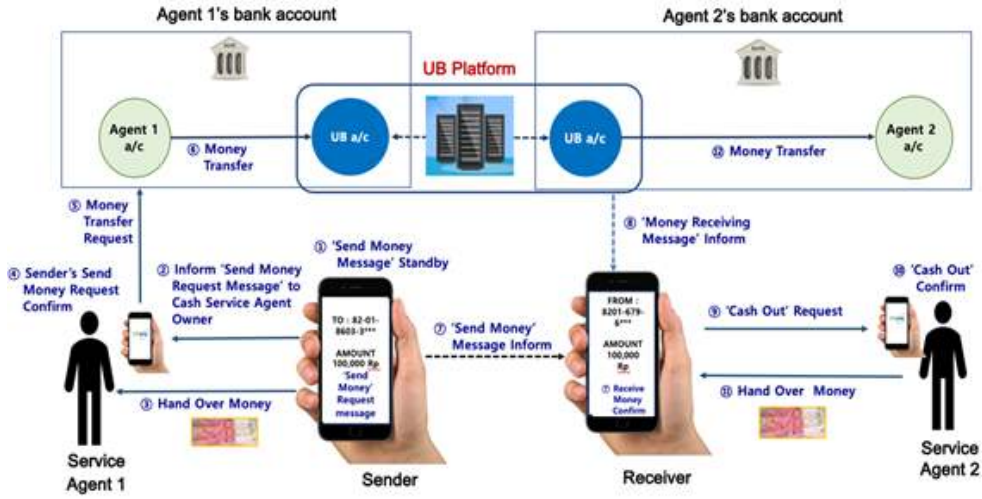
UBpay system is comprised of UB platform, UB cash machine, and payment devices such as ATM, NFC, QR, and UB payment calculator and tablet POS. The cash machine provides similar functions of ATM while much cheaper and simpler than ATM. Therefore, it can be deployed inexpensively in areas where opening a bank branch or ATM is difficult. UB payment calculator and tablet POS are inexpensive enough not to burden small merchants. The establishment of inexpensive payment infrastructure greatly reduces the financial transaction costs.

Furthermore, UBpay does not provide consumer's financial information to a store at the time of purchase, but instead makes

payment by connecting the consumer's mobile phone directly to the bank or card company for the store's payment request. UBpay also does not keep the user's financial information about the account, credit card, password or others on the mobile phone. Moreover, it does not provide it to the store. Therefore, even if an outsider hacked into a mobile phone or the data was intercepted in the process of transferring the data, private financial information does not leak out.

The UBpay system enables real-time funds transfer between financial institutions, which solves the problem of interoperability, the most important in payment systems. For understanding the UBpay's financial service structure, an example of processing a recipient's cash receipt along with the transfer of funds from a sender, both do not have bank accounts in Figure 3-8.

<Figure 3-8>
Remittance and Withdrawal through Cash Pickup Service Agent



Source: HAREX InfoTech

The remittance and cash withdrawal between the unbanked can be

possible through cash pickup service agent. Even though both sender and recipient do not have bank accounts, UBpay makes a money transfer and receipt using the bank account of cash pickup service agents as shown in Figure 3-8. The sender goes to the agent 1 and put a remittance message such as the recipient's account number on his/her mobile phone and presses the remittance request button on the phone, then the remittance request message appears on the agent's phone. The agent receives the money directly from the sender and transfers the money from its bank account to agent 2's account through UBpay platform.

The money withdrawal of the recipient is made by the reversed procedure of remittance. The recipient goes to agent 2 and requests the cash withdrawal through his/her mobile phone, then the withdrawal request message is sent to agent 2's phone. Agent 2 gives the money to recipient and checks whether the money is deposited into own bank account.

(4) Mobile Payment Adoption Strategy

FinTech such as internet-only bank, P2P, ECF, robo-advisor, and blockchain are also very crucial for leapfrogging the underdeveloped financial systems to an advanced level. However, the payment system is the most important financial infrastructure to make financial market efficient and the continuous economic development of the national economy. Without access to payment service, people are likely to be restricted to credit market. Without credit, there comes less trade, less investment, and fewer jobs.

Policymakers may select one or combined services among m-money, m-banking, and UBpay to improve financial inclusion relatively in

short-term. The deployment of mobile money in Nepal can increase the efficiency of mobile financial market through the competition with incumbent mobile banking services. Meanwhile, as mentioned above, the success of M-PESA in Kenya cannot guarantee equally in Nepal. This is because the needs of consumers in different countries are different, the ability of service providers to adapt to different market may be insufficient, and the number of professionals and culture of each country are different.

Therefore, in order to introduce mobile money services offered by telecommunication companies, policymakers must change their way of thinking about regulation. Mobile money services do not initially pose systemic stability concerns and cannot afford traditional levels of banking regulation. In addition, service providers benefit from a central bank that encourages innovation and understands local customer needs. This is a major shift from the traditional role of central banks.

The alternative is to diffuse the current mobile banking into MFIs. The penetration of mobile devices is very high and the supply of smartphones is expected to expand led by the Digital Nepal Program initiated by the government. If such movements are being made in rural areas and MFIs are capable of dealing with mobile banking service, the opportunity of mobile banking to the unbanked will increase. In order to make it easier, policymakers may adopt the mobile banking system of Korea's MG Community Credit Cooperatives (or MG Saemaul Geumgo) and combine it with Nepalese commercial banks' experience and technology of mobile banking.

Another mobile payment strategy that can be adopted is UBpay, in which payments are made without an intermediary. Since the intermediary is not involved and the equipment of UBpay system is inexpensive, the costs involved in the transaction are very low, while it

can provide almost all payment and transfer services. Moreover, unlike other mobile payment systems, it is a user-centric payment system, so the personal information is not leaked out.

The most important thing in policymaking is to determine which mobile payment system should be applied to Nepal. The decision should be made based on the efficiency and inclusiveness of the system. It may be tested throughout the experiment of the regulatory sandbox and pilot test which will be explained in the next section.

<Table 3-7>

Comparison of Mobile Payment Systems

	UBpay	M-PESA	Alipay	Card
Intermediary	no	yes	yes	Yes
Payment processor	User's smartphone	M-PESA outlet	Alipay	Card company
Transaction Cost	Very low	High	Low	High
Security	Safe	Unsafe	Unsafe	Unsafe

Source: https://www.nrb.org.np/bfr/monthly_statistics.php?tp=Monthly_Statistics&&vw=15
Note: Figures in parentheses are year-on-year growth rate

C. Long-term Perspective Strategy

Which FinTech innovations or products are most likely to facilitate financial inclusion and sustainable growth in Nepal? It is not an easy question to answer at this time. It is not because it is difficult to choose the best one but because it may vary very frequently if the technology changes. Today's best one may be different from that of the next year. The policy makers keep in mind that neither FinTech nor financial inclusion is the ultimate objective, and both are tools to

build a sustainable economic development in the long run. Rather, this section suggests pillars of digital financial infrastructure to support digital financial transformation from the long-term perspective of view which Nepal's policymakers have to focus on. They are mainly derived from experiences and lessons from the successful implementation of FinTech innovations in EMEs.

(1) Interoperable Electronic Payment Systems with Digital ID and e-KYC

Payment systems are foundational to financial inclusion because they provide the fundamental infrastructure for money to flow in an economy. Therefore, broader access to payment system is crucial and the first step in the long journey to digital financial inclusion. Central bank has a role and a responsibility to help create the infrastructure that facilitates safe, innovative, and interoperable electronic payment service. That is why central bank should take a more active role in digitalizing the infrastructure to support interbank settlement of faster payment in real time.[64)]

The combination of digital payment and settlement system with digital ID and e-KYC provides the fundamental financial infrastructure. For example, it provides the basis for a simple e-KYC system that can substantially reduce account opening costs when linked electronically with data like tax and address information. Furthermore, it also addresses concerns about market integrity like AML.

Providing a proper identification or a digital identification in a more sophisticated form to every citizen appears one of the particular challenges in Nepal. According to the World Bank Survey (2017), for

64) Refer to the 2018 BOK KPP Nepal report.

an 18.7 percent of Nepalese adults select lack of necessary documentation as a reason for not having an account.[65] Digital identification is necessary for the digital financial ecosystem to rest upon a solid foundation.

In 2019, Nepal government is pushing forward to introduce the National Identity Card and Civil Registration system over the country. Banks or other financial institutions should be ready to utilize this national ID to improve the financial inclusion. For example, a biometric ID such as Irisguard can be a solution for unidentified persons in Nepal. Irisguard is an identity recognition technology that converts an iris image into a unique code that is then used to identify the individual. Irisguard's EyePay platform has been used by the UN to promote financial inclusion of more than 2.3 million Syrian refugees in Jordan since 2016.[66] Another biometric ID technology such as fingerprint and face as well as a randomized ID number issued in India can be used for the digital identification.

(2) Digitization of Government Payment

According to the World Bank (2018), 54.7 percent of Nepal government's payments are received in cash only and cash receipts of private sector wages account for 81.5 percent. The rate of cash receipts for agricultural product payments records 94.1 percent.[67] Although these numbers has improved for years, still they are very high compared with those of other low income countries.[68]

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65) Ibid at 22

66) https://www.irisguard.com/node/39

67) Ibid at 22.

68) The percent of cash payment from Nepal governments fell from 83.9 percent in 2015 to 54.7 percent in 2017 and the ratio of cash only receipts of wages did

If the financial infrastructures of the electronic payment systems with digital ID and e-KYC are established, these cash payments can be converted to electronic payments without any large cost. Then, it will bear good fruit in financial inclusion or also lead large number of financial transaction to formal one.

Government's electronic payments based on digitalization, particularly to the poor, can bring other beneficial effects. It enables government to shift from in-kind assistance such as food and water supply to inexpensive cash transfer. And those accounts made for government payments can be also used for non-government payments. Once they recognize the convenience of the system, they may utilize them in other ways. In addition, the need for digital literacy to receive government payments can resolve cultural attachment to cash. Finally, it can provide the infrastructure for the e-government.

(3) Transforming Credit Provision and Building Better Financial Infrastructure

Another important financial infrastructure is a credit risk analysis system. Credit risk analysis was in general conducted by financial institutions themselves until recently. They checked the financial history and other formal data of the companies and individuals and evaluate them. The low income individuals and SMEs have to get low grade because they did not keep the financial record properly and as a result, they cannot approach the financial resource. They had to provide the collateral if they like to apply the loan to the banks, which was difficult in many developing economies.

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from 87.8 percent to 81.5. Their averages of the low income countries are 43.2 percent and 67.8 percent, respectively. (World Bank 2018)

The history long banking practice can be changed by the recent development of financial digitalization. Any service provider that has accurate customer data can evaluate credit well through the process of analyzing the data. Superior data may be derived from e-commerce platforms, social media services, search engines, and telecommunications. The firm's big data approach can improve business decisions by helping form a better picture of a customer's financial position through the superior data.

Today, diverse technologies, including mobile, internet, blockchain, machine learning, and big data, have been used to redesign financial markets and infrastructure for payment, clearing and settlement systems, alternative financial platforms such as P2P lending and ECF. FinTech is a solution to how to achieve inclusive and sustainable growth through the improvement of financial inclusion. FinTech can potentially generate additional financial resources and make existing or new financial resources efficient.

(4) Regulatory Sandbox and Test Bed Approach

Any FinTech based approach to financial inclusion should accept that technology is not perfect and may bring unanticipated outcome. The recent developments against the challenges of technology are regulatory sandbox and test bed.

A regulatory sandbox is a methodical haven for experimentation. The sandbox creates an environment for businesses to test products without having to meet the hoard of related regulations. Eligibility to enter a sandbox needs to be standardized and publicized, requiring market participants to articulate their value added in a predetermined format. It is cost-efficient for participants and resource-effective for regulators.

Establishing a sandbox sends a strong message to the industry that the regulator is open to innovation, and it also provides an important learning opportunity for regulators especially when coupled with an innovation hub. It is typically a gateway through which start-ups can interact with regulators and seek their advice and adjustments of licensing conditions. A sandbox and test bed can make the business to see the regulator as an entity they can approach for assistance with regulatory challenges rather than a distant policeman to be avoided.[69)]

69) The National Assembly of Korea passed a bill that grants a regulatory sandbox for new businesses in the ICT sector in September, 2018 which came into force from January, 2019. It was expected to speed up the adoption and commercialization of next-generation technologies in Korea. In the area of banking and finance, financial regulatory sandbox started right after the Special Act on Financial Innovation Support came into force on April, 2019. The Financial Services Commission (FSC) selected nine innovative FinTech services to apply the regulatory sandbox under this special law. (http://koreanlii.or.kr/w/index.php/Regulatory_sandbox)

IV. Estimation of Financial Inclusion Index of Nepal

1. Introduction

This chapter attempts to estimate the financial inclusion index of Nepal and other countries. In particular, it plans to estimate Nepal and other countries's financial inclusion index by applying multivariate statistical method and to evaluate the degree of financial inclusion of Nepal. Then, it will check the current status and the past development of the financial inclusion of Nepal and other countries.[70]

For this purpose, we take some national data of many countries representing financial inclusion and ICT utilization and then apply some statistical estimation methods called principal component to them. In particular, we utilize several financial indicators such as the number of bank account and ATM from IMF and internet usage ratio from ITU. Finally, we use these estimated indices to evaluate the financial inclusion of Nepal.

This chapter has four sections. The first one is an introduction while the second one is the theoretical background of financial inclusion index. It makes the definition of financial index and explains briefly statistical theories on index. The third one is the estimation result of financial inclusion index of Nepal. In particular, it applies the principal

70) The research team tried to estimate regional financial inclusion index representing the degree of the financial inclusion of each province of Nepal. It may be used to compare the degree of financial inclusion of each region of Nepal and evaluate the performance of financial inclusion of each region. Moreover, NRB may take region-specific financial inclusion policy based upon this index. However, it cannot be done because of lack of appropriate data of the region. It is only recent for NRB to collect the regional financial data and some of important data representing financial inclusion such as the number of bank account of each region are not collected yet. So it should not be done.

component estimation methods to the several financial indicators and derives the financial inclusion index of Nepal and other countries. It also derives several policy recommendations from the index. The final one is the concluding remarks.

2. Theoretical Background of Financial Inclusion Index

A. Index

Index is a statistical measure of change in a representative group of individual data points. It is mainly made to show the value of something by comparing it to something else whose value is known. In other words, it helps to compare the property of one group with that of another. Some of the examples in the field of social sciences are Gender Gap Index, Human Development Index or the Dow Jones Industrial Average, etc. For example, the Human Development Index (HDI) introduced in 1990 by United Nations represents the degree of human development with the data of life expectancy, education, and per capita income indicators.[71] Gender Gap Index enables researchers and policymakers to compare the gender gap of several other countries with the data of health, education, economy, and politics to gauge the state of gender equality in a country.[72]

71) The concept of HDI was introduced in early 1990s, HDI was a measure of human development that combined proxies for three important human capabilities: health, education, and a decent standard of living. Health (H) was represented by life expectancy (LE), education by literacy (LIT) and school enrollment (ENR) (the literacy and school enrollment indices were combined in weighted average as the education (E) index), and standard of living by GDP per capita (Y). Although their estimation methods changed in 2010, their basic ideas and implication did not change much. More derailed explanations are in Stanton, Elizabeth A. The Human Development Index: A History, Global Development and Environment Institute Working Paper February 2007.

In economics, the index is widely used when researchers compare the volume and value at a certain time with those of other times. One of the most common examples is a living cost index enabling to compare the living cost of one place with other ones. For example, if we like to compare the living cost of the capital city of Nepal, Kathmandu with those of other small cities of Pokhara and Biratnagar in Nepal, we may construct the living cost indices of Kathmandu, Pokhara, and Biratnagar and compare with them. Other examples are consumer price index and producer price index. It is very widely used to see the trend of the price level of a certain region. Some examples of the volume index are export volume index, trade volume index or utilization index. They show how the volume of the variable at a certain time is different from those of other times. The last one is the value index such as stock price index or retail sales index etc.

There are several reasons to ensure an index why economists and policy makers utilize when to analyze the economic activity or performance. First, it is convenient to express economic variable of large numbers to a small one. For example, the market capitalization of Korean stock market at the end of 2018 is 1,343,971,857,986 won, but it can be expressed as 26,104.34 when that of 1984 is 100.

Second, by similar way, it makes easy to compare with the value of each period or to see the changes of in the variables. For example, if we like to compare the consumer price of 2018 with those of 2017 and 2016, we can see how fast the price has changed for these years.

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72) Gender Gap Index is introduced by in 2006 by the World Economic Forum. It ranks countries according to calculated gender gap between women and men in four key areas: health, education, economy and politics to gauge the state of gender equality in a country. This index does not measure equality of the gender but measures women's disadvantage compared to men. More detailed explanation of Gander Gap Index is in Global Gender Gap Report in World Economic Forum (http://reports.weforum.org/global-gender-gap-report-2018/)

In particular, we select the base year and set the value of the variable at the base year at 100. Then, we can check the time series movement of the variables relatively easily.

Currently, the base years of most economic indexes such as consumer price index, import price, industrial production index and retail sales index are the same. As a result, we may compare the rate of changes of these variables very quickly. Finally, it makes possible for people to know the changes of the variables measured in different unit. Applying weight, we can make an average of the variables measured in different unit and see its overall movement quickly.

Index is classified as an single or individual index and a composite index. Individual or single index is an index representing the movement of a single variables. As a result, it is very simple to construct as follows. First, we select the one variable representing the characteristics of certain things or phenomena and second, we choose the base year when the value of that year is set 100 and then we estimate a relative value of each years' value to that of the basis year.

Composite or index is a little more complicated because it is a collection of many variables that are averaged together. It is constructed to represent overall characteristics or the performance of the sector made of several characteristics. By the method of representing each characteristic of the sector, it is classified into weighted index and unweighted index.

The composite index representing the n-element can be expressed as below equation:

$$Y = \sum_{i=1}^{n} w_i \cdot x_i \qquad \text{Equation (4-1)}$$

where xi is an i-th element and w_i is an weight to x_i. If we give the same weight to each element or variable, then we make unweighted indices, which is simply an average of the variables. However, if we give different weights to each element, then we make weighted indices.

There are several ways of estimating weights to make a composite index of variable representing values. The first one is to estimate them by applying the economic theory. The most famous index using this method to estimate the weights of the composite index is the consumer price index. The consumer price index is estimated to represent the general price level of an economy for the consumer to buy. As a result, the price of all products which consumers purchase in general should be included. However, it should be remembered that not all products have the same importance to the people' life. Foods and clothes may be more important than jewelry in people life on average. As a result, each product should be assigned different weight, and these weights have to represent the basket of the people.

Some statistical methodologies are used to estimate the weights representing the basket of the purchase of the people. The most frequently sued ones are Laspeyres Index, Paasche Index and Fisher Index. The below formulas are used to estimate the above indices:

$$\text{Laspeyres Index} : P_L = \frac{\sum(p_t \cdot q_0)}{\sum(p_0 \cdot q_0)} \qquad \text{Equation (4-2)}$$

$$\text{Paasche Index} : P_P = \frac{\sum(p_t \cdot q_t)}{\sum(p_0 \cdot q_t)} \qquad \text{Equation (4-3)}$$

$$\text{Fisher Index} : P_F = \sqrt{P_L \cdot P_P} \qquad \text{Equation (4-4)}$$

Where p_t and q_t represent the price and quantity at time t. Usually, we usually set sum of total weight to be 1,000 or 10,000.[73]

Another important one is stock composite price index which represents price movement of equities and other securities. the Nasdaq, S&P 500 or The Dow Jones Industrial Average are some of the famous examples of stock price in US. They utilize each stock's total market capitalization or price as weight to estimate the stock composite index.

The second way to estimate the weights of the index(wi) is to utilize the multivariate statistical analysis. Instead of utilizing the economic theory, it is derived by directly applying the statistical theory to data to find the most fitted line to represent the movement of the variables. Multivariate statistical analyses are generally applied to extract a few patterns when dealing large number of data and these extracted few patterns may be interpreted as a composite index.[74] In this way, we may estimate the best weight to represent the movement of all elements.

A principal component analysis is used to find a new set of variables as linear combinations of the original set of variables. In this case, the first principal component means the linear combination that explains the maximum amount of variation while the second is another linear combination that explains the second largest amount of variation

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73) Let us say the price increases for a good with a high weighting and the price remains the same for a good with a low weighting. If consumers respond to the price increase of the first good, by substituting it with the second, the overall inflation estimate would be overstated if a Laspeyres index is used. This is an example of item substitution bias. The Laspeyres method tends to over-estimate the general price level, while the Paasche method tends to under-estimate it.

74) There are several multivariate statistical techniques in statistical theory. Some of most commonly used ones are Principal component analysis, Cluster analysis, Factor analysis, Discriminant analysis and Canonical correlation analysis, etc.

independent of the first one. More components are then estimated sequentially, each new component being independent of the previous ones. As a result, these principal components can be good candidates as index and the parameters of this principal component can be a weight to the variables.

The index is also classified as a fixed-base index and a chained index, depending on whether the base year (or time) changed or not. The fixed based index means that the value in any specific time period is based on the value in the initial time period and this base remains unchanged throughout the index. One of the good example of the fixed-based index is the KOSPI (Korean Stock Price Index) whose base time is set up as the January 4th of 1980.

A chained index is the one whose value of any given period is related to the value of its immediately preceding period (resulting in an index for the given period expressed against the preceding period = 100). Consumer price index of Korea or other counties is a standard examples of a chained index. Korea Statistics changed its base year every five years. Currently the base year of Korean CPI is 2015.

B. Financial Inclusion Index

(1) Definition of Financial Inclusion Index

Financial inclusion index represents the degree of the financial inclusion of a certain country or a region at a certain time. It can be a time series index showing the pattern of its movement across the period or a cross-section index making them comparable with other regions or countries. It can use to compare the volume and the value at a certain time with those of other times and those of certain place.

There have not been many studies on these issues before and it is only recently for a few economists to construct it to analyze the financial inclusion across the world. For example, Cámara and Tuesta (2017) estimated the financial inclusion index of 137 countries across the world of 2014. They utilized the world bank survey and took a two-step method of principal component. At the first stage, they made three sub-indices of financial inclusion of usage index, barriers index and access index. And at the second stage, they estimated the financial inclusion index combining these three indices by principal component analysis again. To estimate the usage and access indices, they used the data of the numbers of bank account (savings or borrowing etc.) and the number of bank branches and ATMs etc. For to get the barrier index, they utilize the distance, affordability, documentation and lack of trust. At the second stage, they apply principal component with these three indices once more and finally derive the financial inclusion index of each country. Then they made a rank of each country in terms of financial inclusion index and evaluated it. Since this study only used the data of 2014, it only gave the rank of the financial inclusion of each country at that time. country

Another important study on financial inclusion index is Sharma (2017). He utilized the data of several regions of India and constructed the regional financial inclusion indicators representing the degree of financial inclusion of some regions of India. It also estimated the several categorical indicators such as the banking penetration, availability and access to insurance. It utilized the several regionally available data of the number of bank account, the number of ATM and bank branched and number of life insurance.

There are several reasons why only a few studies have been done in this field. First, financial inclusion has not been an important issue in

the development finance for a long time. For year, topics such as infrastructure finance or establishment of a sound financial system are regarded as more important than financial inclusion. It is widely known that developing countries did not have a good physical infrastructure and urgently needed a financial resources to construct it. As a result, economists had to work to build up the system providing long-term financial resource for them. Designing programs to enhance any international financial cooperation between developing countries and international financial organizations for the construction of infrastructure are some of good examples. Several public–private partnership programs such as build–operate–transfer (BOT) are build–lease–transfer (BLT) are designed and implemented. At the same time, Many economists had to spend so much time to study the financial crisis because it happened very frequently and made so much damages to them. They had to study the causes of debt crisis of Latin America and Asian financial crisis throughout 1980s and 1990s. Or they had to provide the theoretical background for sound supervisory system of developing countries. How to prevent the financial crisis in the developing countries has been an important issue for years. It is only recent years for experts of development economics or in international development institutes to recognize the importance of financial inclusion. As a result, providing infrastructure or solving the debt problem on developing countries were explicitly indicated in the elements of eight goals included in The Millennium Development Goals (MDGs) while investment on financial access or financial inclusion were not.

However, the story has changed recently. Economists and experts in development economy recognized the importance of the financial inclusion to reduce the poverty of developing countries. Several

experiments proved that access of financial resource raised the income of people in rural and remote area as well as urban area. This recent change is shown in the 2030 Agenda for Sustainable Development adopted by all United Nations Member States in 2015. It selected the 17 Sustainable Development Goals (SDGs) as a response of an urgent call for action by all countries - developed and developing - in a global partnership. This new agenda clearly implied the financial inclusion or improvement of financial access as one of the important way to reduce the poverty. It said "we will adopt policies which increase productive capacities, productivity and productive employment; financial inclusion; sustainable agriculture, pastoralist and fisheries development; sustainable industrial development; universal access to affordable, reliable, sustainable and modern energy services; sustainable transport systems; and quality and resilient infrastructure."[75)]

Second, not much data related with the financial inclusion has not been not available for scholars. If we like to study a topic of empirical study on financial inclusion, we must have appropriate statistical data. In particular, national data across the world are required to compare the performance of financial inclusion policy among countries. For example, at least one must have basic data representing the degree of financial inclusion such as the number of bank account or the loan account or the number of bank branches etc if he likes to make any empirical studies.

While there are some examples of case studies on microfinance or their practices, comprehensive national data had not been available for years. It is since 2004 for the first time that IMF began to collect

75) United Nations, Transforming our world: the 2030 Agenda for Sustainable Development, 2015 https://sustainabledevelopment.un.org/post2015/transformingourworld

these data from the countries over the world and thereafter, it becomes possible to estimate the financial inclusion index of countries.[76] At the early days, only high income country reported their data to IMF and many developing countries did not.

(2) Data for Financial Inclusion Index

We originally attempted to estimate two major the financial inclusion indices of Nepal. The first one is the national the financial inclusion index of Nepal and other countries. It takes some national financial inclusion data across the world and then constructs the national financial inclusion indices of many countries including that of Nepal. Later we compare those of Nepal and other countries. It is made to evaluate the financial inclusion of Nepal.

The second is a regional financial inclusion index of Nepal. It utilizes the regional data representing the financial inclusion of the different regions in Nepal and then compares the degree of financial inclusion across the Nepal. It is done to see the regional difference of the financial inclusion and to prepare for the regional financial inclusion policy.

Despite of the importance of the second one, we cannot complete this assignment because appropriate data are not available. For example, the statistics of the number of bank account or bank branches across the region were not made yet in Nepal.

To construct the national financial inclusion index of Nepal, we take data from two major data sources of (1) Financial Access Survey data set by the International Monetary Fund's and (2) ICT utilization rate

76) It is Financial Access Survey conducted by IMF since 2004 shown in IMF Web site: http://data.imf.org/?sk=E5DCAB7E-A5CA-4892-A6EA-598B5463A34C

data by ITU. The Financial Access Survey (FAS), launched in 2009 is a supply-side data set on access to and use of financial service aimed at supporting policymakers to measure and monitor financial inclusion and benchmark progress. The FAS is based on administrative date collected by central banks and other financial regulators. At 2019, it covers 189 countries spanning more than 10 years and contains 121 time-series on financial access and use. It collects annual time series data on access to and use of basic financial services around the world. The results of the survey, including the metadata, are disseminated on the IMF's Financial Access Survey website.[77)]

ICT usage data from ITU's are some of the elements in Telecommunication and ICT data collected from national telecommunication and ICT ministries and regulatory authorities. They include data on the fixed-telephone network, mobile-cellular services, Internet/broadband, traffic, revenues and investment; and prices of ICT services etc. Some of ICT usage indicators such as Internet usage of Percentage of Individuals using the Internet and Mobile-cellular subscriptions (excel) ratio are included in this data set. For the regional data of the Nepal for domestic comparison, we asked NRB.

The next question is which variables in IMF Financial Access Survey database and ITU to choose to make an “good” and “useful” financial inclusion index. We consider the following criteria to select the variables. First, these variables should represent the degree of financial inclusion very well. For example, there are several indicators to represent usages of financial institutions. The number of bank deposit account or amount of deposit over GDP ratio may be some of them. At the same time, those of the loan account may represent it, too. It may be reasonable to guess that one must have a bank account if

77) See http://data.imf.org/fas.

3he/she likes to use financial service.

Second, we have to check availability of the data representing financial inclusion. While there are many indicators and data across the world in IMF Financial Access Survey database, not all countries reported values of every indicators to IMF. While it covers the data as early as 2004, not many countries provide their data to IMF at these days. At the same time, some countries stop reporting some of their data to IMF in recent years. As a result, it is very difficult to find data that many countries reported to IMF. Therefore, we have to check how many available data have been provided from countries and to find the country that provides the data very consistently for years. In some countries, we have to fill the missing data with the estimated derived from statistical methods of interpolation.[78)]

From these two criteria, we select the ten variables to be included to estimate the financial inclusion index as in Table 4-1. We first define the three sub-indices as (1) usage index, (2) access index and (3) ICT readiness index.[79)]

The usage index means how the people in each country use the financial service. To assess it, we try to proxy the utility derived of using such services by considering the use of different products: holding at least one active financial product that allows making and receive payments and storage money, having a savings account and

78) Some rules are applied to fill out the missing values. First, if we have a missing value between two values of actual one, the we applied the moving average method to fill the missing values. Second, if we have several missing values of a certain variable for some years before or after a certain year, then we apply the AR(1) process or linear regression on it, whichever fits best.

79) Camara and Tuesta (2017) use three subindices such as usage index, access index and barriers index. Since they used the world bank survey on global financial inclusion in 2011 and 2014, they had more detailed information on financial inclusion. As a result, his variables and classifications are different from those of this paper.

having a loan in a formal financial institution. It includes the four variables to represent the number of bank account and actual amount of service such as (1) the number of deposit account of commercial bank per 1,000, (2) the number loan account of commercial bank per 1,000, (3) the ratio of outstanding deposits with commercial banks in terms of the percent of GDP and (4) the ratio of outstanding loans with commercial banks in terms of the percent of GDP.

The access index means how conveniently the financial institution can be accessed. It is very important because access to formal financial services should represent the possibility for individuals to use them. We construct the access dimension with supply-side data at country level from four basic indicators: (1) the number of ATMs per 100,000 populations, (2) the number of bank branches and agents per 100,000 populations, (3) the number of debit cards per 1,000 adults and finally (4) the number of credit cards per 1,000 adults. The number of ATMs per 100,000 populations, the number of bank branches and agents per 100,000 population account for the physical points of services offered by the financial institutions. The number of debit cards and credit cards per 1,000 adults represent how much individuals may be equipped with devise for electronic payment. The person with these cards may be able to use the card payment system.

ICT readiness index shows how much social infrastructure are provided to use electronic finance or fin-tech. While there are many indicators representing the ICT infrastructure such as fixed-phone subscription rate or broadband subscription rate, we includes only two variables of percentages of individuals using the internet and mobile-cellular subscriptions. These variables are included because electronic connection infrastructure throughout internet or mobile device is the necessary condition for the electronic payment or electronic

commerce. If more people use internet or mobile service, then more people will be ready to use internet payment or mobile payment. These data are from the data base of ITU.

Then we collect the data of 56 countries among 189 countries from IMF Financial Access Survey database. The names of the countries included in the estimation were shown in Table 4-2. 20 countries and 19 countries among these 56 selected countries are high income countries and upper middle-income countries, respectively, amounting to 69 percent of all countries. It is because relatively these countries have better statistics reporting systems and as a result, IMF may get the data on financial inclusion easily. There are only two countries that provide the financial inclusion data for these periods such as Nepal and Afghanistan.

<Table 4-1>

Variables Used in Financial Inclusion Index

Sub-index	Elements	Variables
Usage Index	Account	Deposit account of commercial bank per 1,000
		Loan account of commercial bank per 1,000
	Savings	Outstanding deposits with commercial banks (% of GDP)
	Loans	Outstanding loans with commercial banks (% of GDP),
Access Index	ATM	ATMs per 100,000 pop
	Branches	Bank Branches and agents /100,000 pop
	Card	Number of debit cards per 1,000 adults
		Number of credit cards per 1,000 adults
ICT Index	Internet system	Percentage of individuals using the Internet
	Mobile system	Percentage of mobile-cellular subscriptions

<Table 4-2>

Countries Included in Estimation of Financial Inclusion Index

Rank	Country	Rank	Country	Rank	Country
1	Afghanistan	20	Estonia	39	Montenegro
2	Albania	21	Georgia	40	Myanmar
3	Argentina	22	Greece	41	Nepal
4	Armenia	23	Honduras	42	Netherlands
5	Bangladesh	24	Hungary	43	North Macedonia
6	Belgium	25	Iceland	44	Pakistan
7	Bolivia	26	India	45	Panama
8	Bosnia/Herzegovina	27	Indonesia	46	Peru
9	Botswana	28	Italy	47	Poland
10	Brazil	29	Jamaica	48	Portugal
11	Bulgaria	30	Japan	49	San Marino
12	Cameroon	31	Kenya	50	Saudi Arabia
13	Chile	32	Laos	51	Seychelles
14	Colombia	33	Latvia	52	Spain
15	Costa Rica	34	Lebanon	53	Thailand
16	Dominican Republic	35	Malaysia	54	Trinidad and Tobago
17	Ecuador	36	Malta	55	United Arab Emirates
18	Egypt	37	Moldova	56	Zimbabwe
19	El Salvador	38	Mongolia		

<Table 4-3>

Countries by World Bank Classification

Group	Number of Countries	(percent)
High income	20	35.7
Upper middle income	19	33.9
Lower middle income	15	26.8
low income (Nepal)	2	3.6
Total	56	100.0

(3) Statistical Methodology

We apply a multi-steps principal component analysis to estimate the financial inclusion index following Cámara and Tuesta (2017).

As applied in many statistical analysis, principal component analysis (PCA) is a statistical procedure that uses an orthogonal transformation to convert a set of observations of possibly correlated variables (entities each of which takes on various numerical values) into a set of values of linearly uncorrelated variables called principal components. This transformation is defined in such a way that the first principal component has the largest possible variance (that is, accounts for as much of the variability in the data as possible), and each succeeding component in turn has the highest variance possible under the constraint that it is orthogonal to the preceding components. For example, suppose that there are K-dimensional data to analyze and we like know their relations or properties. One can do it by drawing a few simple linear lines to represent their linear relationship. This linear line can be estimated by principal component analysis. The first principal component is used to draw the line expressing the highest variance possible. Then the second line to explain some of the remaining variance, which is orthogonal to the first principal component, is made by applying the second principal component. This way of estimation can be done consecutively.

We apply this principal component analysis twice to the data we have. At the first stage, we estimate three indices of Y^u(Usage Index), Y^a(Access Index) and Y^{ICT}(ICT Ready Index) by principle components estimation method with each annual data from 2004 to 2018. Since we have three equations for each year, we have to make total 45 principal

component estimations and find the weights (eigenvectors) for each index as in equations (4-5), equation (4-6) and equation (4-7).

For example, we apply the principle components analysis to the data of account, savings and loans of 56 countries of 2004 and estimate the eigenvectors of the first principal components. Then we use them as a weight as equation (4-5) with the actual value of account, savings and loans of 56 countries of 2004 and estimate the fitted variable, which is the usage index of 56 countries of 2004. Then we apply the same procedure to derive usage index of 56 countries of other years individually and finally we get the values of usage index of 56 countries from 2004 to 2018. To get the values of access index and ICT ready index of 56 countries from 2004 to 2018, we do the same procedure with the data of ATM, branched and card, internet and mobile as explained in Table 4-1.

$$Y_i^u = \alpha_1 Depacct_i + \alpha_2 Loanacct_i + \alpha_3 Savings_i + \alpha_4 Loan_i + u_i \quad \text{:Equation (4-5)}$$

$$Y_i^a = \beta_1 ATM_i + \beta_2 Branch_i + \beta_3 Debitcard_i + \beta_4 Creditcard_i + v_i \text{:Equation (4-6)}$$

$$Y_i^{ICT} = \gamma_1 Internet_i + \gamma_2 Mobile_i + \epsilon_i \quad \text{:Equation (4-7)}$$

At the second stage, we estimate national financial inclusion index (FII) by applying principal component analysis with the three sub-indices by the below equation. In other words, we take three indices of usage index, access index and ICT ready index from 2004 to 2018 and estimate the eigenvectors of the first principal components. Then we use them as a weight as equation (4-8) with the actual value of three indices of usage index, access index and ICT ready index of 56 countries from 2004 to 2018 to estimate the fitted variable, which

is values of national financial inclusion index for each country at each year. Finally, we compare the financial inclusion index of each country at each year with those of other countries and make a rank of each country at each year.

$$FII_i = \omega_1 Y_i^u + \omega_2 Y_i^a + \omega_3 Y_i^{ICT} + e_i \quad \text{:Equation (4-8)}$$

3. Estimation Result of Financial Inclusion Index of Nepal

A. Movement of Individual Variables.

We examine the movement of variables to be used to estimate the financial inclusion index of Nepal and its average annual growth rates from 2012 to 2018 in Figure 4-1 and Figure 4-2. While all these indicators are on the rising trend for these year, their average annul growth rates are quite substantially different with each other. The careful examination on the movement of these data gives the following story:

First, the elements of ICT readiness index show the highest growth rates of all. The average growth rate of internet user per 100 persons and Mobile-cellular telephone subscriptions per 100 inhabitants recorded 32.1 percent and 14.8 percent, respectively. It means that ICT infrastructure of Nepal substantially improves and people of Nepal are ready to use devices for ICT service.

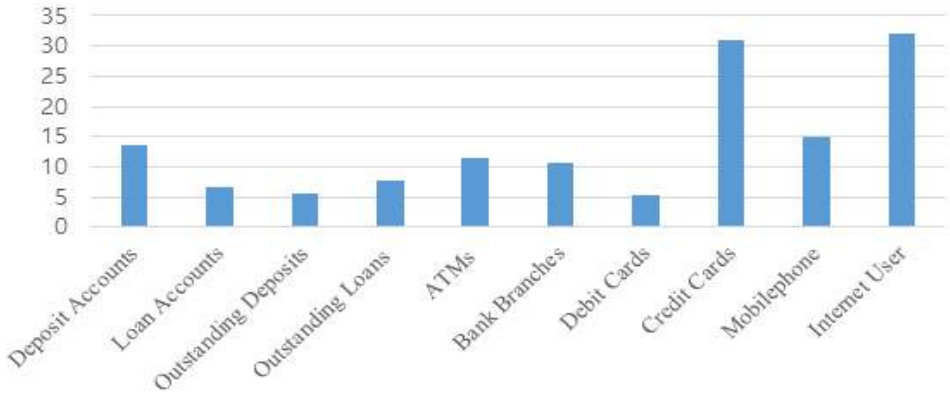
Second, the number of ATMs per 100,000 adults and number of commercial bank branches per 100,000 adults has also increased very much. They recorded 11.4 percent and 10.73 percent of annual growth rate, respectively. It means that people in Nepal are able to access the financial institution more conveniently than before.

Third, the number of deposit accounts with commercial banks per 1,000 adults has increased very much. On average, it increases by 13.7 percent for six years from 2012 to 2018, which is a quite achievement. It is also surprising that the number of loan accounts with commercial banks per 1,000 adults also increased by 6.8 percent for the same periods on average. The ratio of deposit amount over GDP also records a positive growth rate for these years. The ratios of outstanding deposits with commercial banks in terms of the percent of GDP and outstanding loans from commercial banks in terms of the percent of GDP also increased from 59.3 percent and 45.8 percent to 82.2 percent and 70.2 percent, respectively.

In short, it tells that all indicators representing the financial inclusion of Nepal have improved for the past years and in particular, those of ICT infrastructure have risen the most in very recent years.

<Figure 4-1>

Average Growth Rate of Elements of Financial Inclusive Index of Nepal

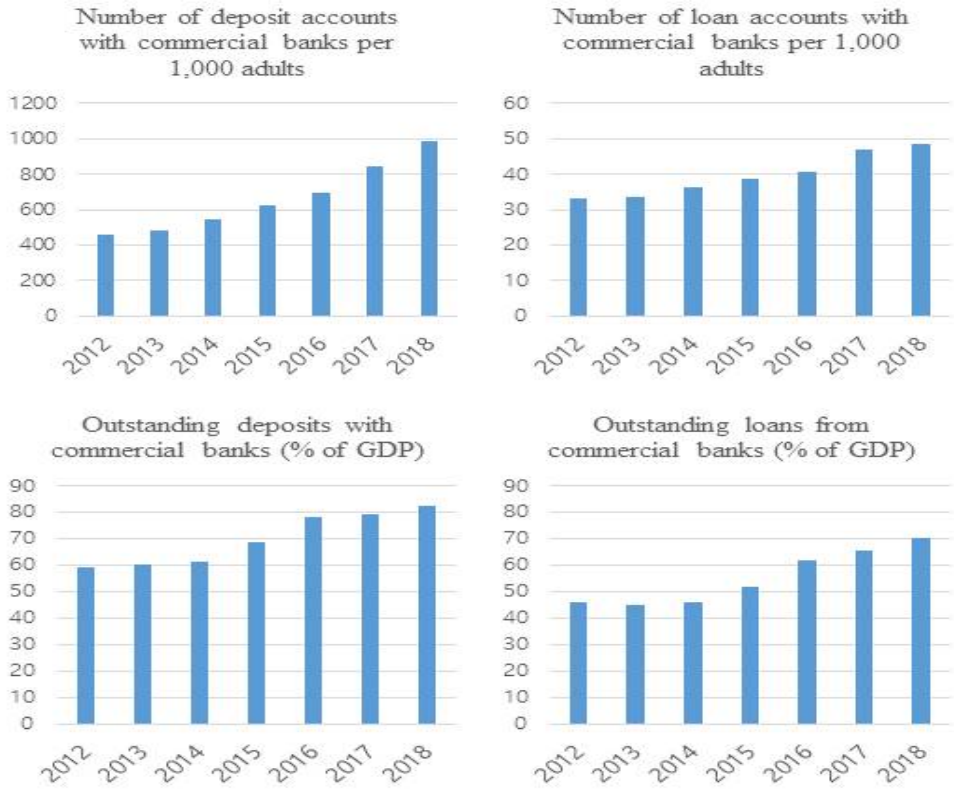


Source: Author's calculation

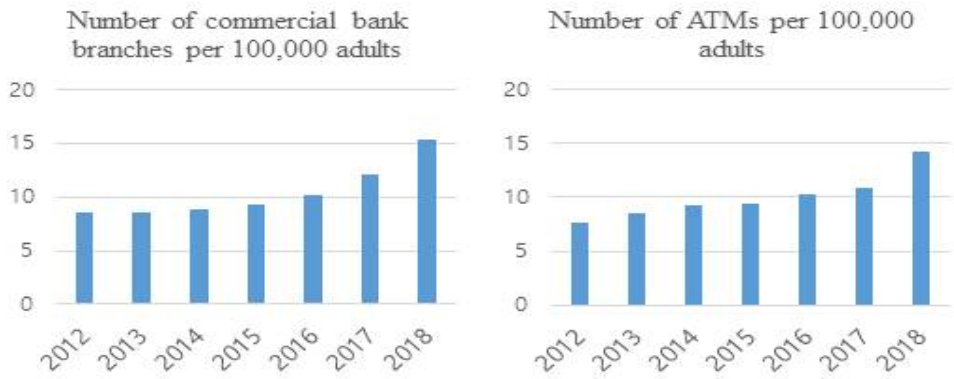
<Figure 4-2>

Movement of Major Variables of Financial Inclusion Index

(a) Variable of Usage Index

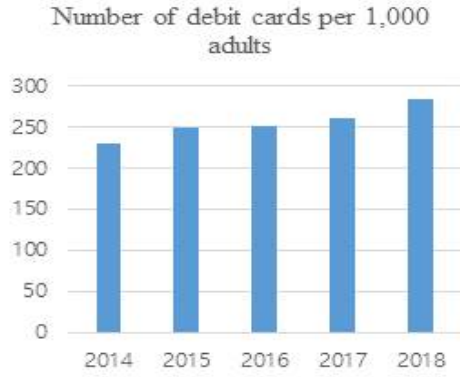


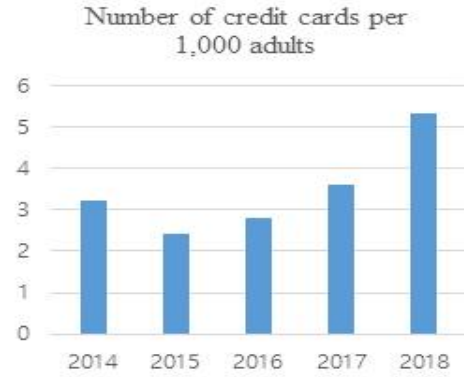
(b) Variables in Access Index



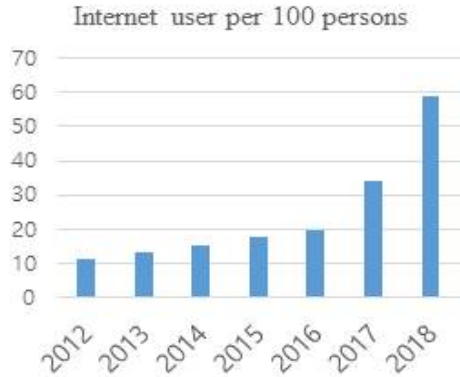
Source: Author's calculation

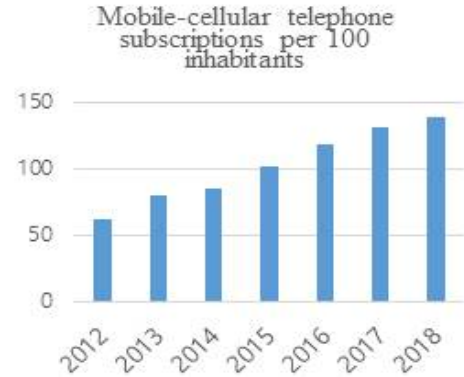
(b) Variables in Access Index





(c) Variables of ICT Readiness Index





Source: Author's calculation

B. Financial Inclusion Index of Nepal

In this section, we applied principle component analysis to the data of 56 countries we constructed in the previous section and finally we estimate the financial inclusion index of Nepal and other countries.

Before we estimate the sub-indices of financial inclusion, we must check the appropriateness of this method by estimating the first eigenvalues of the principle components. The first eigenvalue of the

principal component indicates the ratio of variation explained by this principal component over the total variation. Therefore, it should be high enough to explain the overall movement of elements included in the sub-indices. The second one does that explained the ratio of the second principal component.

As shown in Table 4-4, eigenvalues of the first principal components in sub-indices are estimated to be as high as 60-70 percent, meaning that the linear combination applying the first principal component as parameters on Equation (4-5), Equation (4-6) and Equation (4-7) explain the movement of the sub-indices by those percentages.[80)]

It looks that at the year of 2004-2006, the eigenvalues of the first principal components are estimated lower than 50 percent, meaning the estimated equation or linear combination may not explain the movement of these variables very well. We think that those years are the one when this survey was conducted for the first time and as a result, the data collected in the survey may not be consistent with those of the later years.

The eigenvalues of the first principal components in total index are estimate to be above 70s. So total index estimated by applying the estimated first principal component as parameters of Equation (4-8) explains the movement of three sub-indices quite well.

80) The first principal component is also called as a first eigenvectors estimated by principal components analysis.

<Table 4-4>

Estimated Eigenvalues of the First Principal Component for Sub-indices

	Usage	Access	ICT	Total Index
2004	37.39	75.09	90.53	74.90
2005	44.30	73.94	89.66	75.91
2006	56.02	71.57	87.63	78.23
2007	62.87	69.08	84.80	79.77
2008	66.32	67.23	83.02	80.47
2009	67.49	66.68	78.78	80.05
2010	67.53	66.59	75.45	78.45
2011	68.22	66.73	75.09	78.16
2012	63.82	66.19	77.55	76.90
2013	63.14	65.39	76.10	75.57
2014	62.53	65.42	75.36	75.07
2015	60.02	62.69	75.91	74.58
2016	56.53	62.61	73.41	73.25
2017	57.09	62.06	70.38	74.37
2018	57.59	62.05	69.93	75.54

Source: Author's calculation

Appling eigenvectors made by principal components analysis as weights of the variables in linear combination of Equation (4-5), Equation (4-6) and Equation (4-7), we estimate the Y^u(Usage Index), Y^a(Access Index) and Y^{ICT}(ICT Readiness Index) of each 56 countries at the first stage. And at the second stage, we applies the same method to these three indices and finally get the national financial inclusion index.

Figure 4-3 shows the estimation result of the sub-indices of financial inclusion of Nepal such as usage index, access index and ICT readiness index. The average of 56 countries of each sub-index is set as 100. As a result, the value below 100 mean that they are less than the average value of 56 countries and that those above 100 does mean

vice versa.

Figure 4-3 gives several interesting facts. First, values of both usage index and access index are lower than 100 for year from 2004 to 2018, which means that these values are lower than average values of 56 countries. It is not surprising that most countries included in these 56 countries are high income and upper-middle income countries.

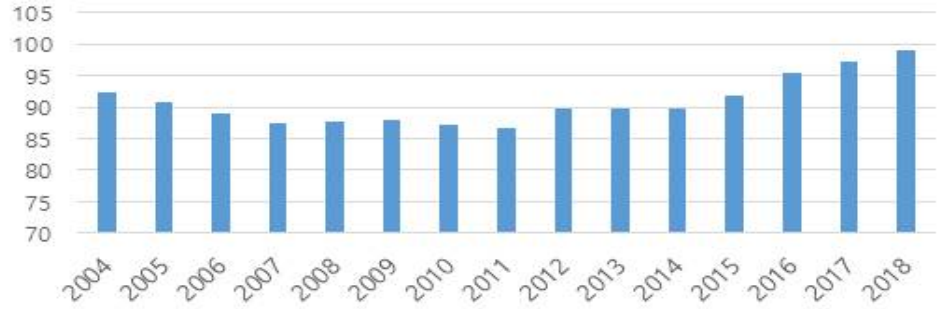
Second, both usage index and ICT readiness index of Nepal have risen quite substantially since 2010. The usage index almost approaches to 100 while ICT readiness index pass it in 2018, which means that these two indices of Nepal reach to the level of average value of these 56 countries. In particular, it is quite promising that the ratios of mobile phone subscriptions and internet users has risen over the average of these 56 countries.

Third, the access index of Nepal has decreased for years. While some elements included in access index has increased very much for years, their relative position has lowered. For example, the number of ATM per 100,000 adults has increased by 6.8 from 7.4 in 2011 to 14.2 in 2018, which gives an annual average growth rate of 11.3 percent. However, during these periods, the average number of ATM has increased by 7.9 from 51.0 to 58.9. As a result, the difference between Nepal and other countries has widened. In addition, the difference of the number of card holder between Nepal and the averages of 56 countries has substantially expanded.

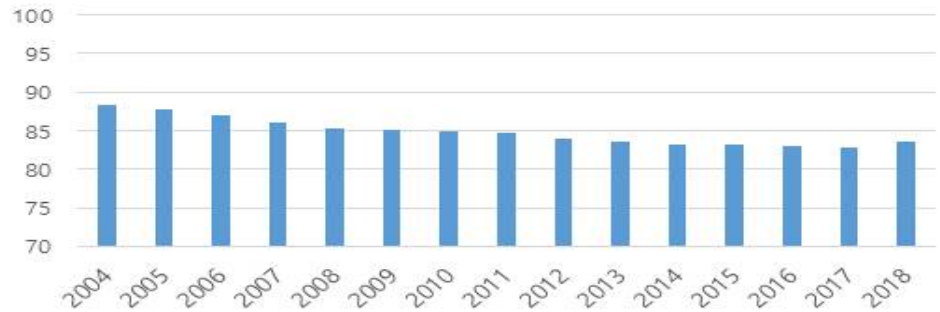
<Figure 4-3>

Financial Inclusion Indices in Nepal

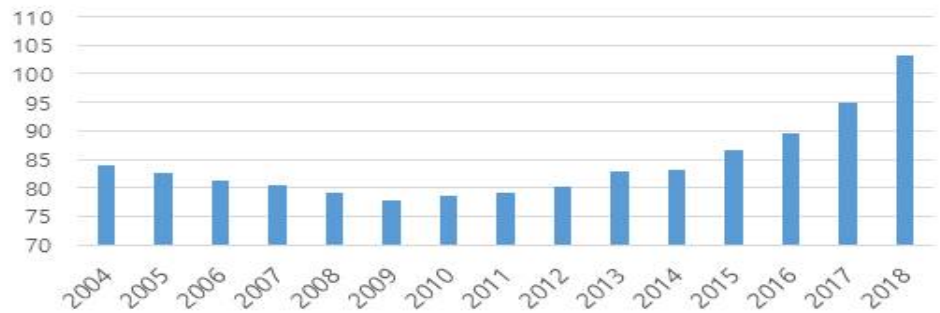
(a) Usage index



(b) Access index



(c) ICT Readiness Index



Source: Author's calculation

Although the estimation result of sub-indices of financial inclusion of Nepal provides several important implications given in above, the absolute value of financial index is not so meaningful because most

individual indicators used to estimate the financial inclusion index are made in different units. For example, the number of accounts are expressed in the actual number while deposit of GDP is expressed in percent. As a result, we utilize ranks of these indices of these 56 countries and to compare the ranks of variables throughout the time.

We assign a rank to the financial inclusion index of each country and analyze them in many ways. First, we estimate the average of four groups of countries of high income, upper middle income, lower middle income and low income. For this purpose, we estimate the average rank of each groups and compare them with each other as in Figure 4-4. We may find several interesting facts as below.

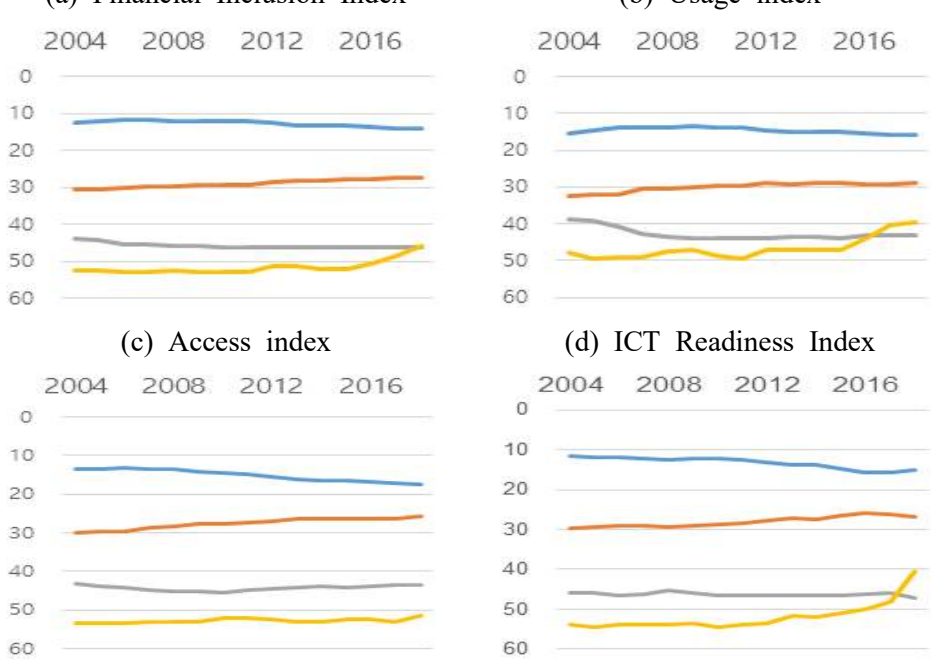
First, the average rank of financial inclusion indices of these four groups has the same order for the past fifteen years: high income country has the highest rank on average and the upper-middle income country does the second rank, too. Those of lower middle-income countries rank the third while that of the low-income country take the lowest rank. Furthermore, these orders did not change for all three sub-indices for the years. This means that the income and financial inclusion move together. It does not say that financial inclusion brings the high income of the country or fast economic development. However, we may claim that high income country at least is on average equipped with good financial access system at least.

Second, the only exception in the order of the average rank of financial inclusion indices of these four groups is the case of the lower middle-income countries and low-income countries during 2017 and 2018. As seen in Figure 4-4, the average financial inclusion index of low-income countries ranks higher than that of lower middle-income countries for these years. In particular, those of usage index and ICT readiness index of lows income country rank higher than those of

lower middle-income country. This change of the ranks of financial inclusion index, in particular ICT readiness index and usage index, between low income countries and lower-middle income countries in 2017 and 2018 is explained by recent application of FinTech and the difference of the government policy. The elements included in the ICT readiness index are mobile phone subscription ratio and internet usage ratio which depend the ICT infrastructure provided by the government. If any country actively installed the ICT infrastructure by government policy and as a result, public has a good infrastructure, these statistics will increase. Furthermore, if these ICT infrastructures and FinTech are utilized in financial industry, it may help people to approach to the banking service.

<Figure 4-4>

Average Rank of Financial Inclusion Indices by Income Group



Source: Author's calculation

Later, we explicitly check the movement of financial inclusion index and three sub-indices of Nepal. Figure 4-5 shows the rank of Nepal for financial inclusion index and other sub-indices from 2004 to 2018, while Table 4-5 does those of all individual indices of Nepal of 2018. These estimation result may tell several interesting implications as below.

First, in 2004, financial inclusion index of Nepal ranked 48th of 56 countries but it rose to 36th in 2018. It is very remarkable that Nepal's rank on financial inclusion index recorded such a high rank in 2018. It had been moving around 50s since 2004 to 2015 but thereafter, it rapidly rose. It is not coincident that NRB announced the Third Strategic Plan of Financial Development of 2017-2021 in 2016 where it emphasized the inclusive growth and financial inclusion as two of the major importance policy actions.[81] As shown in the Chapter 2, the Nepal government and NRB have been actively engaged in financial inclusion policy.

Second, for years, usage index(Y^u) in Nepal showed relatively good performance while those of access index(Y^a) did not. For example, the rank of usage index of 2008 and 2009 of Nepal recorded about the 40th while those of access was about the 50th and more importantly, this trend did not change much for years. To find the reason why the usage index(Y^u) showed relatively good performance, we check individual element making usage index. We find that the number of accounts of deposit and loans ranked only 42nd and 51st in 2018 while

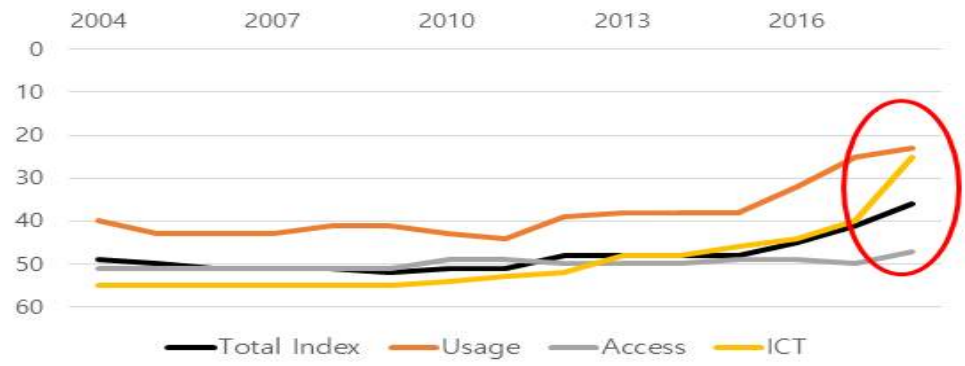
81) The vision of NRB of the Strategy of 2017-21 was “A Modern, Dynamic, Credible and Effective Central Bank” and the mission was as “Maintaining Macroeconomic and Financial Stability for Sustainable and Inclusive Economic Growth through Proactive and Effective Monetary and Financial Policies”.

outstanding deposits and loans with commercial banks (% of GDP) did 12th and 16th. While the number of bank account did not increase much, the average amount of deposit and loans has substantially increased. The access index did not improve much not because of low number of bank branch but because of the low number of ATM. The number of bank branches is not as low as other developing countries. It means that commercial bank in Nepal did not invest much on ICT infrastructure. This assertion is backed up by the fact that the number of debit card and credit card ranked at very low number of 48th and 51st, respectively.

Third, the ICT Readiness index(Y^{ICT}) showed a very rapid improvement since 2010 up to 2018. It has recorded about middle of 50th before 2010 but since then, it continuously rose and finally it reached to 28th in 2018. In particular, the mobile-cellular telephone subscriptions per 100 inhabitants reached to 11th and internet user per 100 persons did to 38th. This fact combining with the low card issuing ratio, also implies that Nepal people are ready to use electronic payment instrument but commercial bank are not.

<Figure 4-5>

Rank of Financial Inclusion Index of Nepal



Source: Author's calculation

<Table 4-5>

Rank of Each Element of Financial Inclusion Index in 2018

Elements	Rank
Number of deposit accounts with commercial banks per 1,000 adults	42
Number of loan accounts with commercial banks per 1,000 adults	51
Outstanding deposits with commercial banks (% of GDP)	12
Outstanding loans from commercial banks (% of GDP)	16
Number of ATMs per 100,000 adults	49
Number of commercial bank branches per 100,000 adults	28
Number of debit cards per 1,000 adults	48
Number of credit cards per 1,000 adults	51
Internet user per 100 persons	38
Mobile-cellular telephone subscriptions per 100 inhabitants	11

Source: Author's calculation

To see the relationship among sub-indices, we estimate the correlation of these variables of Nepal and other countries as in Table 4-6. It tells that the correlation between usage index and ICT readiness index of Nepal of 0.93 is higher than that of all countries of 0.69. It means that improvement of ICT infrastructure in Nepal contributed to the rise of usage of financial service more than other countries.

On the contrary, the correlation between usage index and access index of Nepal is lower than that of all countries. It means that the number of physical branches and ATM did not give a large impact on the financial usage in Nepal as large as the other countries. In particular, the increase in the number of bank branches may not help to raise the bank usage. This fact also gives an important policy

implication such that Nepal should utilize its well-equipped mobile network.

<Table 4-6>

Correlation Among Indices

(a) Nepal

	Usage	Access	ICT
Usage	1		
Access	0.60	1	
ICT	0.93	0.80	1

(b) Other Countries

	Usage	Access	ICT
Usage	1		
Access	0.76	1	
ICT	0.69	0.76	1

Source: Author's calculation

4. Concluding Remarks

This chapter estimates the financial inclusion index of Nepal and other countries and their comparison. For this purpose, we take the data of financial access from IMF and some ICT development data from ITU and applied the multivariate statistical method of principle component analysis to them.

Several important facts are derived from this analysis. First, remarkably Nepal's rank on financial inclusion index rose for years since 2004, which is remarkable. In 2004, the financial inclusion index of Nepal ranked 48th among the 56 countries, and it rose to 36th in 2018. Second, for years, usage index (Y^u) showed relatively good performance, whereas those of access index (Y^a) did not. This is due to the low number of ATMs and less investment on ICT infrastructures by commercial banks. Third, the ICT readiness index (Y^{ICT}) showed a very rapid improvement from 2010 to 2018. This fact, combining with the low card issuing ratio, also implies that Nepal

people are ready to use electronic payment instrument; however, commercial bank are not yet ready.

From these analyses, we may suggest the following policy recommendation. First, NRB should promote the least cost financial inclusion instruments such as the mobile payment or mobile banking rather than opening a physical branch. At 2018, the rank of the number of commercial bank branches ranks at 28 while the number of deposit accounts with commercial banks does at 42. It means that already Nepal has some amount of bank branches but not of ATM. The data clearly shows that people are ready to use their ICT devices but commercial bank did not provide the channels. As a result, NRB should put more emphasis on ICT investment of commercial banks. It seems that commercial bank did not provide adequate electronic banking product to customers while they are ready for it. If it is because of the remarkably small size of each commercial bank, the M&A among commercial banks or their capital expansion should be considered. Or it is recommended to utilize the recently developed FinTech explained in the previous chapter in detail.

Second, NRB should prepare for the next-stage plan of financial inclusion to promote the use of banking service. For years, NRB's financial inclusion policy focused on the improvement of financial access and successfully, it has shown some achievements. Many people have bank account and transfer their money through the bank wire. However, several other indicators still show that commercial banks of Nepal are not taking their business as active as those on other countries. They are very reluctant to provide loans to the people or to introduce new financial service. Many reasons can explain for it: people does not have many new good businesses opportunities or simply, economic growth rate is not so high. Staffs of commercial

banks may be too conservative or modern banking techniques such as credit risk analysis are not introduced well now.

So the next stage of financial inclusion and literacy policy should focus on these matters. It should be designed for the people in Nepal to be able to use various and more advanced financial service such as taking loans or using debit and credit card. It may take long time but it should be done eventually.

This chapter shows usefulness of the financial inclusion index in various ways. As a result, it is highly recommended that NRB estimates the financial inclusion index every year and utilizes it to evaluate its financial inclusion policy and program.

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