

Mongolian Remote Communities and Digital Banking Transformation

Demberel Bolitogtokh
Financial Management Department
University of Finance and Economics (UFE)
Ulaanbaatar, Mongolia
Email: bolitogtokh.d@ife.edu.mn

Dashpil Yanjiv
Financial Management Department
University of Finance and Economics (UFE)
Ulaanbaatar, Mongolia

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ABSTRACT

Although Mongolia has set up a nationwide Internet network as part of its goal of becoming a digital nation, remote communities are unable to have equal access to education, government services and other services due to inadequate infrastructure during the COVID-19 period. As mobile communications and the Internet expand, customers are becoming increasingly familiar with mobile banking and Internet banking services. The uses of digital technology such as artificial intelligence, digital banking services based on big data have increased in recent years. The benefits of

this digital transformation for banks should be shared equally by all customers. This paper assesses the equality of banking services based on reports on mobile banking transactions and reports on Internet connection of citizens in Mongolian's remote communities. The methodology is based on a methodological approach using fixed and random effect estimation and panel analysis based on data from the National Statistics Office of Mongolia, the Mongol Bank and the Communication Regulatory Commission of Mongolia. In this study, we surveyed 421 rural respondents from 21 provinces of Mongolia. This paper's dependent variables are the number of active mobile users and internet bank active users by province. Independent variables are population density, GDP per capita, workers, spectrum of poverty, average salary by province.

Keywords: Remote communities, internet network, assessing the equality of banking services, COVID-19, digital banking transformation, fixed and random effect estimation

INTRODUCTION

The impact of the Corona Virus has highlighted the need for electronic products and services in our daily lives and highlighted the shortcomings that have plagued service organizations and the financial sector in the past. The advantages of digital banking are well understood by both banks and customers. "Revolut", Europe's largest digital bank, officially entered the US market last year. Barclays Bank's introduction of a digital center, "From Home to Bank," in connection with the embargo, which allows it to meet its financial needs electronically, also sets the direction for the future. Foreign governments have also begun to regulate the digital revolution in the banking sector. Digitalising traditional banking

services will make it easier for people to work and deliver services faster, regardless of space or time, and most importantly, reduce congestion, concentration, and movement, thus reducing it significantly. I don't think you should put zero because there is no figure/measurement to start with. The digital transition is expected to reduce inefficient costs and interest rates (Ali, Akhtar & Safiuddin, 2017; Parmar, Ranpura & Patel, 2020).

Several evolutionary changes are anticipated in the era of Internet banking. Some consumers may expect completely autonomous banking operations due to a lack of time and competence, while others will demand high-level interaction. As a result, the banking business in the future will be highly adaptive. A new study by the deVere group on March 30, 2020, found that fintech applications in European countries increased by 72% due to the coronavirus. Figure 1 shows a basic conceptual framework (Ahmad,2021).

DIGITAL BANK TRANSFORMATION AND REMOTE COMMUNITY

The term digital transformation is used in new digital trading channels such as e-banking, m-banking and e-branch. Few have associated it with the degree to which the banks' staff accept it and describe the opportunities or threats it creates or influences. As digital transformation is a relatively new concept in the banking sector, the relevant reports focus mainly on the degree of acceptance and usage of new technologies by users of e-banking applications, whether they are customers or bank employees. (Kitsios, 2021, Nidhi, 2016; Tuya, 2017)).

According to the literature above, the key factors of digital transformation of the organizations should be revisited and evaluated regularly and make sure that the action plan for

implementing phase of the digital transformation is on the right track.

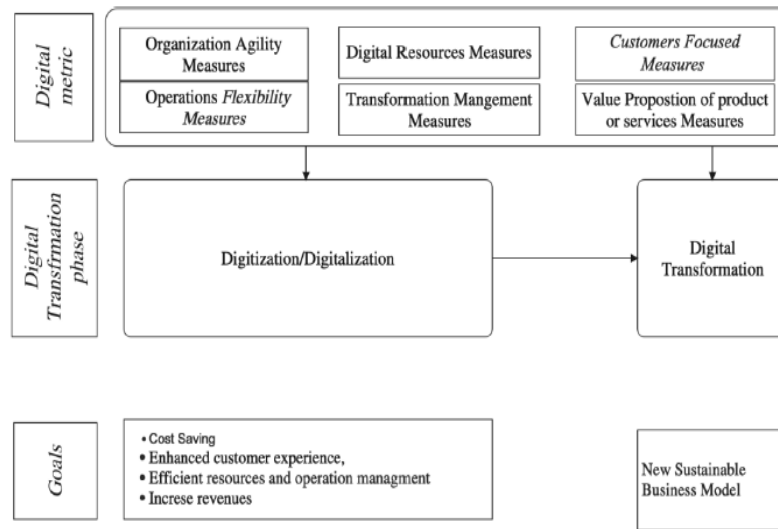


Figure 1. Basic conceptual framework (Ahmad,2021)

To better understand these challenges, a conceptual framework and digital metrics mapping represented by Figure 1 were created to collect specific information about the organization and its performance, the types of measures used in each digital transition phase, frequency of data analysis, and the types of analyses performed to address below propositions. “Rural” refers generally to areas of open country and small settlements. Still, the definition of “rural areas” in policy-oriented and scholarly literature is often taken for granted or left undefined in the process of definition, often fraught with difficulties (Dasgupta, 2015; Parmar et al., 2013; Tripathi et al., 2017). Figure 2 presents examples of digital success measures across four categories (Wade, 2022).

MEASUREMENT OF DIGITAL BUSINESS TRANSFORMATION	INDUSTRY OBJECTIVE	OPERATIONAL EFFICIENCY	CUSTOMER ENGAGEMENT	EMPLOYEE ENGAGEMENT	NEW SOURCES OF VALUE CREATION
	INDUSTRY OBJECTIVE	To save costs and improve operational speed and efficiency	To improve customer satisfaction and engagement	To improve employee satisfaction and productivity	To find new sources of revenue and profit
EXAMPLES	Time to market for digital products / services	Customer NPS on use of digital tools	Employee NPS on use of digital tools	Percentage of revenues from digital products / services	
	Employee hours saved due to digital tools	Customer usage of digital tool (i.e. time on app or functions used)	Employee satisfaction with remote work	Percentage of revenues from digital channels (i.e. web, app)	
	Cost savings due to digital tools (i.e. predictive maintenance)	Percentage lead conversion across digital channels	Employee usage of digital platforms (i.e. Intranet, internal social networks)	Digital vs non-digital customer profitability	
	Reduction in defects due to digital tools	Click-through rates and other digital marketing measures	New ideas generated via digital tools	New customer acquisition via digital channels	
	Percentage of operations handled by digital means	Customer retention through digital channels	Degree of collaboration among employees across digital tools		
		Customer hours saved due to digital tools			
		Percentage of customers who are active on a site or platform			

Figure 2. Examples of digital success measures across four categories (Wade, 2022)

Amudhan, Banerjee and Poornima (2022) conducted a survey "Impact of Digital Transformation of the Banking Sector in Rural Areas" with the objective of looking at the socioeconomic characteristics of respondents who were chosen from the subject area. The four main parts of digital transformation are technology, software, data, and organizational reorganization. In India's banking system, banks play a critical role. They oversee managing public finances and investing in the expansion of business and trade. In emerging countries like India, where other financial sectors are still in their infancy, the banking industry accounts for most of the financial sector. Banks' stability is vital since they act as trustees of public funds, mobilisers, and funders of various operations at the regional and international levels. The banking business has grown from a basic middleman to a vast commercial enterprise.

Neog (2019) conducted a "Usage of Digital Banking Services By Rural Population: A Study In Sivasagar District of Assam". The research was carried out to study the adoption of digital banking

services and other related issues among 100 rural people from the Sivasagar district (Neog, 2019; Tang & Mansumittrchai, 2022).

Drobez et al. (2012) conducted the study “Planning Digital Transformation of Care in Rural Areas” to propose the multi-stage competing risk for control of events leading to ill health and disabilities and show how to forecast the growth of these needs.

DIGITAL BANK TRANSFORMATION IN MONGOLIA

Urbanization of Mongolia's population

Because national definitions of urban and rural areas differ significantly from one country to another, it is difficult to compare these areas across national borders. To facilitate international comparisons, a coalition of six international organizations developed a new global definition of cities, towns, semi-dense areas, and rural areas. Although this is a relative concept to describe an urban area, many countries utilise the smallest population. Therefore, the classification of urban and rural areas includes administrative decisions, employment, infrastructure, services, poverty, electricity, water, internet access, roads, and other infrastructure.

The total area of Mongolia is 1.5 million sq km, with 21 provinces and 330 territorial administrative units. It is one of the most sparsely populated countries in the world, with a population of 2 people per square kilometer. According to the 2015 urbanization rating of the European Union GHSL, 55.8% of Mongolian's total population is in urban areas, and 17.7% is in rural areas. An urban center consists of contiguous grid cells of 1 sq km with a density of at least 1500 inhabitants per sq km and a minimum total population of 50,000. An urban cluster consists of contiguous grid cells of 1 sq km with a density of at least 300 inhabitants per sq km and a minimum total population of 5,000.

Grid cells of 1 sq km with a density below 300 inhabitants per sq km and other grid cells outside urban clusters or centers. In 2021, 1.5 million people of the total 3.2 million population lived in Ulaanbaatar, 0.9 million in the territorial administrative unit, and 0.8 million in the rural areas. The territorial administrative unit with the largest population is 136700, and the smallest population is over 18000. In recent years, the rural population density has declined significantly because the migration from rural to urban areas has increased. The population of 17 of the 330 territorial administrative units is less than 1500. Accordingly, the territorial administrative unit with the smallest population is 976. The most remote territorial administrative units from Ulaanbaatar are in Bayan-Ulgii at 1710 km to the west; Tsengel is to the west, and 80 km from the center of the province, and Khalkh Gol to the east is 360 km from the center and more than 1000 km to Ulaanbaatar.

Remoteness affects the economy, business environment and infrastructure, which affects the livelihoods, employment, education, health, finance, technology, information and services of rural people in the territorial administrative unit.

The Rural Development Index/RDI

The Rural Development Index is composed of five domains that are closely related to the quality of life of people living in rural areas. The domains are (1) economy, (2) health welfare, (3) education, (4) environment (residential and natural environment), and (5) culture leisure.

In 2018, Mongolia approved the “Methodology for estimating the Local Development Index” and annually estimates the development index of 21 provinces and 330 territorial administrative units by education, health, economy, infrastructure, environment and others. This index is estimated based on five groups of 65 indicators. As of 2021, Orkhon and Darkhan-uul

provinces are leading in the Local Development Index in terms of economic capacity and infrastructure, while Dornod and Govi-Altai provinces have the lowest capacity (Mongolia CRC, 2022).



Figure 3. Local development index, by some indicators by province (Development, 2022)

The Mongolian Economic Policy and Competitiveness Research Center /EPCRC/ estimates the province’s competitiveness index by four groups of 142 indicators and presents the report annually. Estimating competitiveness assessment encompasses detailed technology infrastructure, including the use of digital devices, internet users, information organizations, access to information, landline points, telecommunications technology, total telecommunications, and mobile phone users.

The Human development index /HDI/

The Human Development Index, or HDI, is a metric compiled by the United Nations and used to quantify a country's "average achievement in three basic dimensions of human development: a long and healthy life, knowledge and a decent standard of living." The HDI was first launched in 1990 and has been released annually ever since, except in 2012. Figure 4 shows HDI and poverty by some indicators by province.

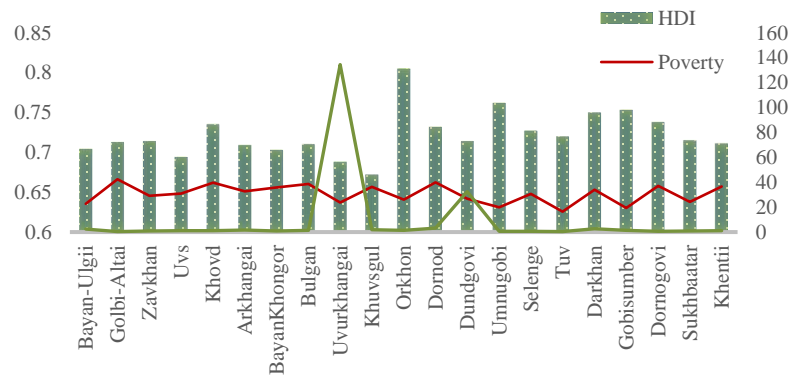


Figure 4. Human Development index and poverty, by some indicators by province (Development, 2022)

Human Development Index value is determined by combining a country's scores in a vast and wide-ranging assortment of indicators, including life expectancy, literacy rate, rural populations' access to electricity, GDP per capita, exports and imports, homicide rate, multidimensional poverty index, income inequality, internet availability, and many more. These indicators are compiled into a single number between 0 and 1.0, with 1.0 being the highest possible human development. HDI is divided into four tiers: very high human development (0.8-1.0), high human development (0.7-0.79), medium human development (0.55-0.70),

and low human development (below 0.55). According to the 2022 UNDP estimates, Mongolia is ranked 0.737 or 99th globally. As of 2021, Orkhon province leads in HDI, while Bayankhongor province has the lowest value.

Current situation of Mongolian telecommunication infrastructure

The 1992 transition from an analogue system to a digital one has laid the foundation of the fiber optic cable network in Mongolia, which facilitated the connection of Mongolia to the world wide web in 1994. By 1996, Mongolia was officially connected to the internet via local firm Datacom. As of 2019, Mongolia ranked 57 in the Network Readiness Index, 91 in the Development of Information and Communication Technology (ICT), 101 in the Competitiveness Index, and 92 in Utilization of Digital Development. Furthermore, as of 2019, 21 provinces and 310 districts were connected to the internet via fiber cables and a 4G network was available for all districts.

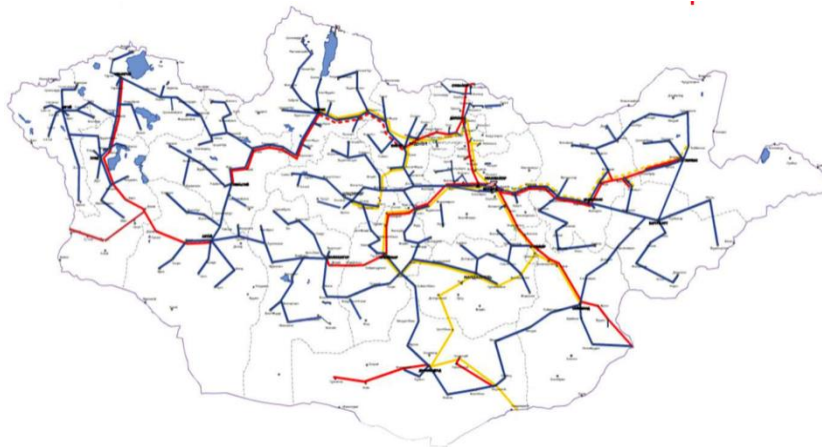


Figure 5. Mongolian national fiber cable networks (Mongolia, 2022)

Of 15 services currently operating in the Information Communication sector in Mongolia, Cellular network services made up 55.4%, Internet and Data 10.3%, Internet Wholesale services 9.1% and the other 12 services accounted for 25.2%. According to Mongolian Statistical Information Service 2015-2019 reports, Internet users in Mongolia are increasing. As of 2019 (including duplicates):

- Regular Internet Users: 5450610
- Fixed Internet Users: 303200
- 3G Users: 3190600

By payment method, 67.7% of all users are on prepaid plans, 25% are on monthly plans, 7.4% are on hybrid plans. Of all internet users, 93% are households whereas 6% are firms. Furthermore, 71% of all users are reportedly using 2Mbps to 5Mbps. As of 2021, excluding Ulan-Bator, Khuvsgul had the most cellular network users, whereas Govi-Altai had the least, Umnugovi had the highest number of regular internet users, and Dundgovi had the least internet users.

Current situation of Digital Banking in Mongolia

These days, everyone seems to be somewhere in the process of digital transformation. When the pandemic changed life for everyone, the need for digital transformation became even more apparent as having more automated processes and working from home became even more critical. Digital transformation involves redesigning business practices to incorporate digital technology within all facets of the business. Digital transformation will mean and require different things depending on the business. Digital transformation [DT] will look different for every company and enterprise. Digital transformation in banking requires a shift to online and digital services and a change in backend processes to

promote digitisation and automation. To compete with digital natives, banks should provide an end-to-end digital experience to their customers by integrating necessary technologies.

There are various issues and challenges in implementing digitalisation in rural banking (Dhanraj & Kumar, 2016; Nayak, 2018) as follows:

- a. The literacy rate is low: It is evident that the usage of digital banking services needs education.
- b. Lack of infrastructural facilities: Digitalization of rural banking requires the availability of Infrastructural facilities, here we are considering mainly the Electricity and communication networks.
- c. Few people using smartphones: The number of people in rural areas using smartphones is significantly less, which is a huge hindrance to the implementation of the digitalisation of rural banking.
- d. Lack of banking habits among rural people: most people in rural areas do not have access to banking because of a lack of banking awareness and financial literacy.
- e. Network issues in rural areas: There is a problem with communication networks, so there are fewer digital payments in rural areas. This needs to be addressed.
- f. Lack of financial literacy: financial literacy among rural people is very low, and because of this, people are not aware of different kinds of payments.
- g. Cash economy: Rural areas mainly depend on cash rather than digital cash to meet their daily needs, as transactions happen mainly with the help of cash or barter.
- h. The volume of transactions: the volume of transactions in rural areas is very low because of the lesser demand for goods and low-income level.
- i. Customer resistance to new technology: rural people do not

change so easily in the case of the usage of technology, and there is a lack of awareness of the usage of digital banking services.

- j. Cost of financial services: The cost of providing financial services is too high in rural areas because of a lack of infrastructure and a low volume of transactions.

The sudden outbreak of coronavirus has further accelerated the rapid transformation of the technological era. With Digital Transformation becoming a necessity for survival for many businesses, redesigning business structures and practices is imperative to facilitate successful digital transformation, and how it's done is different for every business. Digital transformation in the banking sector requires the integration of necessary technologies to promote digitalisation and automation further, thus providing end-to-end digital services to stay competitive.

The increasing number of Internet and Cellular network users has created both opportunities and challenges for traditional banks. According to Mongolbank 2021 digital banking report, the Internet bank has 1.66 million active users, mobile bank 530 thousand users, and 864 partners, a 4% increase from the previous year.

Of all digital transactions, 76.5% were intrabank, whereas the other 14.7 were made up of other transfers such as interbank, international, wire transfer, credit payment, etc.

METHODOLOGY

The study is based on primary data. For the required information, individuals who were financially data included were mainly considered. The required information was collected through a structured questionnaire covering the socio-economic and demographic characteristics of sample respondents. The sample

constitutes 424 rural respondents in 21 provinces of Mongolia, using Google Forms.

Table 1: Variable explanation

	<i>Variables</i>	<i>Sign</i>	<i>Years</i>	<i>Sources</i>
Dependent variable	Number of active mobile users, by province	Mob_bank_num	2015-2019	Mongolbank.mn
	Number of internet bank active users	Int_bank_num	2015-2019	Mongolbank.mn
Independent variable	Population density, by province	density	2010-2021	1212.mn
	GDP per capita, by province	Per_gdp	2010-2021	1212.mn
	Workers, by province	emp	2010-2021	1212.mn
	Spectrum of poverty, by province	poverty	2016,2018, 2020	1212.mn
	Average salary of employees of enterprises and organizations, by province	sal	2010-2021	1212.mn

RESULTS AND DISCUSSION

The study was carried out in May 2021. Logistic regression models have been applied to study the factors that determine access to digital banking services. The data was analyzed using Eviews10 software and estimated using the fixed effect estimator approach.

$$INT_BANK_NUM = -24108.35 + 0.49 * PER_GDP + 13.08 * SAL + 2012.19 * DENSITY + [CX=F, PER=F, ESTSMPL="2015 2019"], R^2 = 0.86$$

$$\begin{aligned}
 MOB_BANK_NUM &= 27336.02 - 15.04 * SAL + 1882.9 * \\
 &DENSITY + [CX = F, PER = F, ESTSMPL = "2015 2019"], R^2 \\
 &= 0.94
 \end{aligned}$$

GDP per capita, population density, and average salary rates directly correlated with demand for digital banking. Notably, Arkhangai, Bayan-Ulgi, and Khenti provinces were lagging in the aforementioned metrics, thus needing to increase them. This study used convenient sampling techniques to sample 424 customers in 15 provinces using Google Forms, which was intended to assess the effect of digital banking on rural users. The questionnaire consisted of 3 sections of 18 questions, taken via the internet. Subjects were chosen by random sampling method, and the data was processed using SPSS25 data processing software. In section 1, we questioned age, number of family members, household income per month, distance, internet and mobile phone bills on average per month, education and province. Table 2 presents socio-economic characteristics of the sample respondents.

Table 2. Section 1. Socio-economic characteristics of the sample respondents

	<i>Mean</i>	<i>Std. dev</i>
Age	37	10
Number of family members	4.25	1.33
Household income per month	USD 290.32	USD 193.55
Distance	600-800 km	USD 6.54
Internet and mobile phone bills on average per month	USD 12.9-19.35	

The average age of respondents was 37; of all respondents, 60% were public servants, and 18% ran their own businesses. The average family size was 4, and the average personal monthly income was \$290.32. Of all respondents, 23% were from Arkhangai, and 81%

had attained higher education. 21 respondents were at least 1600 km away from Ulan-Bator, and on average, respondents were 600-800 km away from Ulan-Bator and reported spending an average of \$16.13 on internet bills.

In section 2, we questioned: networks, devices and spendings for mobile phone bills. Respondents reported to be extensively using 4G, 3G, Wifi and Local Area Networks to connect to the Internet. Unitel and Univision were the most used networks, with cellular internet connection being the most used method of connection.

In section 3, we questioned digital banking service types, purposes of the above digital banking services and frequencies, biggest concerns about digital banking services, and some improvements in your area to increase access to digital banking services. Respondents report using the internet, mobile banking and ATMs to make transactions, pay bills, deposit and withdraw cash and wire transfers every day. Identity theft, phishing and technical difficulties were among the biggest concerns for users of digital banking systems, and internet speed and cost of services were challenges faced by rural customers. To conclude, increasing available internet speed, reducing the cost of service in rural areas, and more digital safeguards and information availability should be the first steps to encourage higher digital banking in rural areas.

The following results were obtained considering consumers, digital infrastructure, and digital banking consumption by province.

The questionnaire yielded the following results:

- Household income was the lowest in Zavkhan and Sukhbaatar,
- Sukhbaatar province reported the lowest internet and cellular network usage,

Table 3: Customers' digital infrastructure some improvements in your area, by province

	Indicators	Max	Min
1	Household income per month	Orkhon	Zavkhan, Sukhbaatar
2	Internet and mobile phone bills on average per month	Darkhan 21.7%	Sukhbaatar 16.7%
3	Networks		
	LAN	Darkhan 17%	Govi Altai 12%
	Wifi	Darkhan 25%	Zavkhan 11%
4	Difficulties		
	Poor equipment capacity	Dornod 10.3%	
	The cost of the service is high	Sukhbaatar 20%	
	It is difficult to open a digital banking service for the first time	Dundgovi 14%	
	Lack of information on digital banking services	Khovd, Dundgovi, Khuvsgul 14.3%	
	Some services are not available at all	Orkhon 20%	
5	increase access		
	Increase the range of digital banking services	Khovd 45%	
	Increase citizens' knowledge of digital banking services	Orkhon 50%	
	Increase target-oriented projects and programs	Zavkhan, Dundgovi 20%	
	Reduce service costs and fees	Sukhbaatar 60%	

- Local Area Network and Fixed internet was used the least in Govi-Altai and Zavkhan,
- Respondents reported the least equipment capacity in Dornod,
- Sukhbaatar had the highest cost of service,
- Respondents in Dundgovi reported the most difficulty opening first bank account,
- Khovd, Dundgovi, Khuvsgul had the least available information about digital banking

As for suggestions to problems faced by digital banking in rural areas, respondents suggested:

- Increasing the availability of digital banking in Khovd,
- Increasing information availability in Orkhon,
- Increasing target-oriented project and programs in Zavkhan, Dundgovi,
- Reduction of service fees in Sukhbaatar

Furthermore, the distance from Ulan-Bator directly correlated with cellular network costs and inversely correlated with household income.

CONCLUSION

In the digital era, Mongolia desperately needs to transition to be a digital country. The disparity between Ulan-Bator and rural province's household income and internet availability is relatively high. Mongolia has the lowest population density in the world and sees a high amount of migration to urban areas, thus has a vast infrastructure development gap, more apparent in whilst Mongolia ranks 99 out of 189 countries on the Human Development Index, but rural provinces rank lower than the average.

Citizens at least 2000 km away find it challenging to gain education and see health professionals, which increases the pressure to change to internet-based government services. Although 21 provinces and 310 districts are connected via Fiber cable, troubles like unreliability, cost of connection, monopoly in rural internet markets, and lack of information impede the fair distribution of information communication. The Mongolian government has taken initiatives to better the infrastructure to increase access to information communications in rural areas.

The surge of the Internet in Mongolia has created favorable markets for the digital transition of traditional banks, which would cut costs and time loss for both the bank and the customer. But it is still impeded in rural areas by the lack of internet access, cost of connection and poor quality of equipment. The questionnaires concluded that to increase digital banking services in rural areas, it is crucial to decrease outward migration, develop infrastructure, decrease the cost of connection, and increase living standards as first steps. Cyber security of digital banks is still a major concern for banks, as more sophisticated encryption cyber-crime prevention is needed. Furthermore, customers demand varied service selection, access to information, and fair pricing from digital banks.

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