ECONOMIC AND FINANCIAL ANALYSIS

A. Introduction

1. Poor access to finance and high finance costs are the most important constraints on enterprise development. By improving efficiency in Mongolia's payment and banking systems and making financial services more cost-effective, the Payment System Modernization Project will help improve access to finance. This will benefit the entire population, although the greatest positive impact will be in the rural areas and provinces where the majority of people are not currently linked to the formal banking system. The project will also address banking congestion in Ulaanbaatar, the capital city, where more people have bank accounts but bank branches are severely overcrowded. The modernized payment system aims to provide a more cost-effective branchless banking agent network that will allow customers to minimize visits to bank branches, use their electronic virtual accounts for transactions instead, and be more efficient in terms of their time and costs. These efficiency gains will also benefit major segments of the business community.

2. In addition to direct financial benefits, the project will have significant external impacts. It will increase the scale and scope of the retail banking infrastructure and help banks better satisfy consumer needs for savings, credit, payment, risk management, and information services. It will also substantially reduce the costs incurred by the central bank in the printing, handling, and transporting of cash. This system will help minimize government costs in making salary payments to public sector employees and social welfare payments to the rural and poor population. The project will bring about greater healthy competition between banks because it will provide an opportunity for all banks to increase their activities beyond the capital city, something that has been difficult up to now due to the country's large and often rugged geographical territory and the high costs of expanding branch networks. The project will enable all banks to offer competitive services to the rural and poor population while providing a wider range of financial services, including direct electronic debit and credit capacity, to the entire population. Manual paper-based payments mechanisms restrict productivity in the banking system, and, by substituting electronic payments, the project will help banks reduce branch congestion, serve more customers, and provide better service.

3. The payments system is national in character and not specifically targeted to benefit any group but the entire country. However, in the process it does help to provide access to banking services to those who have difficulty accessing the system. The project thus promotes financial inclusiveness by helping the poor participate in the financial markets by providing better access to sources of finance and making payments easier and affordable. By improving banking services in rural areas, the project will indirectly reduce regional disparity. Mongolia can increase the returns of the telecommunications infrastructure it has already built by using it, in collaboration with the banking sector, to create a national payments system. This will significantly benefit the private sector. Businesses will no longer need to hold or transport large amounts of cash. Their funds will remain within the banking system, earning interest until they are required for payments. The new system will also allow them to pay the salaries of their employees electronically, saving time.

4. The financial and economic assessment considered the modernization of Mongolia's payments system in the context of a vast country that has low bank branch density but high penetration by mobile phones. The assessment is based on several different sources of information: (i) business model of the payment system modernization project; (ii) Asian Development Bank (ADB) Indicative Lending Rates for London interbank offered rate (LIBOR)

Based Facility; (iii) National Statistical Office (NSO) of Mongolia yearbooks 2005–2011; (iv) NSO's population and housing census of 2010; (v) Information, Communications, Technology and Post Authority (ICTPA) Statistics; and, (vi) internal reports of the Bank of Mongolia (BOM) on interbank transactions.

B. Description of Benefits and Methodology

5. The economic evaluation compares the costs and benefits of the project by considering the potential cost savings and the economy-wide benefits. The project will provide part of the infrastructure required for the development of the financial sector and should be considered as part of the overall development of Mongolia. Paras. 19–20 detail the project's economy-wide benefits and quantify them, wherever possible.

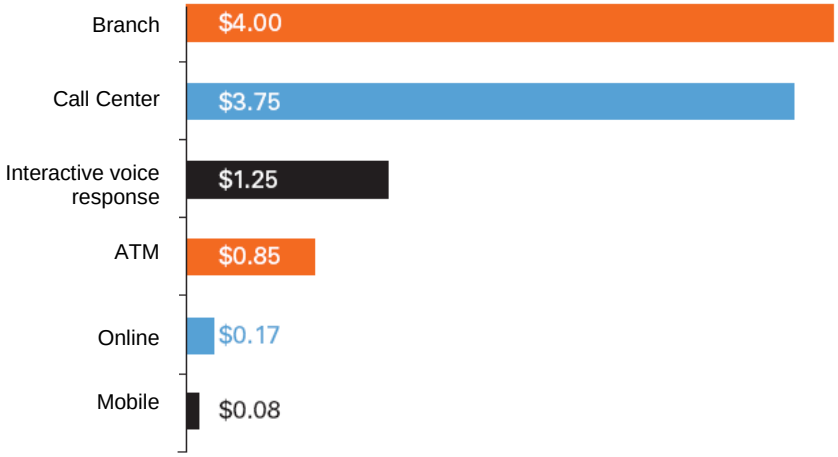
6. **Cost savings.** A quantifiable economic benefit will be savings for the BOM from a reduction in the costs of printing, transporting, handling, sorting, insuring, and destroying paper currency. These costs have been estimated at about $1.8 million per annum. The analysis assumed that these savings would gradually increase to around 5% of the cost in 2012 by 2016. This does not include potential cost savings associated with potential reduction of fraud, theft, and counterfeiting.

7. The project is intended to set up a retail payment system that will play a key role in the country's monetary and financial system and be crucial to economic development. The modernization of the payments system and the introduction of interoperable mobile payments will benefit all Mongolians, particularly the nomads and individuals living in rural areas. Anyone with access to a mobile phone will be able to avail of a savings account without needing access to a physical bank branch. Access to secure savings accounts, affordable credit, and easy payment options will help people build their assets, reduce transaction costs (see para.16), increase convenience, and improve their standard of living. The economy will benefit from a reduction in funds held outside the financial system and in the costs incurred by industry and government when making payments. Lowering transaction costs by even 1% would mean significant savings for the national economy.

8. **Broader financial services offerings.** Increasing the scale and scope of the retail banking infrastructure will lead banks and nonbank financial institutions to better meet consumer needs for savings, credit, payments, risk management, and information services and thereby address an important constraint on development.

9. **Improved banking system productivity.** Replacing paper-based payments with electronic ones will reduce branch congestion and increase the capacity of banks to serve more customers and provide better service. It will also reduce banking costs for individuals by limiting the need to travel to branches. All the shared facilities to be developed under the project, such as a one-time password, gateways, mobile payments system, and a backup center will significantly increase efficiency in the banking sector. The convenience and availability will increase the banking population. A nomad living in a rural area may easily spend $3.00 for a round trip to the nearest bank branch and sacrifice at least 3 hours of earnings, or about $5.60, to make a transaction. These are conservative estimates, both in terms of the travel cost and the loss of income.

Physical and Electronic Costs per Banking Transaction



Source: Tower Group.

10. **Higher return on infrastructure investments.** Mongolia has major telecommunications infrastructure in place. Mobile phone penetration is 100%, and the main centers of almost every *soum*, or county, are connected by fiber-optic cables. The return on this infrastructure investment can be increased by using it to create a national payment system with the banking sector.

11. **Gains for business.** Businesses will no longer need to transport or hold large amounts of cash. Their funds will remain within the banking system, earning interest until required for payments. Small retailers will benefit from the electronic payments system. The current need to travel to purchase supplies will be reduced, especially for traders in rural counties. Ordering and paying by mobile phone allows supplies to be delivered by a third party without the merchant needing to travel to secure the order. Cash held in retail stores will be cut back, reducing the security risks and the holding costs. Introduction of shared one-time password service and an internet payment gateway will allow secure e-commerce to flourish and greatly reduce the costs merchants incur to reach consumers.

12. The economic analysis spells out the quantifiable incremental and nonincremental economic benefits of the project through five major benefit streams: (i) the BOM's cost savings in the handling, printing, and transport of currency; (ii) benefits related to more efficient and quicker delivery of the banking services; (iii) benefits from less use of paper-based transactions; (iv) incremental fee revenue from mobile banking usage; and (v) benefits for the rural population from being able to transact through mobile banking. The analysis results show that the project is economically viable in terms of net present value and economic internal rate of return (EIRR). In addition, the results do not reflect the full business impact of the project because some of its overall economic benefits could not be quantified within a short time frame.

13. Cash flow models were developed for the financial and economic assessment, which considered setup costs, operating expenses, revenue sources, and potential cost savings. The analysis also took such positive externalities as rural development, greater efficiency and modernization of the banking system, and improvement to the economy's international competitiveness into account.

14. The analysis time frame was 22 years, from 2014–34. The inputs to the analysis have been derived from various sources, including the business plans developed for the project. The transaction volume and the revenue are based on the transaction volume compiled described in a business model for the project. The business model provided an estimate of the volume of the additional transactions that will be generated through the implementation of the Mongolia interoperable mobile payment system (MIMPS). The revenue estimate was based on the current fee structure:

(i) The low-value payment volume was assumed to be 25% of all MIMPS transactions, based on the observation that, as a rule, 25% of all mobile payment transactions are interbank transactions.
(ii) The financial transfer system switch transaction volume was assumed to be 10% of all MIMPS transactions, based on the observation that 10% of all MIMPS transactions are uploads or downloads of funds from a card account—i.e., they are switched through the financial transfer system switch.
(iii) High-value transaction volumes were based on an assumed increase of high-value settlement transactions by 1% of all MIMPS transactions.

C. Economic Evaluation

15. The financial and economic analyses are built on the project's potential impact on the industry, the government's administration and cash distribution, and other economy-wide implications. Its viability needs to be assessed on the strength of potential national economic benefits as the financial criteria do not fully capture the return on investment. Without the project, the national economy would continue to incur costs arising from inefficiencies, particularly in the finance and real sectors. Mobile phones can be easily used to carry out banking functions and replace point-of-sale machines, ATMs, and bank tellers. By introducing an electronic payments system, the project will significantly reduce transaction costs in the real economy and the financial sector. It will also enhance the international competitiveness of Mongolia's economy and help boost investment inflows. In addition, with all government salary and welfare payments to be eventually made electronically, Mongolia will be moving to a cashless system. The project is expected to lead to efficiency gains by lowering the currency in circulation, improving productivity, generating a higher return on past telecommunications infrastructure investments, and helping the business sector make more efficient use of its funds. It will also have a positive impact on the government's efforts to reduce poverty, unemployment, inequity, and regional disparities in Mongolia. Since Mongolia is a country with a small population disbursed over a vast and physical diverse territory, the project can be used as a model for similar countries. Taking into account the specific character of the project, the analysis assumed that major economic costs will be tradable (90% of total cost), while economic benefits will all be non-traded.

16. The following benefits are easily quantifiable: (i) benefits for banks related to more efficient and faster delivery of the banking service, which was calculated as an opportunity cost related to the greater time spent to process the expected incremental mobile banking transactions in the traditional, non-electronic way; (ii) benefits for banks from less use of paper-based transactions, which was calculated as an opportunity cost related to the printing and handling of paper vouchers for the incremental mobile interbank transactions if they were handled in the traditional way; and (iii) benefits for the rural population, which were calculated as the opportunity cost related to travel to the nearest bank branch and time spent to make bank payments in the traditional way.

17. The main assumptions of the economic analysis were the following:

(i) By 2035, the rural population will decrease to 25% of the total population from the current 33.8%;
(ii) 1% of the rural population will use the bank transfer service frequently; and
(iii) A bank teller's average capacity to serve is 250 customers per day.

18. The evaluation used constant mid-2012 economic prices. The project benefits and costs were revalued in economic prices at the border price equivalent value by separating the cost items into tradable materials and equipment, non-traded materials, and labor. The prices are expressed in US dollars using the foreign price numeraire, with a standard conversion factor.[1] A shadow wage rate factor was used to put an economic value on the wages paid to labor.[2]

19. The potential economic benefits discounted at 10% yield a positive economic net present value (ENPV) of $37.1 million and an EIRR of 26.1%, and a positive ENPV of $27.2 million when discounted at 12% over a period of 22 years. These estimates would be much higher if other macroeconomic wide impacts were quantified and incorporated into to the analysis. These impacts include a broader-based and stronger national payments system, improved banking system product, and the higher return on the current infrastructure.[3]

20. The major parameters to which the ENPV and EIRR are sensitive involve the revenue stream and the number of MIMPS transactions. Results of sensitivity analysis carried out by applying scenarios of decreases of 10% in revenue and transactions from those forecast showed a positive ENPV of $25.1 million at 12%, and an EIRR of 25.2%.

D. Financial Evaluation

21. The financial analysis of the project estimated the profit accruing to the BOM, which will operate the system that the project will develop. The following financial benefits were estimated for BOM: (i) incremental fee revenue from mobile banking usage, which was calculated using the BOM's current fee structure; and (ii) cost savings in cash handling, currency printing and transport by BOM, which were calculated as 5% from the costs currently being incurred by the BOM.

22. Financial cash flows were expressed in real terms using the mid-2012 prices and exchange rate. Physical contingencies were included to the cash flow stream, but price contingencies and financial charges during development were excluded to effectively segregate the investment decision from the financing decision.

23. The results of financial analysis carried out based on the assumptions on Table 1 indicate a positive financial net present value (FNPV) of $10.0 million at 10% and $5.4 million at 12%, and a financial internal rate of return (FIRR) of 15.6% for the project over a period of 22 years. The prevailing bank discount rate in Mongolia[4] is 12%. However, the project-specific

[1] The value for the standard conversion factor for Mongolia (0.98) is calculated by ADB. See attached calculations.
[2] The value for the shadow wage rate factor in Mongolia is 0.80. This is from the ADB. 2008. Technical Assistance to Mongolia for Regional Logistics Development. Manila; ADB. 2012. *Report and Recommendation of the President to the Board of Directors: Regional Improvement of Border Services Project.* Manila.
[3] Mckinsey & Co., 2010. Inclusive Growth and Financial Security: The benefits of e-payments to Indian society. India.
[4] ADB. 2012. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to Mongolia for Urban Transport Development Investment Program*. Manila.

proxy for financial opportunity cost of capital was estimated at 4%. The FIRR is far greater than the cost of capital, so the project can be considered financially viable.

Table 1: Main Inputs for Financial Analysis

Total Loan	$20,000,000.00
Evaluation period (years)	22
Project period (years)	3
Lending rate (20y forward LIBOR + 40 bps)	2.82%

24. The major parameter to which the FNPV and FIRR are sensitive is a change in the revenue stream from that projected for MIMPS transactions. The results of a sensitivity analysis carried out with a scenario of 10% lower-than-forecast revenues showed a positive FNPV of $3.3 million at 12% and an FIRR of 14.2%.

E. Identification of Project Alternatives

25. There are two alternatives to implementing the project in Mongolia. One is BOM to mandate interoperability throughout the country's payment system, i.e., mandated participant bank connection to the interbank payment system's infrastructure as an integral part of the national payment system regulation which requires all licensed banks in Mongolia to clear and settle all interbank payments through the BOM clearing and settlement system. Mandated interoperability for all card or mobile account issuers / operators as an integral part of the national payment system regulation which requires all licensed card or mobile account issuers / operators in Mongolia to provide full interoperability between card accounts, mobile accounts and conventional bank accounts, and with all related interbank transactions cleared and settled through the BOM clearing and settlement systems. Based on extensive international experience, this approach is going to speed up modernization and achieve interoperability in a fully regulated environment at the earliest possible date.

26. **Alternative solution set (voluntary incremental interoperability).** The other is to leave the implementation of the project to the mobile network operators and the retail banks. This is the approach that has been adopted in most European countries and in the United States. Under this approach, interoperability will involve creation of a number of closed loop or walled garden systems. This will lead to emergence of dominant players and after 10–15 years to a realization by the mobile network operators and the banks that interoperability and sharing of payment systems facilities are necessary for both financial and competitive reasons. The end result will be consolidation, resulting in cannibalization of equipment and software solutions—all at the cost of poor customer satisfaction and customer frustration.

27. **Least-cost analysis.** Table 2 shows the result of a least-cost analysis carried out to establish the cost differential between the two alternatives—i.e., the mandated interoperability and voluntary incremental interoperability.

Table 2: Alternative solution set and its cost implications

Solution Alternatives	**Cost estimate over the period of the Loan ($'000)**
Mandated Interoperability	21,730
Voluntary incremental interoperability	74,800
Potential Cost Saving if Mandated Interoperability is adopted	53,070