

Republic of the Union of Myanmar

FY2018 Ex-Post Evaluation of Japanese Grant Aid Project
“The Project for Development of ICT System for Central Banking”

External Evaluator: Masato Onozawa, IC Net Limited

0. Summary

This project aims to improve the operational efficiency through introducing an information and communication technology (ICT) system to the Central Bank of Myanmar (CBM) and computerizing interbank settlements in the country, thereby maintaining and improving mainly the safety and reliability of funds payments as well as government bond settlement.

With regards to consistency with the national policy of Myanmar, the project was consistent with the development plans of Myanmar such as the *National Comprehensive Development Plan (NCDP¹)*, which was a long-term national plan at the planning stage and at present, and the *Myanmar Sustainable Development Plan (MSDP²)*, the NCDP’s sub-plan for contributing to increased stability of macroeconomic policy of Myanmar through improved reliability of interbank settlement. In addition to market liberalization, economic growth and developing financial systems and standards aiming at market integration with Association of South-East Asian Nations (ASEAN), the financial sector of Myanmar has developing needs such as improving efficiency and reliability of the sector by computerization, responding to diversification of the services. The project was expected to solve many of these issues.

Further, it corresponded to Japan’s ODA policy at the time of planning, aiming at “development of infrastructure and related systems necessary for the sustainable economic development”. Therefore, the relevance of this project is high.

The undertakings pledged by Japan and Myanmar have been implemented as initially planned. As a result of the project, interbank settlements by the central bank as well as the government bond settlement in Myanmar are computerized. As a result, the computerization of settlements between bank and the securities company and the government bond settlement have been facilitated. The total project cost was within the amount initially planned. On the other hand, the project period slightly exceeded the plan, and the efficiency is fair.

In the project, the processible number of interbank settlements and the velocity of bill processing were confirmed to exceed the target values. The system has been operating stably. In addition, the qualitative effects of “improvement of ICT literacy at CBM” and “improvement in information security at CBM” and “contribution to the modernization of the financial sector” have been confirmed achieved. Therefore, the effectiveness and impacts of this project are high.

From the viewpoint of sustainability, the role demarcation is clear among system manager of CBM and system development vendors, and they are always ready to respond in case of

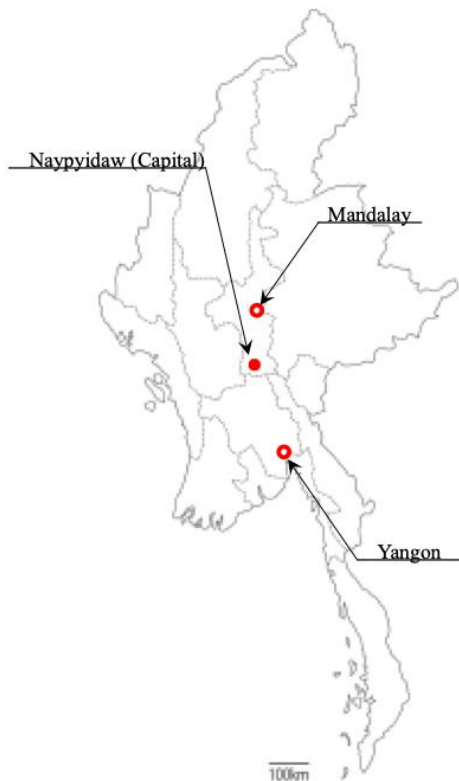
¹ The target year of the plan: 2011 - 2030.

² The target year of the plan: 2011 - 2030.

emergency situations. In addition, development of human resources of CBM to maintain a necessary level of technical infrastructure has been secured by utilizing resources supported by the on-going technical cooperation project (TCP) such as finance, technical resources, training opportunities, etc. It was confirmed that the maintenance cost borne by CBM is fully affordable level from the CBM's financial point of view. Consequently, the sustainability of this project is evaluated as high.

In conclusion, this project is evaluated to be highly satisfactory.

1. Project Description



Project Location



Magnetic Ink Character Recognition (MICR) device / sorter

1.1 Background

At the time of planning the project, the government of Myanmar was considering market-oriented economic reform and investment promotion as goals of its economic development, and was preparing for modernization of the financial sector such as deregulation of the sector and the establishment of a stock exchange. The development of an ICT system that would support the prospective market development, however, was lagging critically. As many operations at CBM, funds payments among CBM headquarters, CBM branches and commercial banks, account management of commercial banks at CBM, registration of government bond sales, were carried out manually. Improved operational efficiency and stronger data security

have been identified as priority issues for CBM. Myanmar anticipated an increased demand for cash in the market by domestic companies, increased foreign direct investment, expansion of use of banks by both individuals and firms due to liberalization and economic development; a rapid increase in the volume of transaction on both funds and data handled by the financial institutions was expected. Improvement of operations by development of application software and ICT infrastructure (collectively referred to as an “operation system”) for the Central Bank that bears a primal responsibility of overseeing various economic activities of the country was recognized as a pressing issue to address for improving the reliability of the financial sector.

Given such a situation, CBM requested the government of Japan for implementation of the project to improve operational efficiency and modernize the financial sector through development of the operation system for the Central Bank.

1.2 Project Outline

The objective of this project is to improve operational efficiency by developing an operations system of the Central Bank of Myanmar, thereby contributing to the modernization of the financial sector.

Grant Limit / Actual Grant Amount	5,100 million yen / 4,625 million yen
Exchange of Notes Date/Grant Agreement Date	October 2013 / October 2013
Executing Agency	Central Bank of Myanmar
Project Completion	January 2016
Target Area	Head Office of the Central Bank of Myanmar (Naypyidaw) and branches (Yangon and Mandalay)
Main Contractors	(1) CBM-NET Application ³ : NTT Data Corporation (2) Check Clearing System ⁴ (MCH): NTT Data Corporation (3) ICT Infrastructure ⁵ : Daiwa Institute of Research Ltd.

³ CBM-Net application comprises CBM-Net software, which is software for electronically handling settlements of the Central Bank (checking account management (RTGS), government bond registration, clearing house system, Delivery Versus Payment, collateral management of government bond), and database management system and OS that are required for running it.

⁴ MCH (Mechanical Clearing House) is an automated system for concentrated clearing that financial institutions can use to perform cashless remittances and payments by interbank account transfers. It is an automated system that provides the functions of a clearinghouse.

⁵ In addition to a system called CBM-OA which computerizes the transactions of internal office documents related to daily administration and clerical matters of CBM, ICT infrastructure includes system equipment required for CBM-NET (database server, web server, application server, terminal authentication server etc.) and terminal for users.

Main Consultants	Mitsubishi Research Institute, Inc., Promontory Financial Group Global Services – Japan, LLC.
Preparatory Survey	March 2013–January 2014
Related Projects	<p><u>Technical Cooperation</u>: Project for Modernizing the Funds Payments and Securities Settlement Systems (February 2014 - January 2018)</p> <p><u>Grant Aid</u>: The Project for the Development of Financial Market Infrastructures (August 2018- ongoing)</p> <p><u>World Bank</u>: Modernization of Public Finance Management (April 2014 - March 2019)</p> <p>Myanmar Financial Sector Development Project (December 2016 - December 2020)</p>

2. Outline of the Evaluation Study

2.1 External Evaluator

Masato Onozawa, IC Net Limited

2.2 Duration of Evaluation Study

This ex-post evaluation study was conducted with the following schedule.

Duration of the Study: August 2018–September 2019

Duration of the Field Study: November 13–December 2, 2018

3. Results of the Evaluation (Overall Rating: A⁶⁾)

3.1 Relevance (Rating: ③⁷⁾)

3.1.1 Consistency with the Development Plan of Myanmar

At the time of the ex-post evaluation, Myanmar’s national plans include the *Second Five-year Plan* based on the current NCDP revised in 2013 as a supreme national plan, and the *Economic Policy of the Union of Myanmar*⁸ prepared by the National League of Democracy (NLD), the ruling party. Among them, the 12 measures listed in the *Second Five-year Plan* consist of items closely related to this project, including “1. Expanding our financial resources through transparent and effective public financial management,” “4. Prioritizing the rapid development of fundamental economic infrastructure such as electricity generation, roads and ports, and establishing a data ID card system, a digital government strategy, and an e-government system,” “8. Achieving financial stability through a finance system that can support the sustainable

⁶ A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

⁷ ③: High, ②: Fair, ①: Low

⁸ Economic Policy of the Union of Myanmar is an economic plan formulated by NLD in July 2016, comprising 12 measures. The policy document does not specify the target year.

long-term development of households, farmers and businesses,” and “12. Identifying the changing and developing business environment both in ASEAN and beyond, so as to enable our own businesses to situate themselves to take advantage of potential opportunities.”

In addition, according to the MSDP, the latest medium-term plan, “no more than 20% of the people of Myanmar use a formal financial system such as a bank.” The growth strategy of this plan, therefore, sets to “expand the access to financial services and strengthen the entire financial system.” Consequently, it is confirmed that this project is consistent with the development plans of Myanmar at the time of both the planning and the ex-post evaluation.

3.1.2 Consistency with the Development Needs of Myanmar

At the planning stage of the project, Myanmar’s financial sector was moving ahead to make various domestic systems and standards conform to those of the ASEAN member countries and international standards under the process of market liberalization and rapid economic growth. Through the Central Banking of Myanmar Law was enacted in July 2013, CBM became independent from the Ministry of Finance. As the use of computers in banks was still limited at the time of the planning, almost all the operational processes such as internal approval of business proposals and documents, transaction records and bookkeeping, and their confirmation and storage were done on paper. Therefore, improved operational efficiency was considered an issue back in those days. In addition, most of the settlement processes were manual back then, and there were concerns about the reliability and safety of data handled by the banks. The introduction of operations software and an ICT infrastructure (operation system) into CBM’s operational processes was considered a pressing issue in order to improve the reliability of Myanmar’s entire financial sector.

At the time of the ex-post evaluation, the computerization of transactions and service diversification including the popularization of mobile banking and small settlements, and extended business hours (seven days a week and 24 hours a day) have also moved ahead in line with the economic growth of Myanmar⁹. As a base for supporting such new financial services, there is a considerable need for computerization and expanding the functions of the entire financial sector.

3.1.3 Consistency with Japan’s ODA Policy

At the planning stage, Japan’s ODA policy stated that “The economic assistance to Myanmar is significant from the perspective of providing support for the country to establish itself as a prosperous and stable country fully integrated into ASEAN, by boosting the country’s reform

⁹ Asian Development Bank. Accelerating Financial Inclusion in South-East Asia with Digital Finance. p.63 URL=<https://www.adb.org/sites/default/files/publication/222061/financial-inclusion-se-asia.pdf> , retrieved on April 10, 2019.

efforts towards democratization, national reconciliation and sustainable development.”¹⁰ In April 2012, to support Myanmar’s reform for democratization and national reconciliation, Japan changed its economic cooperation policy for the country. The scope of assistance, which was mainly provided in the conventional and the basic humanitarian areas where citizens of Myanmar directly received the benefits, was expanded to: (1) improvements in the lives of citizens, (2) capacity improvement of human resources and improvements in systems that support economy and society, and (3) improvements in infrastructures and the systems necessary for sustainable economic growth. As the project contributes to all three items, it is highly consistent with Japan’s ODA policy.

As indicated in each item above, this project is highly consistent with Myanmar’s economic policy and plans. The introduction of an ICT system into the financial sector is also consistent with the development needs at the planning stage. In addition, it is also consistent with Japan’s ODA policy at the planning. According to the above, this project has been highly relevant to the Myanmar’s development plan and development needs, as well as Japan’s ODA policy. Therefore, its relevance is high.

3.2 Efficiency (Rating: ②)

3.2.1 Project Outputs

The support provided by this project is broadly divided into: (1) CBM-NET application software, (2) MCH, (3) ICT infrastructure, and (4) capacity building program (so-called “soft component”). Regarding the software development of CBM-NET application, the work was given under a special direct contract to NTT Data Corporation, which was in charge of the BOJ-NET, a central bank system software (hereinafter referred to as “BOJ-NET”) used by Bank of Japan (BOJ), in order to secure the same level of efficiency and stability as operated by BOJ based on the request from the Myanmar side. As a system development vendor needed to be the one with relevant development experience and knowledge of the similar systems to meet the planned date of inauguration and quality, the methodology for selecting the contractor was appropriate.

Among the items undertaking required by the Myanmar side, environmental improvement at the Yangon Data Center (power sources, air conditioning, etc.) and that of the clearing house (air conditioning) were implemented as planned. In the process of project implementation, no major change took place that affect the project objective, and barring a few items, the project was implemented almost as planned. Some of the items with minor change and the reasons are

¹⁰ Ministry of Foreign Affairs. “2013 Official Development Assistance (ODA) Country Data Book – Myanmar.” URL= https://www.mofa.go.jp/mofaj/gaiko/oda/shiryo/kuni/13_databook/pdfs/01-09.pdf . Visited on February 15, 2019.

explained in the following:

- Additional racks for equipment and machines were procured for more efficient use of the installation space and to protect equipment. The changes are recognized as appropriate from both the process and maintenance aspects.
- It was decided to provide the equipment required for CBM-NET WAN¹¹ connection to two newly established commercial banks¹² and two branches of Myanmar Economic Bank, a government-owned bank. Some equipment were additionally procured and installed. The change was necessary in order to complete the interbank settlements of all banks via CBM-NET.

Table 1: Comparison of the Plan and the Result of the Project Outputs

Item	Plan	Actual	Compared to Plan
Procured equipment in CBM	(i) CBM-NET Application Software Development of software concerning the following functions at CBM •Real Time Gross Settlement (RTGS) of checking account management, government bond registration and management, and clearing house system •Delivery Versus Payment settlement (DVP ¹³), and collateral management of government bond	(i) CBM-NET Application Software •CBM-NET Application Software (1 set) (Same as left column)	As planned
	(ii) Check Clearing System (MCH) •Magnetic Ink Character Recognition devices (MICR) / sorters (6 sets) •MICR encoders (100 sets, distributed to CBM and commercial banks)	(ii) Check Clearing System (MCH) (Same as left column) •Equipment required for an MCH connection in the commercial banks that were newly established after the project started was additionally procured (MICR encoders: 2 sets).	Mostly as planned
	(iii) ICT Infrastructure •Network equipment at CBM Mandalay and Yangon branches (1 set each) •Network equipment and WAN equipment at the CBM Yangon Data Center (1 set)	(iii) ICT Infrastructure (Same as left column) •Additional procurement of equipment required for WAN connections at two banks newly established after the project started	Mostly as planned

¹¹ WAN is a wide area network which connects computers extensively via public lines and optical cables provided by telecommunications carriers.

¹² Two banks were Myanmar Micro Finance Bank, and Shwe Rural and Urban Development Bank.

¹³ DVP (settlement) stands for Delivery Versus Payment, which enables simultaneous settlements of funds and national bonds between banks that have checking accounts and national bonds accounts in the central bank. It is an agreement to condition the delivery of securities and payment of charges collaterally and to prevent one side from being executed until the other side has been processed. This is a method and mechanism to avoid the risk of "failure to settle a payment," in which instead of paying the funds (or securities) as part of the settlement of securities, the securities (or funds) cannot be received as value from the trading partner.

	<ul style="list-style-type: none"> •Facilities and equipment at CBM Naypyidaw Head Office (1 set) •Facilities and equipment at CBM Mandalay Branch (1 set) •Facilities and equipment at CBM Yangon Branch (1 set) 		
Capacity building program (soft component)	<p>(i) The objective of the soft component: To ensure a smooth start-up of the system by CBM, into an autonomous and sustainable utilization and operation status.</p>	<p>(i) Achievement of the objective of the soft component</p> <ul style="list-style-type: none"> •During the comprehensive operation tests (from the beginning of December 2015 to the beginning of January 2016), all the established indicators were satisfied by the handover time and all works were completed by the time operations started on January 5, 2016. 	As planned
	<p>(ii) Implemented Items</p> <ul style="list-style-type: none"> •A detailed operation plan is prepared based on laws, and CBM's organizations and systems. •The quality and quantity of the manuals are secured to use and operate the CBM-NET and check clearing system (MCH system) appropriately in operations. <p>•Sufficient quality and quantity of training is conducted for the CBM staff to use this system appropriately in operations.</p> <p>•Support for the commercial banks concerned: Sufficient quality and quantity of briefings and training sessions are conducted for the staff of commercial banks to use this system appropriately in operations.</p>	<p>(ii) Achievement of the implemented items</p> <ul style="list-style-type: none"> •The system started up smoothly and access from external terminals was enabled by confirming the results of system opening and closing, smooth booting and rebooting by the reduced number of operational mistakes occurred during its operation.. •With regards to bill settlement, funds payments (local currency), funds payments (foreign currency), management of collateral, government bond management (bond registration and settlement based on the deposit and transfer), DVP, and common transaction, operation manual (draft) for CBM and the commercial banks was prepared and handed over completely. The manuals were approved by CBM and are in use. •Training was completed without duplicating the schedule or content of the TCP activities. •All CBM staff who needed to take the training participated in the training and understood to the required level. After the training was completed, the content of questions and answers was confirmed. The level of acquisition and understanding was also confirmed through observing operations. •A briefing was held for two 	As planned

	<ul style="list-style-type: none"> •The operations plan to operate this system appropriately after the start-up is prepared and implemented. •The work operations system (organizational structure, segregation of duties, regulation of authority, appropriate recruitment, etc.) for the CBM-NET and MCH is established. •A maintenance system made up of the CBM system-related departments and system-related external contractors is established. 	<p>responsible persons each at the commercial banks who will use this system. The operational status was confirmed via daily reports, and the level of acquisition and understanding was confirmed.</p> <ul style="list-style-type: none"> •Comprehensive operational tests were conducted using the actual operations system. •Responsibility assignments for each member of staff and liaison system were clarified. •Help desk was established to serve as a contact point for any problems that occurred. •Short meetings are held regularly, and a cross-work operations system was established. •A liaison (the customer relations) between the commercial banks and CBM, and to the person in charge at Japanese system development vendor when necessary, established at the vendor's branch in Myanmar in case problems occurred. •A strict management system has been established for entering the Data Center. 	<p>As planned</p> <p>As planned</p>
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Source: Prepared based on documents provided by JICA.

3.2.2 Project Inputs

3.2.2.1 Project Cost

The total project cost for this project was 4,626 million yen against the planned 5,120 million yen. In comparison to the plan, this represents 90%, staying within the plan. Table 2 indicates the actual values compared to the planned values for the responsibility share between the Japanese side and the Myanmar side.

Table 2: Project Cost

		Plan (Million yen)	Actual	Actual/Plan
a	Cost borne by Japan	5,100	4,625	90.7%
b	Cost borne by Myanmar ^(*1)	20 ^(*2)	0.7 ^(*3)	3.5%
c	Total project cost (a + b = c)	5,120	4,626	90.4%

Source: Cost borne by Japan (plan / actual), cost borne by Myanmar (plan): Documents provided by JICA; Cost borne by Myanmar (actual): Documents provided by the executing agency.

*1:Source: JICA (2013) . Final Report, Preparatory Survey on the Project for the Development of ICT System for Central

Banking . The cost of environmental improvement at the Yangon Data Center and its clearinghouse, strengthening

accounting and ledger system, communication costs during the execution period were calculated into Japanese Yen because the amount shown in the report was in Myanmar Kyat (MMK).

*2: The calculation was based on the monthly average exchange rate to the yen in at the time of planning in November 2013. JPY 1.0 = MMK 0.1024572.

*3: Expenditure borne by Myanmar side was in MMK. MMK 6,600 thousand MMK 0.104598 = 0.7 million yen, calculated by average monthly rate from October 25, 2013 to January 5, 2016. Note that other expenditure such as the fees for A/P (Authorization to Pay) and remittance have been borne by Myanmar side. The total amount has not been disclosed at the time of the evaluation.

The cost borne by Japanese side (a) is 4,625 million yen, 90.7%, compared to the planned 5,100 million yen. As for the difference between the actual and planned, the cost-saving was made by accumulating by careful review of specifications and minor changes of equipment and changes in specifications, etc. of items related to the ICT infrastructure required for the CBM branch office. In addition, the overhead cost constituting the ICT procurement were reduced according to the information provided by JICA.

Design changes were made twice during the ICT infrastructure procurement. As a result of the redesign, the ICT infrastructure procurement costs increased by 38 million yen from the initial contractual price of 1,896 million yen to 1,934 million yen. The increased amount was a 2% over the original bid price. The reason for the increase was that although initial target was 48 financial institutions, two new banks were added to cover all financial institutions in Myanmar. In addition, additional procurement of racks necessary for proper management of equipment is another reason. Compared to the increase of the costs, a larger effect was realized.

The cost for telecommunication for the network during the construction period has not been borne by CBM until August 2018, based on an arrangement with the Myanmar state-owned postal and telecommunications carrier (MPT).

3.2.2.2 Project Period

The project period was 28 months compared to 27 months originally planned, exceeding the plan slightly by 104%.¹⁴ The period of the project designated originally in the ex-ante evaluation was for 26 months (from November 2013 to December 2015 (date of completion)); the actual date of G/A was executed earlier date on October 25, 2013. Thus, a comparison was made taking October 2013 as a starting point and making the project period 27 months. As the actual completion date (inauguration of the operation) was on January 5, 2016, therefore the total project period was 28 months. The scheduled date of the start of the operation was appropriate from the perspective for avoiding any negative impacts on banking services and markets by ensuring safe system transfer.

¹⁴ CBM switched to the new settlement system during the five day-long New Year holiday between December 31, 2015 and January 4, 2016, and resumed its operation on January 5, 2016. Although the one month difference in the difference in calculation of the comparison used for the ex-post evaluation was only five days during the New Year holidays, the calculation of the ratio of the actual duration against plan was based on a monthly basis and was calculated as 104%.

Table 3: Project Period

	Plan	Actual	Actual/Plan
Project period (detailed design/bidding and system development/ installation/test operations)	27 months	28 months	104%

Source: Documents provided by JICA and the executing agency

According to the above, although the project cost was within the plan, the project period exceeded the plan. Therefore, the efficiency of the project is fair.

3.3 Effectiveness and Impacts¹⁵ (Rating: ③)

3.3.1 Effectiveness

3.3.1.1 Quantitative Effects (Operation and Effect Indicators)

The effectiveness of this project was evaluated based on two indicators set at the time of planning, (1) the number of transactions processed (transaction/day), (2) time taken in check clearing operations (second / check). Table 4 indicates the baseline, target, and actual values of these indicators.

Table 4: Quantitative Indicators

Indicator ^(*1)	Baseline	Target	Actual			
	(2013)	(2018) 3 Years After Completion	2015	2016 1 Year After Completion	2017 2 Years After Completion	2018 3 Years After Completion ^(*3)
The number of transactions processed (transaction/day) ^(*2)	500	5,000	N/A	5,000	5,000	5,000
			90	243	379	698
Time taken in check clearing operations (second/check)	4.2	0.3	4.2	0.2	0.2	0.2

Source: Executing Agency and Preparatory Survey Report.

*1: The numbers indicate the processing capacity of the introduced system, transaction/day or second/ transaction.

*2: Actual maximum number of transactions in a day is indicated in the lower cells.

(1) The number of transactions processed per day

According to the data provided by CBM, the “the number of transactions processed (transaction/day)” indicates the maximum capacity that can be processed by the provided system. The system has achieved 5,000, the target value for transaction capacity at completion of the project in January 2016.¹⁶In addition, even if there will be active transactions of interbank settlement in the future which significantly exceed the current level of a little less than 700, the

¹⁵ Sub-rating for Effectiveness is to be put with consideration of Impacts.

¹⁶ Indicator at the time of planning (5,000 transactions/day) is calculated based on the forecast that transaction capacity will be ten times that of 500 transactions/day, the capacity at the time of the planning. Logic behind ten times is based on the productivity improvement achieved by introduction of MCH, wherein the check clearing operation (30 minutes/check) will be three minutes/check, one tenth of the time.

system can process them fully when the interbank settlement would become much more active in the future market.

The actual result of interbank bill transactions after the project completion was also checked in the ex-post evaluation. The number of bank settlements is increasing annually even after 2015 when the project was completed. The maximum number of interbank settlements processed up to date was 698 on October 26, 2018. As the number of settlements in Myanmar is still small, the processing capacity of the system is more than adequate. In addition, this system has been operating stably without any hindrance to settlements since it started operations. Therefore, it is possible to judge that the targets were achieved.

(2) Time taken in check clearing operations per transaction

Another indicator, “processing time per clearing” exceeded the target value (0.3 second/case). The target value also serves as the system specification. Currently, bills are processed stably at a speed faster than the goal¹⁷.

Consequently, these two indicators satisfy the target, and the capacity to fully respond to the number of both interbank settlements and increased bill transactions expected in the future increase in Myanmar has been made available. Therefore, the effectiveness of this project can be evaluated as high.

3.3.1.2 Qualitative Effects (Other Effects)

The qualitative effects set at the planning stage, “(1) improvement of ICT literacy at CBM”, and “(2) improvement in information security at CBM” were evaluated as impacts, because they are expected to be achieved through operation and maintenance of the ICT system when the system in the Central Bank is significantly improved by the implementation of the project (The result of the evaluation is explained in next section “3.3.2 Impacts”).

3.3.2 Impacts

As mentioned above, in addition to “(1) improvement of ICT literacy at CBM ”, and “(2) improvement in information security at CBM ”, “modernization of the financial sector” mentioned as the project objectives in the ex-ante evaluation was evaluated.

¹⁷ The indicator (0.3 second/ transaction) were calculated based on the actual transaction observed at then-Yangon Branch (2,550 checks were processed within three hours by hand, equivalent of 4.25 seconds per transaction as a basis of analysis. Some 6,350 checks would be processed by 2018 if the total volume of transaction would increase by 20% annually and these checks would be processed by planned MCH within 30 minutes. Accordingly, the estimate indicators were calculated by 0.3 second per transaction.

3.3.2.1 Intended Impacts

(1) Improvement of ICT literacy at CBM

According to the interviews with CBM officers, most of the banking services have been computerized and information-processing equipment needs to be used on a daily basis. As one specific example of change, knowledge and skills have significantly improved in relation to handling digitized ledgers, PC skills, and other operations in connection to computerization. About the introduction of CBM-NET, 100 PC terminals to be used by the staff of at the offices of CBM were installed for day-to-day bank operation, and all bank operations such as payments, settlements, financial fund management, and issuance and sales of government bonds were transferred onto the ICT system. The use of PC terminals installed in the bank for daily operations became a prerequisite for the staff engaged in these operations, and the acquisition of operational knowledge and skills became essential.

In addition, because of the transfer of operations to the ICT system, all the paper-based information (ledgers) was transferred to digital data. As a result, major changes have been observed in the operations themselves; for example, integrated financial information between head office and branches, access to more accurate information, expedited decision-making, and more precise analysis became possible. Particularly, ledger digitization allowed the bank staff to be released from labor-intensive operations such as registering and data retrieval, freeing up human resources to concentrate on operations related to analysis and decision-making. Accordingly, it is fair to say that “improved in-house information literacy” is fully satisfied.



Storage conditions of prepared settlement documents before the start of this project (CBM head office)



ICT system users are managed via biometric authentication (CBM head office).

(2) Improved knowledge related to information security at the Central Bank

The following was clarified through the field survey on the changes in information security knowledge at the planning stage and at the time of the ex-post evaluation. Firstly, a security policy aligned with the importance and frequency of use was established for each introduced

system. For example, access rights to the system are limited to those bank staff actually engaged in operations. This is considered a matter of course in day-to-day operations. Therefore, it can be confirmed that an understanding of the need for a security policy and operational readiness have been well established.

Secondly, when the evaluator visited the Yangon Data Center, he experienced a very strict security clearance (prior permission, sending of ID, limited places to enter, photography prohibited, etc.) and could confirm the ongoing practice on-site. As it was mostly accessible without strict control and procedures to enter the office rooms at CBM prior to the project, a major improvement was observed in operational rules such as entry to the office rooms and the Data Center, which is an important facility, and it was confirmed that operations are performed in line with the information security rules.

(3) Contribution to modernizing the financial sector

The largest contribution of this project to modernizing the financial sector is that it became possible to perform interbank transactions digitally on a single system. The following are examples of specific service improvement: (1) real-time settlement, (2) dematerialization of government bonds, (3) DVP, (4) online systematization of collateral management of the central bank, (5) mechanized check clearance, (6) digitization and online systematization of interbank settlement, (7) improvement of remittance security, (8) opening of interbank markets¹⁸, (9) issuance of government bonds, (10) overdraft contracts¹⁹, etc.

All settlements such as buying and selling of government bonds, government payment settlements, and bill and check clearing, which had been performed through clearing securities, and real checks and bills or via paper-based ledgers in each branch of CBM and the commercial banks, were integrated into a single system of the CBM-NET. This can be evaluated as a very significant change to Myanmar's entire financial business so that it functions from an integrated base.

The project has been particularly effective by focusing on the settlement services of all commercial banks in Myanmar and providing all banks with full support. The implementation of this project not only makes the transaction status of all banks immediately available, but also the reduction of systemic risk involved in settlement (e.g. dysfunctions such as insolvencies in individual financial institutions and specific markets). It also contributed to the prevention of adverse effects occurred such as risks spreading from one financial institution to other markets.

¹⁸ The interbank market is a venue where financial institutions sell and buy funds of each other. Its function is equivalent to the wholesale market of the foreign exchange market in contrast to the retail market. Its players include central bank, commercial banks, and securities company.

¹⁹ Overdrafts are made by financial institutions such as banks engaged in deposit and lending businesses (in this case, CBM), and to current account customers (in this case, commercial banks). It is a form of provision of credit from central bank to commercial banks by paying out checks or bills beyond the balance, withdrawing or settling cash, within the maximum amount and period previously agreed to by the overdraft agreement.

In addition to the fact that the CBM has established the above-mentioned common foundation (a platform) of the financial sector, CBM is the central bank independent from the government based on the rules and principles that have been improved compared to the past few years. It is defined as the modernization of finance that financial services based on regulation are provided. It is the various effects and changes that occur as the day-to-day business processes and transactions that are digitally and automatically documented. Specifically, the recording of settlements and transactions has resulted more efficient and accurate clerical work, and the labor-saving enabling CBM to monitor and supervise commercial bank transactions that was previously impossible. Whereby CBM is able to spare its human resources to areas where CBM can play more significant roles and responsibilities in its mission, such as monetary policy.

There were positive impacts to the financial sector of Myanmar from these perspectives.

3.3.2.2 Other Positive and Negative Impacts

(1) Impacts on the Natural Environment, Resettlement and Land Acquisition

As all the information terminals are installed within the head office and branch offices, it can be confirmed that the environmental impact is negligible. As a result of confirming the newly constructed Data Center on-site, which is built on the premises of the CBM Yangon branch, neither topographic changes (embankment, leveling of ground, etc.) nor resettlement of residents due to construction work did not take place. There is no impact on the neighborhood and existing users either. Therefore, it could be confirmed that there are very limited on the natural environment, resettlement, and land acquisition.

It is fair to say that improving the efficiency of banking operations through digitizing the ledgers and dematerializing securities also had a major effect from the perspective of environmental load reduction as a result of introducing the system. Previously, it took much time and labor, and a large environmental load was generated as the transfer of funds, security as well as transaction information was required between the central bank and commercial banks. By implementing the project, such as the digitization of settlements and dematerializing government bonds, transfer of goods, information and employees has been significantly reduced.

(2) Financial inclusion

In the CBM survey and interviews, there was a comment that this project contributes to financial inclusion. In Myanmar, as the percentage of the people with access to the financial system is low, the people tend to depend on informal finance. By computerization, it can be expected that the infrastructures such as mobile payments that provide easy access and convening financial services safely will become more accessible, and the use of financial institutions by those who have not accessed will increase.

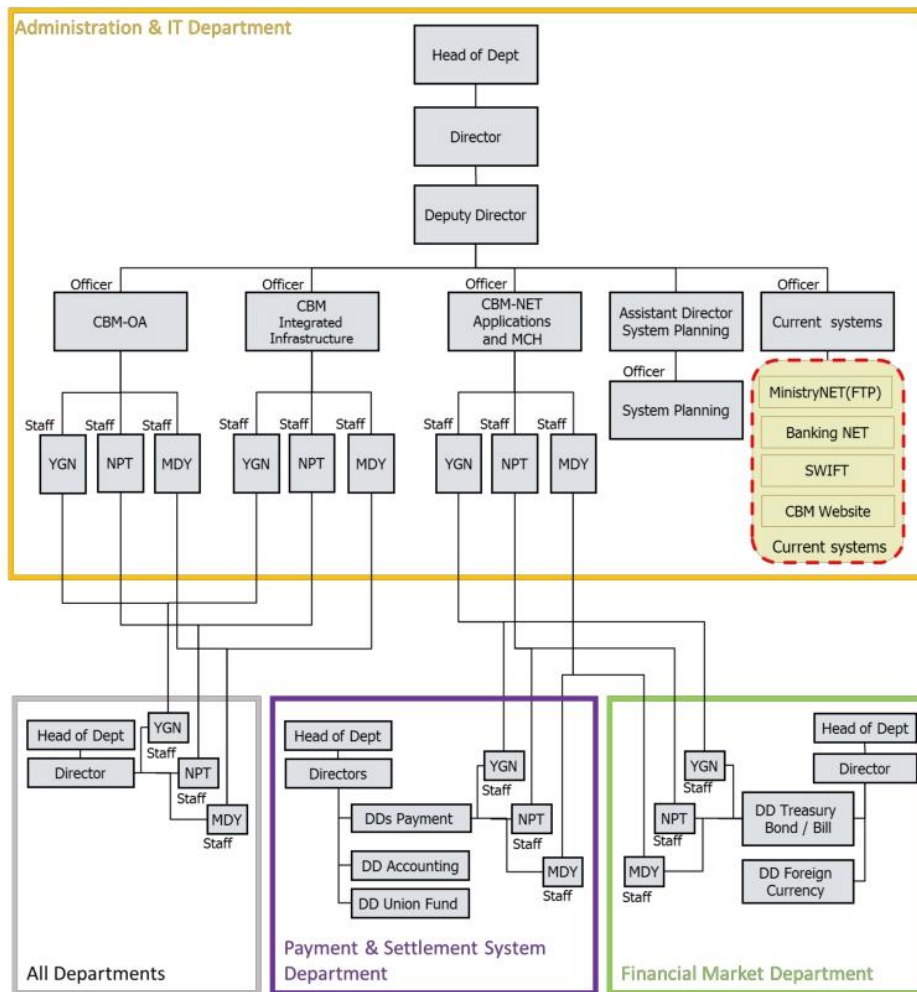
According to the above, this project has achieved its objectives as planned. Therefore, the effectiveness and impacts of the project are considered high.

3.4 Sustainability (Rating:③)

3.4.1 Institutional/Organizational Aspect of Operation and Maintenance

In the comprehensive operation tests started in November 2014, the operations structure was also tested for the actual operations. CBM established a system operations structure and assigned the required personnel (Figure 1). According to the documents provided by JICA, it was confirmed that the responsibility assignment of each staff member, a service desk system as a liaison, which serves as the focal point for both the commercial banks and CBM, have all been established. In addition, the comprehensive tests were conducted with the actual operation structure to ensure it will function when the operation starts. According to the questionnaire survey to CBM conducted during the ex-post evaluation, it was confirmed that this operations structure has been maintained.

On the other hand, securing the personnel is an issue in order to operate the maintenance structure. A shortage of manpower is expected with just the current 34 staff members to respond to system maintenance, management and operation, as well as to handle the planned system expansion at the time of the ex-post evaluation (Table 5). Therefore, CBM is currently working on securing more personnel. However, it is difficult to secure highly capable staff necessity by fulfilling the number of able personnel as there is a disparity in salary levels of system engineers employed by private sector and CBM staff, who are government officials.



Source: Preparatory Survey Report

Figure 1: CBM Organization Structure for ICT Operation

Table 5: Number of Staff Engaged in ICT System Maintenance

Year	No. of staff (No. of personnel at the beginning of the year)
2015	18
2016	22
2017	22
2018	34

Source: Materials provided by CBM

During the survey, it was found that an internal help desk has been established by the vendor, which has developed the system, to respond to possible inquiries on ordinary troubles or operational issues from departments of CBM and the commercial banks. The contacts of vendor responding to the inquiry in case of problems and emergency are posted locations visible from the PC terminals easily. The same notice was also posted in the commercial banks when the

evaluators visited (Figure 2 and Table 6). As discussed above, a system to provide prompt technical assistance has been established in case of any incidents which might occur in the new ICT system. Consequently, it is fair to say that the maintenance structure was established satisfactorily and there is little concern that any problem that occurs will affect banking operations.

Table 6: Role Demarcation Among the Contractors in Charge of Maintenance

Scope of Work	Area to be Covered	Responsible Contractor
CBM-NET infrastructure CBM-OA support	Hardware, license, and maintenance	DMS Ltd.
CBM-NET application support	License and SE service (maintenance)	NTT Data Corporation (Myanmar)
MCH support	Hardware, license, and maintenance	NTT Data Corporation (Myanmar)

Source: Documents provided by CBM



Notices in the CBM Office

(The photo was modified due to confidentiality)

Figure 2: Reporting Procedures at the Help Desk

Each department using the ICT system received the training by the consultant prior to the start of operation, and they are using the system without any major problem. The CBM-OA system installed in all departments is used without any problem for the approval of documents and the internal mail system. On the other hand, CBM-NET, which is closely related to CBM's payment operations, has been placed at each of the Payments and Settlement Systems Department and the Financial Markets Department, and has been used without problems since its operation.

3.4.2 Technical Aspect of Operation and Maintenance

According to interviews during the field survey, it was found that the operation manuals prepared in this project properly cover the content required for system operations effectively. The manual has been renewed when necessary and kept up to date by the department in charge of the operation of the system. A TCP²⁰ has been implemented at CBM since February 2014 when the project was still under implementation, with the aim of “smoothly operating, maintaining and managing the ICT system for central banking, and developing the environment for CBM to strengthen its financial policy operations.” In addition, a grant aid project²¹ as a succeeding project, started with the aim of “contributing to supporting responses to increased and diversified financial transactions, adapting to international standards, and developing the infrastructure and systems required for sustainable economic growth through expanding the functions of funds payments and securities settlement systems at CBM.” A variety of activities such as expansion, connection and integration of the system introduced by this project are advancing concurrently. According to a person in charge of systems at CBM, improving the technical capacity of the system department, particularly the capacity of the staff has been recognized as a pressing issue for the department to address in order to respond to advance and complex system operations.

Improving the technical capacity at CBM is promoted in two approaches: strengthening the recruitment of IT human resources and moving forward with human resource development. Recruitment policy aims to hire those who have a strong will and a sense of mission to engage in public services such as CBM, in addition to those who have the basic skills and experience.

Using the framework of ongoing technical cooperation to develop human resources, CBM is moving forward by strengthening its technical capacity through acquiring skills related to organizational strengthening and system operations. The ICT department at CBM regularly monitors if the system is being strictly operated based on the already prepared procedures and manuals, and tries to maintain and improve the operation and maintenance services. For that purpose, the skills and knowledge required for the operation of a large-scale system is strengthened through daily education and training such as direct guidance from long- and short-term experts in OJT and participation in training and seminars. Particularly for the development of younger staff, the acquisition of qualification certifications from external organizations is strongly recommended and CBM subsidizes part of the cost for this acquisition. After acquiring qualifications, incentives are available including promotions, assignment of positions in charge of more responsible operations, and salary increases.

²⁰ Project for Modernizing the Funds Payments and Securities Settlement Systems (February 2014–January 2018)

²¹ The Project for Development of ICT System for Central Banking (Phase 2)(August 2018 - ongoing)

It was confirmed that, through these initiatives, continuous learning and maintenance of skills involving operations and maintenance are being implemented; that the technical capacity to cope with sudden issues is being secured; and that CBM is working to maintain such skills.

3.4.3 Financial Aspect of Operation and Maintenance

The maintenance cost of CBM estimated during the preparatory survey was MMK 4 billion/year (approximately 0.4 billion yen/year) if reduction measures would not be taken proactively.²² As a part of effort to strengthen the financial sustainability of CBM, it has been agreed that the cost for technical support, etc. among other maintenance cost has been borne by the TCP, limited to the duration of the TCP as a part of efforts to strengthen the financial sustainability of CBM. According to information provided by CBM, CBM bore the cost such as software license fee from 2017 and is gradually increasing its share of the costs. They have borne accumulated total of approximately 301 million yen for about three years since the operations started. Table 7 indicates the costs CBM shared that is known to the evaluator.

CBM generally has ample funds from commission income gained from government payments and buying and selling of government bonds. According to the latest financial statements (2015 – 2016) that could be obtained during the field survey, CBM’s operational profit and loss is MMK 318.6 billion (approximately 33 billion yen). The annual maintenance was estimated at approximately 0.4 billion yen/year in the plan. It is considered fully possible for CBM to also secure the necessary funds in the future as the maintenance cost account for only 1.3 percent of the operational profit and loss, in addition to which CBM has started sharing part of these costs. Furthermore, with regards to part of the maintenance cost associated with the installation of terminals in the commercial banks, CBM is requesting the commercial banks for appropriate sharing according to the size of the business based on the benefit principle and has started collecting costs from some of the banks. Therefore, CBM’s financial sustainability is considered high based on above information.

Table 7: Maintenance Cost Borne by CBM

	Maintenance costs (fiscal year)				Accumulated Total
	April 2016 – March 2017	April 2017 – March 2018	April 2018 – September 2018 (*2)	October 2018 – September 2019	
Maintenance cost borne by CBM ^(*1)	MMK 899,970,000.00 (77 million yen) @ 11.62MMK=1yen)	USD 706,713 (78 million yen) @ 110.4529	MMK 803,133,586.20 (62 million yen) @ 12.81MMK = 1 yen)	USD 754,131.08 (Budget) (84 million yen) @ 111.7200	301 million yen

Source: Documents provided by CBM

*1 The cost for maintenance of IT infrastructure (warranty for hardware, software license fee, etc.)

²² Preparatory Survey Report. p.100.

*2 The fiscal year of Myanmar has begun from April until March next year, same as that of Japan. It was changed to October to September next year since 2018.
(Each currency exchange rate adopted the mean value from the first day to the last day of the relevant month.)

3.4.4 Status of Operation and Maintenance

Based on the operation and maintenance plan formulated at the planning stage, CBM carries out the operation and maintenance of its operation system. The operation and maintenance of the operational ICT systems is supported by the on-going TCP of JICA. At the beginning of the start of operations, the transaction status between CBM-NET and MCH was monitored with assistance given by the TCP team. CBM outsources a part of its maintenance work to system development vendors to secure the confidentiality of the system.

According to the interviews with the banks, the terminals installed in each commercial bank are maintained by CBM and all are being maintained and managed properly.

It was confirmed visually during the field survey as part of the ex-post evaluation that the maintenance of the system provided to CBM is being properly conducted.

Consequently, no major problems have been observed in the institutional/organizational, technical, financial aspects and status of the operation and maintenance system. Therefore, the sustainability of the project effects is high.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project aims to improve the operational efficiency through introducing an ICT system to the Central Bank of Myanmar (CBM) and computerizing interbank settlements in the country, thereby maintaining and improving mainly the safety and reliability of funds payments as well as government bond settlement.

With regards to consistency with the national policy of Myanmar, the project was consistent with the development plans of Myanmar such as the NCDP, which was a long-term national plan at the planning stage and at present, and MSDP, the NCDP's sub-plan for contributing to increased stability of macro economic policy of Myanmar through improved reliability of interbank settlement. In addition to market liberalization, economic growth and developing financial systems and standards aiming at market integration with ASEAN, the financial sector of Myanmar has developing needs such as improving efficiency and reliability of the sector by computerization, responding to diversification of the services. The project was expected to solve many of these issues.

Further, it corresponded to Japan's ODA policy at the time of planning, aiming at "development of infrastructure and related systems necessary for the sustainable economic development." Therefore the relevance of this project is high.

The undertakings pledged by Japan and Myanmar have been implemented as initially planned. As a result of the project, interbank settlements by the central bank as well as the government bond settlement in Myanmar are computerized. As a result, the computerization of settlements between bank and securities company and the government bond settlement have been facilitated. The total project cost was within the amount initially planned. On the other hand, the project period slightly exceeded the plan, and the efficiency is fair.

In the project, the processible number of interbank settlements and the velocity of bill processing were confirmed to exceed the target values. The system has been operating stably. In addition, the qualitative effects of “improvement of ICT literacy at CBM” and “improvement in information security at CBM” and “contribution to the modernization of the financial sector” have been confirmed achieved. Therefore, the effectiveness and impacts of this project are high.

From the viewpoint of sustainability, the role demarcation is clear among system manager of CBM and system development vendors, and they are always ready to respond in case of emergency situations. In addition, development of human resources of CBM to maintain a necessary level of technical infrastructure has been secured by utilizing resources supported by the on-going TCP such as finance, technical resources, training opportunities, etc. It was confirmed that the maintenance costs borne by CBM is fully affordable level from the CBM’s financial point of view. Consequently, the sustainability of this project is evaluated as high.

In conclusion, this project is evaluated to be highly satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

(1) Continuation of capacity development

CBM fully understands the need to continue to improve their mid- and long-term operational capacity through planned development of human resources. In anticipation of completing the series of support from JICA, it seems necessary to invest continuously in the ongoing strengthening of human resources, organizations and systems. At present, with the TCP and proceeding grant aid project, “Project for the Development of Financial Market Infrastructures (August 2018 – ongoing)”, is underway, it needs to strengthen the technical capacity towards the expansion and enhancement of CBM-NET as projected, establish the capacity to use vendors effectively, and establish an organization to operate, maintain and manage the CBM-NET.

(2) Necessity of the CBM business plan (roadmap)

In anticipation of the ongoing TCP and the proceeding grant aid project completing, it is important to develop a plan to improve settlement system (roadmap) including securities for the next five years and ten years for after completion of these projects. Introduction and evolution

of ICT systems in the financial sector is extremely rapid, grasping the overall picture of development of financial sector by formulating the roadmap indicating the future plan and implementing it gradually will contribute to development of the financial sector as a whole. Using the resources used to formulate a sector plan proposed by the World Bank at time of the ex-post evaluation, it would be desirable for CBM itself to initiate describing what the settlement system of Myanmar should be in the future.

4.2.2 Recommendations to JICA

None.

4.3 Lessons Learned

(1) Effects emerged because of long-term support provided jointly with multiple cooperation schemes

In this project, clear effects emerged because of providing integrated support through grant aid and technical cooperation. Through continuously supporting the operation, maintenance, and management by providing technical cooperation after having developed the system and infrastructure (provision of equipment) with grant aid, the effects of the invested grant aid became steadily apparent. In addition, through dispatching Japanese experts to CBM including those from the BOJ through the technical cooperation scheme, a support was provided from the BOJ, so its knowledge and operational experience was fully utilized for expanding BOJ-NET, the core system of the Bank of Japan, to overseas for the first time. Furthermore, through seminars and workshops as part of multiple schemes of ODA, long-term multifaceted support has been provided including proposals on effective financial measures for undeveloped short-term financial markets, responses to contingencies such as settlement impossibilities at commercial banks, and dialogue to enable CBM to function more effectively as a central bank. In this way, it is considered that providing any possible support such as technical cooperation, seminar and training in Japan immediately after a grant aid project is effective for ensuring effects to emerge. One of the proofs of recognizing importance of collaboration between a TCP and a grant aid project is shown in this project being able to deliver the effects early. As in the case of this project, in similar projects where the implementing agency lacks the facility and functions to be provided at the time of planning, or challenges in operation and utilization after the delivery of the system expected, or there is space for further expansion or strengthening after the grant aid project is completed, implementing TCP immediately after the project is considered effective.

(2) Effective use of Japanese knowledge

The introduced operational ICT system was developed in a comparatively short period and is operated without any major problems. As background, it can be pointed out that a combination of multiple initiatives was implemented to enable Japanese knowledge to be used effectively.

Firstly, this project was based on BOJ-NET, whose safety and stability have been proven as the settlement system of a central bank. BOJ-NET has a proven track record of operating safely and stably without major problems since it started operations in 1988. Through development based on this system, it was possible to introduce an operational ICT system to CBM in a comparatively short period.

Secondly, a Japanese system development vendor knowledgeable in planning and design were selected through a single tendering. In addition to entrusting the firm that has developed and operated BOJ-NET together with BOJ utilizing a single tendering, operation and maintenance work after the completion of the system has been assigned. In this way, the knowledge and experience of BOJ-NET development and operations were fully applied to this project.

Such an approach helped reduce the risks associated with an ICT system development with a high degree of difficulty. As no major problems or accidents have occurred since operations started in January 2016, it was an appropriate decision to have based the project on BOJ-NET knowledge and experience, also from the perspective of system reliability and safety. This experience can be used as a reference for future projects for supporting introduction of operational ICT system whose main focus is settlement at central banks.