



Informatics Services Corporation

# ***CHAKAVAK Project***

***(Iranian Cheque Imaging System)***

***CMS 2.0 (2014 - 2015)***

## Recommendation Form

Recommended Project:

CHAKAVAK project ( Iranian Cheque Imaging System )

Category :

- Trade Facilitation
- Electronic Business in Public Sector
- Electronic Business in Private Sector
- Bridging Digital Divide
- Special Honorary

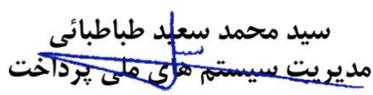
Recommended by:(in print by the HOD)

Rational:

Signature of the HOD:

Date:

### Application Form

Country/Economy: The Islamic Republic of Iran	Date: Jun 4, 2015
Project Title: The CHAKAVAK project ( Iranian Cheque Imaging System )	
Organization: Informatics Services Corporation (ISC)	
Category : <input type="checkbox"/> Trade Facilitation <input type="checkbox"/> Electronic Business in Public Sector <input checked="" type="checkbox"/> Electronic Business in Private Sector <input type="checkbox"/> Bridging Digital Divide <input type="checkbox"/> Special Honorary	
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Signature: 	

**Project Title:** CHAKAVAK Project (Iranian Cheque Imaging System)

**Project Leader Name:** The Central Bank of Iran (CBI)

**Organization/Company:** Informatics Services Corporation (ISC)

**Nominated by:** The Central Bank of Iran (CBI)

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## Abstract

CHAKAVAK is an automated Cheque Imaging System for interbank cheque which enables the transfer of cheque data and images electronically rather than transferring paper cheques between banks to better meet the needs of end users. Cheques continue to play a vital role in the Iranian payments systems and economy. CHAKAVAK not only enhances national trade and e-Business, but it also integrates with the existing large core banking systems. All Iranian banks interact with CHAKAVAK seamlessly.

There are 2 phases of the CHAKAVAK Project. The first phase was launched in February 2014 and concluded in September 2014. It was fully supported by the government resources as well as the CBI (Central Bank of Iran). In this phase all 34 governmental and nongovernmental participants got trained. Moreover, during these eight months, all participating banks started interacting through their CMS workstation<sup>1</sup> to initially send the request to CHAKAVAK and subsequently respond to their cheques. Beside these, in this phase the participants worked hard to be familiarize with the CHAKAVAK system and also, worked on their core banking system to interact with CHAKAVAK.

The second phase of CHAKAVAK Project was launched in September 2014. In the beginning of this phase, only 4 out of 31 states were included. In this phase, based on a timely schedule, CHAKAVAK was deployed in all other states. Final state added was Khorasan which had a ceremony in June 2015.

Since the project started in 2014 until now, 3000 clearing room centers were closed and more than 50000 clearing room's employees were trained during both Phases I and II of the CHAKAVAK project. The CHAKAVAK project has become a platform for the cheque imaging system.

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<sup>1</sup> CMS Workstation: Cheque Management System Workstation interface.

## Executive Summary

Payment systems are placed at the heart of the economy. By the end of 2014, all of Iranian's banks used a new method of processing cheques known as cheque imaging system (CHAKAVAK), instead of processing and storing paper cheques. Participant banks can now easily scan the cheques to capture digital images, send the image through this system to the debtor banks, and store the cheque in electronic archives.

Although Iranian banks had long recognized the potential of cheque imaging technology, such projects were considered too expensive to deploy and accommodating business requirements were estimated to take too long. Now, using vastly improved technology and low costs, CHAKAVAK has made cheque imaging a viable option for processing and storing cheques.

The CHAKAVAK currently assesses, validates and settles more than \$1 million in transactions during each business day. Moreover, the shift to image-based cheque clearing not only results in faster and more efficient processing, but also allows the introduction of new services for customers, offering greater convenience and quicker access to information about their cheques. The imaging system also makes the detection of fraudulent cheques easier.

The main objectives of CHAKAVAK is to introduce electronic cheque to the Payment Systems, as well as enhance the monitoring and governance of CBI over the lifecycle of cheques to detect and prevent Money Laundering in financial institutions. What is more, the CBI has a role that it can cancel the cheque request or response, according to the governance role over all Iranian banks. In addition, it can control the CAP<sup>2</sup> parameter of each participant, which is a critical parameter in RTGS<sup>3</sup> system.

In the past, customers deposited cheques at bank branches. At the end of each operational day, these cheques were bundled and sent to one regional processing centers known as a Clearing Room, where the value of each cheque is evaluated. Then, the cheques were re-sorted to verify the number and total amount of cheques received. Finally, they were sorted by the branch holding the account on which the cheque originated from. Finally, this kind of system cleared with physical exchange of documents. (Figure. 1 old clearing room schema)

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<sup>2</sup> Maximum allowed multilateral participant position

<sup>3</sup> real-time gross settlement system - RTGS

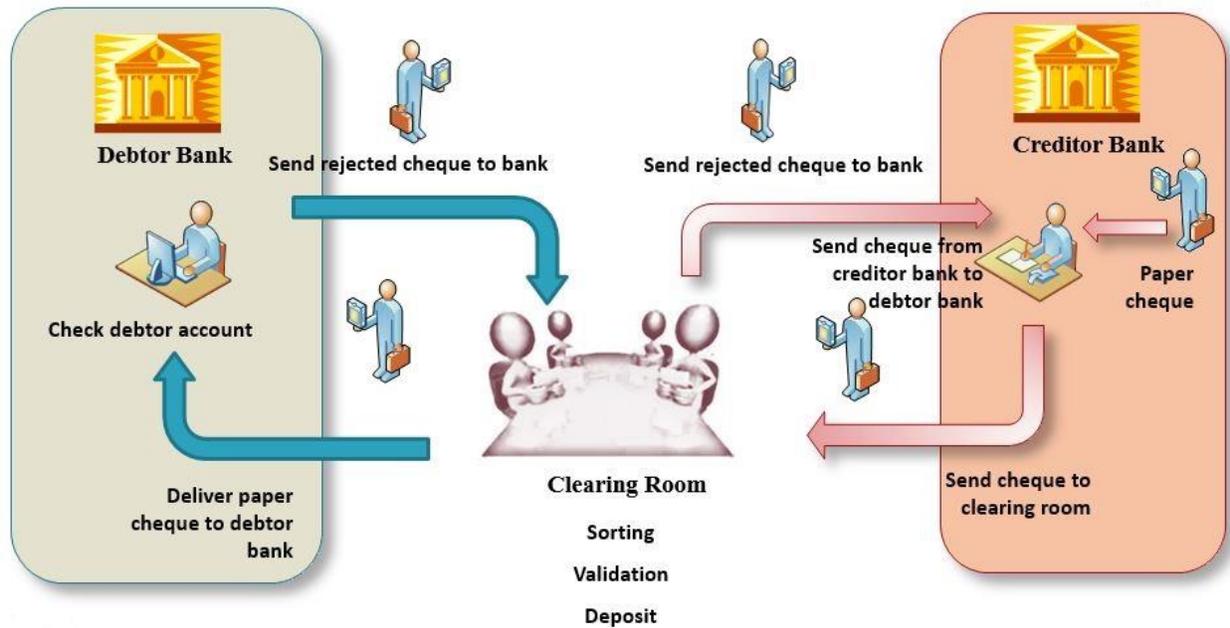


Figure. 1 old clearing room schema

The clearing and settlement of cheque used to be very time consuming. Also, some nongovernmental banks could postpone the settlement process up to 48 hours. These types of activities can be categorized as Money Laundering. In addition, if such money laundering happened, it was difficult to find out due to lack of IT infrastructure.

As a result the cheque imaging systems are less dependent on air and ground transportation networks, making them less vulnerable to delays. On the other hand, CBI (Central Bank of Iran) can control and monitor the life cycle of cheque settlement. Moreover, CBI has a major role in all financial institutions and the CHAKAVAK is a valuable way to monitor all of the participating financial institutions.

# Project Content

## Project scope

The scope of the CHAKAVAK includes all Iranian banks, which consists of over 5000 branches all around the Iran. Each branch is able to send a cheque request from the CMS workstation interface to CHAKAVAK. The CMS workstation is an interface that acts as the clearing section of branch interacting with CHAKAVAK. CMS workstation is a user friendly interface that cover all branch's needs. This interface is compromise of sections required to send cheque, reporting, summery of transaction, etc.

CHAKAVAK is a main switch to assess, validate and settle the final state of cheques among creditor bank and debtor bank. Firstly, a creditor bank send the cheque request to CHAKAVAK, then the request is evaluated and validated at CHAKAVAK, then it is sent to the debtor bank. Afterwards, the debtor bank withdraws from the debtor customer account, then sends the response to CHAKAVAK. Finally, the creditor received the final status of the cheque. The CHAKAVAK is the main system where all these transactions take place, but both creditor bank as well as debtor bank have an interface to interact with the CHAKAVAK system. (Figure. 2 CHAKAVAK schema)

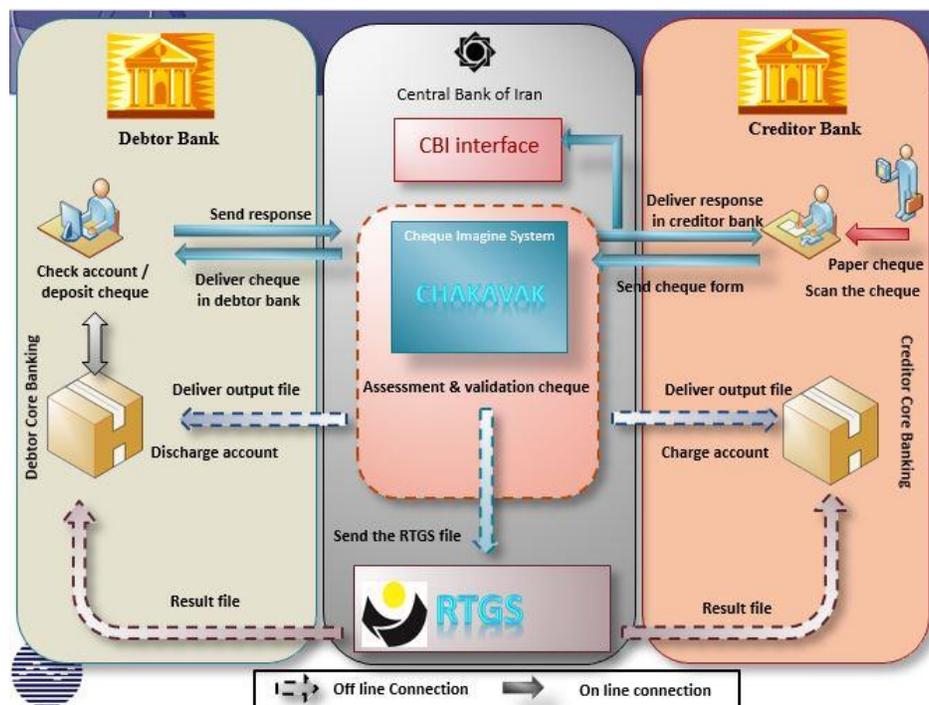


Figure. 2 CHAKAVAK schema

What is more, CHAKAVAK can recognize the end user cheque data that is hidden in QR Code of the cheque image. This feature can effectively aid and control the bank's employee so CHAKAVAK can interact with creditor/debtor banks reducing manual tasks. This is a configurable feature in CMS workstation, which can be enabled during user input of cheque data in sending cheque form. On the other hand, the MCIR<sup>4</sup> technology is another way to store hidden cheque data on cheque. Indeed, this process uses ink with magnetic resonance to print characters on the bottom of each check indicating the routing and transit (R/T) numbers of the clearing bank, the account number on which the check is drawn, and the check number. Thus, the QR Code brings about more beneficial features on cheque imaging system compared with MCIR technology.

CHAKAVAK is a bilateral application in Persian and English languages. This application has a feature that can add support for other languages with simple configuration. But currently it only supports two languages.

CHAKAVAK allows financial institution clients (Banks) to search for cheque images quickly and easily based on:

- Date and Time
- Amount
- Account
- Transit
- Transaction code
- Currency
- Creditor/Debtor bank
- Trace number

Another objective of the CHAKAVAK was to uniform the financial institutions infrastructure. Which means that, all participants need to have cheque scanners to be able to produce output files for CHAKAVAK system, and an acceptable network connection to the (NiBN). Some banks current bandwidth of banking's network did not support the value of cheque data, so they had to re-establish the network band width.

Last but not least, the CHAKAVAK project also provided an innovative platform for cheque imaging systems. So on one hand, the CHAKAVAK can share their experiences in assessment and validation of the digital cheque image as an online transaction. In the other hand, this project is a great experience on interacting with other national payment systems such as RTGS and ACH.

The characteristics of the CHAKAVAK Project are as follows:

- CBI can control and governance on cheque lifecycle.
- CBI can control participants' CAP.
- Lowering the risk in interaction of end user in banking system with cheque.

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<sup>4</sup> magnetic ink character recognition

- Validation and settlement of cheque in less than 24h.
- Interaction with national payment system such as RTGS and ACH.
- Omit more than 50000 clearing rooms all-around of Iran.
- Enhance security of cheque processing
- Pioneer the standard and protocol for digital cheque.

The major challenges of the CHAKAVAK Project are: (1) the CBI can control and monitoring on cheque life cycle; (2) the validation and settlement of cheque in less than 24h; (3) Interaction with national payment system such as RTGS and ACH; (4) Enhance security of cheque process; and (5) Pioneer the standard and protocol for digital cheque.

## Goals and Objectives

The main goal of the CHAKAVAK Project is as follows:

- Assessment, validation and settlement of cheques in secure infrastructure which means CHAKAVAK reduces operational risk by securing the transmission route. In fact, each cheque is validated and assessed in CHAKAVAK. Then it is forwarded to the debtor bank to be cleared, and a response is sent to creditor with the final state of the cheque. The final state of the cheque is stored in CHAKAVAK database. In addition, at the final step, CHAKAVAK creates a net settlement file to be sent to the RTGS system to settle.
- Faster settlement cycle, which means clearance of more cheque are made possible within the same day. In the old Clearing Room system, the final status of a cheque was declared after 48 hours, which makes some methods of Money Laundering possible for financial institutions to postpone the clearing process illegally.
- Decrease paper cheque with online transaction. The paper cheque is an old and vital part of Iranian financial institutes and most illegal financial issues involved cheques. In fact, by eliminating the manual processing and storing of paper cheques, banks and credit unions will save time.
- Omit any physical exchange of documents in validation and settlement systems. The manual processing and storing paper cheques is a time consuming process in financial systems. So in online cheque imaging systems, the scanner, scans the image of cheque, then the bankers can process cheques instantly.
- Online assessment, validation and settlement of cheque is made possible. CHAKAVAK, can assess and validate all cheque in an effective way so both creditor and debtor banks can clear their cheque in securely. CHAKAVAK can interact with core banking systems based on complete XSD file so the interaction is done in a safe and secure way. At the end of operational day of CHAKAVAK, this system settles the final state of each banks then creates a net settlement file to be sent to the RTGS system.

- The detection of fraudulent cheques is made easy. In fact, the CHAKAVAK interaction is safe and secure. On the other hand, in CHAKAVAK a CBI administrator can monitor the lifecycle of a specific cheque as well as monitor the maximum and minimum CAP amount of a specific bank. Another feature of this system is the usage of the NiBN network. This fundamental infrastructure assures the safety of the network so sniffing or such activities are not possible on this banking network.

## Challenges:

The main challenges of the CHAKAVAK Project is as follows:

- The large span of bank branches. Iran has numerous banking branches all across the country in all of which CHAKAVAK must be deployed due to important role of cheque in financial institutes.
- A numerous number of paper cheques in circulation in all financial institutions. The drawbacks of paper cheque were the main challenges that CHAKAVAK faced at the beginning of its implementation phase. The main life cycle of cheque was dramatically awkward and time consuming, which means that in the old system, the processing of a cheque took 48 hours, so it was a nonprofessional process for banking systems.
- Decline assessment, validation and settlement of cheque. The assessment, validation of CHAKAVAK is an online process and it can do it in a second so the life cycle of cheque has dramatically decreased.
- Reliability in cheque process.
- Integration with existing large core banking legacy systems are a major IT and operational investment for banks. The Iranian financial institutions each have their own core banking systems and it is difficult to create an application that interacts with all core banking systems seamlessly. In fact, the simple structure of allows efficient integration of this system into the core banking systems. CHAKAVAK is less dependent on air and ground transportations, making it less vulnerable to delays.

## Strategies:

- Interaction between RTGS, ACH and CHAKAVAK systems.  
Before the CHAKAVAK system was implemented, all Iranian core banking systems worked with RTGS and ACH systems, so they must have same interaction with CHAKAVAK. Also, Chakavak must be able to produce output files in the formats accepted by these systems.
- Asynchronies Debit, Governmental Monitoring and Policy management. This strategy is a critical one for CHAKAVAK in implementation and development phase. The CBI user must monitor all lifecycle of all cheques.

## Methodology:

The development methodologies of CHAKAVAK are Agile and RUP. The Agile methodology defines a system of methods designed to minimize the cost of change, especially in a context where important facts emerge late in a project, or where we are obliged to adapt to important uncontrolled factors and these methodologies are advertised as programming methodologies for a high-speed software development. Indeed, CHAKAVAK needs this methodology to implement. On the other side, RUP<sup>5</sup> is a configurable software development process that is based on many years of experience in using object technology to develop mission critical software in a variety of industries.

Moreover, CHAKAVAK use of the RUP allows us to define a clear, repeatable process for quality software to be delivered to our end user on time, every time. CHAKAVAK processes are tailored to meet financial institutes' requirements and are aimed at delivered maximum, tangible value to them within determinable project boundaries of cost, schedule and effort. The RUP is supported by tools, which automate large parts of the process including visual modeling, requirements and change management as well as documentation and testing.

## Innovation:

- Bring about beneficial influence on economical and financial governmental system.
- Improving the control as well as monitoring of CBI over cheque life cycle.
- Omitting manual process of cheque in all financial institutes of Iran,
- Limiting the risk of human interaction with cheque process.

## Re-engineering:

The CHAKAVAK has no re-engineering process. In fact the Iranian cheque imaging system is the only application that was developed in this scale in Iran. In the past, the assessment, validation and settlement system has no facility such a CHAKAVAK, that it can assessment, validate and settlement all cheque in online process.

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<sup>5</sup> The Rational Unified Process

## Standards:

The CHAKAVAK used the ISO 20022 | camt.053.001.01 as a standard for output files. These files are used in core banking systems. Moreover, the interaction of CHAKAVAK with other core banking systems is based on XML signature files.

In this project the implementation is based on asynchronous consumer and producer threads and debit standards.

## Economic benefits, achievement, and impacts:

- **Benefits:**
  - Decrease number of employees in bank's clearing systems; the banking administrator can use these human resources in other parts of the system.
  - Improve transparency in Cheque process.
  - Better reconciliation.
  - Achieved KPI by central bank  
The establishment of key performance indicators (KPIs) reflecting participant progress and customer behavior can study and simulating model of reflections.
  - Assessment of Banking and Monetary policy for administration  
An effective regulation is in urgent need in order to support e-commerce development as well as to avoid potential financial risks. In response, information systems such as CHAKAVAK plays an essential role in helping the authorities achieve the mission.
  - Intelligent support of regulatory policy  
Policy effect analyzed by adjusting regulation indicators and evaluating the consequences. Policy suggestion is made by optimization analysis for given regulatory goals.
  
- **Achievement:**

The achievements of CHAKAVAK Project are summarized as follows:

- Coming one step closer to electronic cheque.
- Settlement of cheque in lower than 24 Hours.
- Online monitoring for all cheque process.
- Increase operational efficiency by cutting down on overheads involved in the physical cheque clearing process.

- Impacts:
  - Increase level of security in financial institutions.
  - Declining cost of cheque operation in banking systems.

### Next step on ward:

- Expand Cheque imaging to include processing electronic cheques.
- Cheque imaging will provide greater opportunities for banks and developing societies to innovate and provide new services. For example, customers may be able to take a photograph of their cheque on their smartphone and send it electronically via their bank's mobile banking app to be processed.

### Resources (indicate the expense allocated on manpower, hardware, software, networking, etc.)

- Software: JBoss Application Server, MOM IBM WebSphere, Oracle 11gR2 Database,
- Hardware: HP Server 8G
- Network: NIBN network infrastructure.

### Conclusion:

The CBI had made a comprehensive economical plan for e-Banking of Iran. Based on this plan, the cheque imaging system was the final step for National Payment Systems. The implementation and deployment of CHAKAVAK as a solution brings the CBI one step closer to their goal. Moreover, the monitoring as well as governance abilities of the CBI has improved gradually. In addition, to govern the paper cheque the CBI has another project known as a SAYAD. SAYAD is supposed to centralize the production and unify the shapes of the paper cheque to be able to add more security and automation options. In the upcoming year, the SAYAD system will join the CHAKAVAK to complete the cheque lifespan from production to settlement.