

Information System in the Public Sector: A Critical Analysis and Evaluation of PMIS of the Ministry of Public Administration

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Abstract: This paper analyses and evaluates a computer-based information system, i.e. personnel management information system (PMIS) implemented in the Ministry of Public Administration. PMIS is mainly a working database of a segment of Bangladesh Civil Service (BCS) officers. It performs under local area network and also extends a web-enabled intranet service for its clients outside the Ministry. By adopting CIPSODA model this paper analyses how PMIS supports the organisational and community processes through reaching its wider audience. This paper also illustrates whether PMIS has been a success or failure by utilizing the 'stakeholders' goal model! Incorporating the different dimensions of this information system Design-Reality Gap analysis is used to calculate the actual amount of change between 'where PMIS is now' and 'where it wants to get us'. In the PMIS's gap analysis, a very small score was found which signals the viability of this project. The paper finally poses several key suggestions for the real success of this information system in the public sector

1.0 Introduction

The Personnel Management Information Systems (PMIS) is one of the leading ICT/e-government projects in the public sector in Bangladesh. It is a computer-based information system (IS) for assembling, storing, processing and delivering information for human resource management (HRM) in the Ministry of Public Administration, the regulatory ministry of the cadre officials and concerned with their appointment, posting, promotion, and training (Ministry of Establishment, 2007). All members of Bangladesh Civil Service (Administration) cadre and deputy secretaries & above-ranked officers from other cadres are the main clients or users of this system. Public Administration Computer Centre (PACC) under the Ministry of Public Administration is the implementing unit of this information system with donor support from the International Development Agency (IDA).

With a broader meaning of information systems (Bellamy & Tailor, 1998; Hughes, 1994), PMIS, is an e-administration initiative in the public sector, and a subset of e-government activities (Heeks, 2006).

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Since the vision, mission and strategic plans of Ministry of Public Administration are designed for the better delivery of services to the citizen (Ministry of Public Administration, 2008a), PMIS aims to perform efficient service delivery to its different clients which include ministry officers & other civil servants posted countrywide and the citizens as well. From the government perspective, it is a reform initiative for improving processes of the Ministry's internal workings.

2.0 Physical Structure of PMIS

PMIS is intended for efficient management of human resources through facilitating decisions support system of Ministry of Public Administration. Working under the local area network (LAN) with internet connection within the Ministry PMIS also extends a **web-enabled** intranet service for its different clients to achieve the goals of minimising cost and effort and maximising output (Ministry of Public Administration, 2008b).

2.1 Technological Infrastructure

Since it is a computer-based and networked IS, it has a set of formal ICT components and data contents that also include the architecture of the networks, hardware and software (Chaffey & Wood, 2005:117). The details of the 'information-centred technology' infrastructure used under PMIS are given below.

2.1.1 Data Contents

Data are 'facts and figures held in computer' (Boddy et al., 2005:14). PMIS uses a database for all civil officers across the country. Its data contents consist of different modules such as master data, **service-related** data and personal & pay details. Each of these modules has more detailed data for each category. For example, personal details go further for the name, ID no., date of birth, educational qualifications, family information, address and so on. Bee & Bee (2005) explain the general functions of these data:

"A system to convert data from internal and external sources into information and communicate that information in an appropriate form, to managers at all levels in all functions to enable them to make timely and effective decisions for planning, directing and controlling the activities for which they are responsible."

Figure 1 below shows the real data contents of PMIS as extracted from a partial personal data sheet (PDS):

Figure 1: Data Contents of PDS on PMIS.

DATE:15/01/10

**MINISTRY OF ESTABLISHMENT
PUBLIC ADMINISTRATION COMPUTER CENTRE (PACC)
PERSONNEL DATA SHEET**

GOVT ID: 9962

GENERAL INFORMATION

NAME : MD JAHID HOSSAIN PANIR	FATHER'S NAME : LATE MD ABUL HOSBAN MDA
HOME DIST : BARISAL	MOTHER'S NAME : URS ZAKIATUNNESA
DATE OF BIRTH : 02/09/74	LPR_GATE : 010901
RANK : SR ASSISTANT SECRETARY	ORDER/JORN DATE : 11/09/02 (O)
POSTING : CDE ON STUDY, MO ESTABLISHMENT	BATCH : 20TH
LOCATION : DHAKA	CONFIRMATION G.O. DATE : 12/12/05
CADRE : BCS(ADMINISTRATION)	RELIGION : ISLAM
CADRE DATE : 20/05/01	
SEX : MALE	
MARITAL STAT : MARRIED	

SPOUSE INFORMATION

NAME : JESHMY SERAZ	OCCUPATION : HOUSE WIFE	DESIGNATION : NOT APPLICABLE
HOME DIST : MADHUPUR	ORGANISATION : NOT APPLICABLE	LOCATION : NOT APPLICABLE

PERMANENT ADDRESS

VILLAGE/HOUSE NO & ROAD : RAMRPOLE	PRESENT ADDRESS
POST OFFICE : RAMRPOLE	VILLAGE/HOUSE NO & ROAD :
POLICE STATION : VILLAGI	POST OFFICE :
DISTRICT : BARISAL	POLICE STATION :
	DISTRICT :

Source: Ministry of Public Administration (2009).

2.1.2 Hardware Platform with Network Components

Hardware is the physical devices or components used for information processing and storage (Chaffey & Wood, 2005). These include system's host computer that works as a hub of communications configuration, 142 workstations or client machine such as desktop PCs, laptops and six servers. Since PMIS extends its service internally through LAN and externally through the Internet, it has the following network components (Laudon & Laudon, 2007):

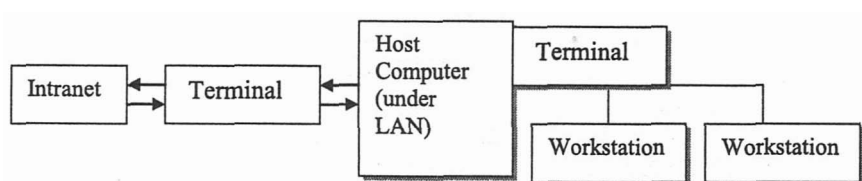
- (i) **Terminals:** To access or to get connected to the network. For PMIS, it is a device for entering data with a view to receiving information out of the system.
- (ii) **TCP/IP:** Transmission Control Protocol (TCP) is used to handle the movement of data between computers. It also establishes connection between computers. Internet Protocol (IP), on the other hand, delivers the packet of data.

- (iii) Network interface card: It is used to send data over the network and to control its flow.
- (iv) Hubs and routers: These are used to facilitate the connection of terminals to the network and the transmission of the content from one medium to another (Heeks & Morgan, 2009a).

2.1.3 Software Components

PMIS uses Oracle as communication software to enable different components of the network for working together in order to access to network. A partial view of PMIS under Ministry of Public Administration is depicted in Figure 2 below:

Figure 2: A Partial View of PMIS.



Source: Adapted from Laudon & Laudon (2007).

2.2 Management and Organisational Set-up

As a complete information system, PMIS needs to be viewed from organisational and management perspectives as many IS researchers argue that due to only technological view of IS (Bellamy, 2003:114) or poor management quality (Brown, 2000; Gupta et al., 2004; Heeks, 2006) many IS projects fail. With the emphasis on 'man behind the machine', PMIS serves both its internal clients i.e. officers in the ministry and external clients i.e. officers working outside the ministry.

3.0 Work Processes of PMIS

This section analyses how the Ministry of Public Administration as an organisation best utilises PMIS and how the data flow and information management of this system support its organisational process for better service delivery to its internal and external customers (Teng et al., 1994). Currently, the total number of clients of PMIS is 4514 civil officers who are working both at different ministries and departments, local governments, and other organisations all over the country (Ministry of Public Administration, 2010). Other than this category,

the citizens as community people as a whole are also stakeholders because they are indirectly affected by these civil officers.

Information system transforms and disseminates data (Boddy et al., 2005; Lucey, 1997). As an IS, the dissemination of information is the main function of PMIS. Since the Ministry of Public Administration is concerned with personnel management issues, its basic functions include keeping the updated 'information' about these civil officers and making decisions in time about their placement, promotion, training and retirement and performing human resource-related other administrative matters.

3.1 Support to Organisational Process

A systematic and core explanation of how PMIS supports the business process of the Ministry of Public Administration can be illustrated by CIPSODA model (Heeks, 2006). For example, from PDS which are filled up by officers at the time of joining the service, the data entry operators first Capture this raw data to collect their necessary information. Then they Input those data filling a preset format. Third, after Processing through the system those data are Stored to database server and they become an Output as processed data or information either for the officers in the ministry or for the officers working outside the ministry. Upon receiving this information, ministry officials take Decisions on any matters relating to their posting, promotion, or training and so on. Finally, on the basis of those decisions, necessary Actions are taken by issuing or disseminating office orders for their execution. However, raw data are not always derived from PDS. Since data entry is a continuous process, any decisions about officers are automatically communicated to data entry section for an instant entry.

Second, since officers can access to their personal information through intranet, they can also input data to their personal files. For example, if any officer acquires any language skill which **was not** inserted in **his/her** personal file, **he/she** can do it through intranet even from any remote access. However, some information requires necessary documents to be submitted to the authority in support of the claim of any further qualifications.

Third, another widely used LAN facility under PMIS also clarifies its role in the ministry's business process that replaced previously existing paper-based filing system. For example, when any **officer**

joins the Ministry after returning from the overseas training programme, the section officer instantly comes to know the details about this fact by simply clicking on his/her personal identity number.

Fourth, knowledge management (KM) is another key support offered by PMIS. KM involves 'knowing what an organisation knows' (Davenport & Prusak, 1998). This can be made possible by knowing how data through PMIS can be transformed into a resource (information) imbued with meaning and relevance which (knowledge) can again be applied to solve problems and getting things done (Bocij et al., 2003; Alter, 2002).

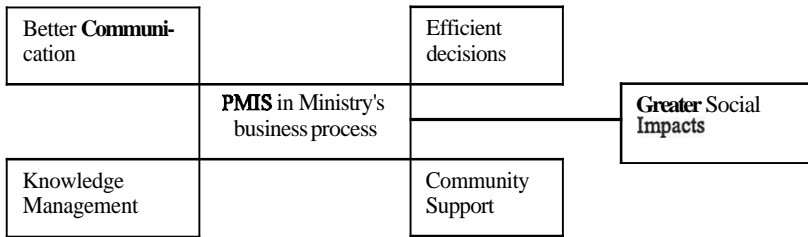
Finally, The direct beneficiary of this system is the ministry itself that can now save money, time and efforts for introducing such an e-administration project. Ministry's benefits again impact upon the activities of the central government that can reinforce such a good practice to its other organs.

3.2 Support to Community Process

From the community perspective, PMIS is a value-adding information system. For example, any person of any locality can access to civil officers' general database i.e. who are working for their community. The Ministry itself reiterates that 'the users of this site will be able to utilise the information they want as a citizen, or just to meet curiosity and for any other purposes' (Ministry of Public Administration, 2007). Thus it can help achieve the community's social, economic, political, or cultural goals by promoting 'community informatics' (Gurstein, 2000:3) through leveraging minimum 'access' to the government's database.

ICTs have introduced these new dimensions to organisational and community process (Porter, 1985; Porter & Millar, 1985) through their various information system functions such as decision support, knowledge and communication (Markas, 1984) as depicted in Figure 3 below:

Figure 3: PMIS's Support to Organisation & Community.



Source: Adapted from Boddy et al. (2005).

4.0 Evaluation of PMIS

The contextual structure of any information system is a set of both micro and macro environment. Along with organisation's internal factors, external driving forces & key actors and stakeholders in political, socio-cultural, technological, economic and legal environment often remain uncontrollable and play pivotal role for its success or failure. PMIS in the government domain is also subject to these considerations. This section evaluates whether PMIS has been a success or failure. For this purpose, 'Stakeholders' Goal Model' encapsulated by House (1980) is adopted because of its applicability in any situation (ibid.). Based on the PMIS project the five steps of this model are analysed below:

Step 1: Identifying the Stakeholders

The five main stakeholders of this project are:

1. The Ministry of Public Administration of the Government of Bangladesh as the owner and main user;
2. The civil servants of the Government as another key users of PMIS;
3. Other ministries/departments/agencies of the Government that require consolidated information from PMIS;
4. The citizens as community people who are affected by the civil servants in receiving their service; and
5. The donor agency that have financed the project.

Step 2: Identifying Each Stakeholders' Goals

1. Ministry of Public Administration

- a. Introducing an efficient management of public service system by saving money, taking minimum time and spending less efforts;
- b. Establishing effective communication with the civil officers via online such as e-mail & messaging etc;
- c. Arranging and updating civil officers' information regularly for administrative efficiency and
- d. Confirming accountability by publishing all regulations, rules and policy for placement, promotion, local and foreign training, and disciplinary action etc.

2. Civil Servants:

- a. Accessing to any information of the Ministry of Public Administration about personal and service matters *i.e.* placements, promotion possibilities, and availability of training facilities etc.;
- b. Making effective two-way communication via the intranet with the ministry **officials** for service affairs;
- c. Confirming the availability of necessary information about Annual Confidential Reports (**ACRs**) regarding remarks of higher officials, performance appraisal, and pending reports etc.

3. Other Ministries/Government Departments or Agencies

Requiring necessary reports and information and sharing of database of the civil servants from the Ministry of Public Administration for the purpose of preparing department-wise statistical reports etc.

4. Citizens as Community People

Accessing and sharing government information and decisions about civil servants of the country.

5. Donor Agency

Establishing a transparent personnel management system for **decision-making** on civil servants' promotion, placement and nomination with a view to nominate them for higher studies etc. It is needed to achieve efficiency, and effectiveness in the public sector HRM.

Step 3: Measuring the Achievements of Each Goal

1. Ministry of Public Administration

- a. The goal for saving money, taking minimum time and spending less effort in making decisions in the Ministry has proved to be wholly achieved because by replacing paper-based system efficiency was gained.
- b. The goal for making online communication with the civil officers through e-mail is partly achieved because PMIS has an option for sending and receiving e-mails. But many of the officers do not use it.
- c. The goal for updating civil officers' information meets the reality because on the same day the data about any posting or promotion of officers are inserted by the data entry operator. Therefore, this goal is wholly achieved.
- d. Ministry of Public Administration publishes all regulations, rules and policy for any decisions on placement, promotion, local and foreign training, and disciplinary action etc. Therefore, this goal is also wholly achieved.

2. Civil Servants:

- a. The goal for accessing to any information of the Ministry of Public Administration by its officers about their personal and service matters i.e. placements, promotion possibilities, and availability of training facilities are evidenced to be almost wholly achieved because the Ministry, in reality, is placing all information through PMIS on a regular basis.
- b. Civil servants have not met their goal for making an effective two-way communication via the intranet with the ministry officials for administrative and personal affairs. Very often e-mail messages receive no response resulting in ineffective two-way communication. Hence, the goal is not achieved.
- c. The availability of necessary information on ACRs regarding remarks of higher officials, performance appraisal, and pending reports etc., the achievement of PMIS is partly achieved because these matters are now progressing and information about ACRs of 9th batch of BCS Administration cadre are available on PMIS (Ministry of Public Administration, 2010). Therefore, the achievement is partly achieved.

3. Other ministries/government departments or agencies
 - a. The goal for accessing to the necessary information and reports and sharing of database of the civil servants from the Ministry of Public Administration for the purpose of preparing department-wise statistical reports etc. is wholly achieved as the Ministry is strictly instructed by the higher authority to comply with this goal.
4. Citizens as community people
 - a. The goal for accessing and sharing government information and decisions about civil servants of the country by the community people are most likely to achieve. However, in a broader sense, they face problems in the full access to PMIS database due to security reasons. Therefore, the goal is partly achieved.
5. Donor Agency
 - a. Donor agency's goal for establishing a transparent personnel information management system for civil officers' promotion, placement and nomination for higher studies is partly achieved because these activities are not transparent enough to be accomplished through PMIS.

Step 4: Identifying Other Impacts

Brynjolfsson & Hitt (2000) propose that a large part of the benefits of IS investments come from intangible benefits such as convenience, service, and discretion etc. which are hard to measure quantitatively. Other impacts include the views of staff that see the improvements in their role or working environment, and user satisfaction because of the 'commitment of innovation' of the Ministry.

Step 5: Classifying the Project Outcome

The PMIS project attained major goals and did not experience significant undesirable outcomes. As a result, PMIS can be considered to be successful.

5.0 Analysis of the Design-Reality Gap

Any information systems' fate depends on the criteria set for the project. To analyse whether PMIS is a success or failure, Design-Reality Gap analysis is adopted. It determines the success or the

failure measuring the size of the gap existing between 'current realities' and 'design of the project' (Heeks & Morgan, 2009b). It is actually the amount of change between 'where we are now' and 'where the IS project wants to get us' (ibid.).

5.1 Dimensions of Gap Analysis

This analysis compares the assumptions or requirements within the project/systems design with the reality which was available just before that design was implemented. The design-reality gap analysis also considers the ITPOSMO acronym (Heeks, 2006) for its seven dimensions as below:

- Information
- Technology
- Processes
- Objectives and values
- Staffing and skills
- Management systems and structures
- Other resources: time and money

5.2 Measuring Gap Scores

Putting these dimensions together in a **question** format poses the following analysis:

- Information: The information system was designed on the pre-existing data items including some additions. However, the new system redesigned and modified some of data contents for its updated version. This created a small design-reality gap on this dimension. Gap score: 0.2
- Technology: The complete architecture of PMIS's included six servers, DDN connection with one Mbps bandwidth, one gateway router, and seven network switch points, 152 workstations with internet connection, two line printers and one network printer. In reality, other than some workstations there is nothing different with the initial design. This created a very small design-reality gap on this dimension. Gap score: 0.1
- Processes: The design assumed full automation of pre-existing processes i.e. gathering of data, storing of data and its output

were supposed to experience full automation. In reality, the assumptions have not been altered. This created no gap on this dimension. Gap score: 0

- Objectives and values: The design assumed that the objectives of PMIS project i.e. automation of processes, quicker decision-making, connection with civil officers, ensuring transparency, and building a central database of public officials will be shared by its stakeholders. In reality, almost all senior officials supported all initiatives. However, some internal staff did not find it to be effective due to their technological phobia. Furthermore, they assumed that full automation would change their working pattern and may declare them redundant. Overall, there was a very small design-reality gap on this dimension. Gap score: 0.2
- Staffing and skills: Regarding this dimension, PMIS project assumed that PACC, the controlling unit of PMIS will be rightly staffed with necessary incentives. As a result, they would feel interested to work with it. But in reality, since the staffs are not permanent cadre officers of the government with high social status, many of them feel reluctant and do only routine work. Many of them quit the job finding better options. However, the percentage of this trend is very low. As a result, it creates a very small design-reality gap. Gap score: 0.1
- Management systems and structures: The design assumed some changes with the pre-existing management structures and customer-centric reforms. For example, the civil servants, the main clients of PMIS, would be given the first preference to access to its database meaning that whenever, they needed any information, they would be instantly supplied with. Furthermore, there will be a 'citizen-charter' about the responsibilities of the staff and officers of PMIS project as one of reform agenda in the public sector. In reality, although there is still a citizen charter, it has got no value to the staff. Many of them do not know what it actually means. This creates a very small design-reality gap on this dimension. Gap score: 0.2
- Other resources: The PMIS project assumed two sets of financing to be available: a larger sum for initial stage of the system and a smaller ongoing sum for system operation and

maintenance. In reality, the donor agency allocated the required money to the Ministry from where necessary funds are disbursed for the required expenditure on the basis of existing financial rules of the government exchequer. From time perspective, the project approached a roll-out system which also seems to match fairly well with the design of the project. Gap score: 0.

- Overall: There was an overall small design-reality gap in the PMIS project. Total gap: 0.8.

6.0 Conclusion

PMIS is supporting the operation of organisational process and improving its performance. Thus it is involved in value adding activities for organisation through better quality services to its customers, reducing costs through information achievements and making the business process and creating new realities by innovating new ways for service development (Marchand, 2000).

As suggested by Heeks (2006) the smaller the gap between design and reality, the greater the chance for the project of being successful. In the PMIS's gap analysis, a very small score (0.8) was found. It means that this project is very unlikely to fail. The existing gap is common for an information system project in the public sector in a developing **country** like Bangladesh. One of the good practices of this project is that it has been positively accepted by its clients. Since it is still new, after being benefited from its current service, many **officers** will start to embrace it in the age of ICT diffusion. Only then PMIS's broader approach will be meaningful to all its beneficiaries.

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