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**Use of Information and Communication Technology by State Owned
Enterprises in Bangladesh: Comparison between privatized and
non privatized SOEs**

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Abstract

Title: Use of Information and Communication Technology by State Owned Enterprises in Bangladesh: Comparison between privatized and non privatized SOEs

Keywords: ICT, e-business, Privatization, SOE

Category of paper: Research Paper

Purpose of the research/paper: The objective of this paper is to compare the use of ICT by privatized and non-privatized SOEs to enhance competitiveness and productivity. The paper in particular addresses issues related to: the opportunities of using ICT applications in the value-creating processes for SOEs, and challenges in adopting these ICT tools by the SOEs in Bangladesh.

Methodology: Quantitative using survey with assisted questionnaires.

Findings: The research found that the process of adoption of ICT within SOE under Privatization Commission is still in the very early stage. A large gap exists between Internet connectivity and e-business models adoption and, more in general, between the possession of ICT and the actual use of it. But SOEs who have already been privatized tend to use Internet and ICT tools for better communication and productivity.

Implications for practice: The findings will have implications for ICT use policies and practices at SOEs .

Value of the paper: The paper will be of interest to ICT academics, policy advisers and practitioners.

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Use of Information and Communication Technology by State Owned Enterprises in Bangladesh: Comparison between privatized and non privatized SOEs

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Abstract

The potential contribution of Information and Communication Technology (ICT) to increase the productivity of State Owned Enterprises (SOEs) in developing countries has long been recognized. However, the realization of this potential has been problematic and over recent years there have been a number of initiatives supported by government, non government and foreign agencies which have endeavored to aid and encourage the up take of ICT to enable access to such promised benefits. Despite strong theoretical arguments suggesting that ICT has much to offer to SOEs, the study would seem to suggest that use of ICT by SOEs listed under Privatization Commission is still in its infancy. In contrast, the SOEs that have already been privatized have taken initiative to use ICT to increase productivity and revenue. It also identifies some significant barriers which are impacting upon the level of ICT adoption amongst SOEs, and confidence on ICT of the SOEs in Bangladesh. This paper is based on the study conducted as part of the IDA funded Enterprise Growth and Bank Modernization Project and explores the opportunities and barriers of using ICT to provide a necessary lever to enhance competitiveness and productivity of SOEs in Bangladesh.

Introduction

The prospect of using Information and Communication Technology (ICT) to improve the competitiveness and productivity of State Owned Enterprises (SOEs) has long been recognized world wide. Despite the recent initiatives by the government, non government and foreign agencies to aid and encourage the up take of ICT to enable access to such promised benefits, the study suggests that the use of ICT by SOEs listed under Privatization Commission is still in its infancy. One of the factors that have been identified as impacting upon the level of ICT adoption amongst SOEs is access to, and confidence of the management on ICT. SOEs that have already been privatized have already taken the initiative to use ICT to increase productivity and revenue by overcoming these factors. Climbing the technological ladder does require skills upgrading through explicit learning in the new technologies.

Due to the ICT's capability to transfer, collect, manage a great amount of information and to reduce the distance and time barriers new opportunities could well take in place both to create new ventures and to modify the existing businesses. Therefore, SOEs may reduce the transaction costs of information-intensive activities by resorting to ICT. These opportunities may especially favor SOEs that in most cases operate in a dense inter-firm relationship and need to manage a great amount of information.

SOEs performance is highly associated with learning capabilities, level of technology, firm-level knowledge, skills and experience. The successful adoption of ICT tools is likely to enhance individual SOE's productivity in sectors such as electronics and general machinery. In traditional sectors such as jute and textile, there is a propensity for significant rise in product quality and more precise processing. To achieve the goal of better quality products, SOEs should undertake greater training and investment in skills and knowledge upgrading (Oyeyinka et al. 2006).

This paper compares the use of ICT by privatized and non-privatized SOEs to enhance competitiveness and productivity. The paper in particular addresses issues related to: the opportunities of using ICT applications in the value-creating processes for SOEs, and challenges in adopting these ICT tools by the SOEs in Bangladesh.

Literature Review

This section reviews the literature relevant to the research.

Privatization in Bangladesh

Privatization in Bangladesh has gone through various phases since its Independence. Just after the war of Independence in 16 December 1971, the Government had to step in to fill the vacuum in economy as the then-owners, abandoned their properties and left the country. In addition, the nationalization policy of March, 1972 of major industries like Jute, Textile, Chemical and other basic industries, DFIs, Banks and Insurance etc. brought into fold nearly 90% of such enterprises under Government control. However these public sector enterprises right from inception could not run profitably and efficiently and many of them ran into severe financial difficulties and serious management problems. By end of 1975, the Government began to reverse its policy of nationalization due to the heavy burdens created by the public sector enterprises on the national exchequer. During 1976-1992, about 500 SOEs had been sold or returned to their former owners.

The Privatization Commission which came into being in March, 1993 is entrusted with the overall responsibility of privatizing State-Owned Enterprises identified for privatization, whether small, large, profitable or non-profitable. The Commission is now headed by a Chairman with the rank and status of a State Minister to the Government. The Commission has been placed under the administrative jurisdiction of the Cabinet Division which is headed by the Hon'ble Prime Minister. Ministries having SOEs under their control have either set up or in the process of setting up Privatization Cells for assisting the Privatization Commission in identifying, preparing, processing, implementing and monitoring SOEs for privatization. Since the creation of Privatization Commission as the special agency in March, 1993 by the Government to implement the program of divestiture of SOEs, till to- date 74 SOEs have been privatized so far. It is worth mentioning that 25 more SOEs have been handed over to

Privatization Commission for privatization as well. Moreover, decisions to off-load the shares of some public limited companies have also been taken (Annual Report 2008).

Classifications of ICT tools

The widespread adoption of ICT worldwide has given rise to an increasing number of studies on this field recently. These studies have dealt with different and complementary aspects, such as: potential effects of ICT on the organizations, the inter-organizational relationships, the market, and the social-economic systems; ICT classification; analysis of the organizational and managerial actions required to support the ICT adoption; and interpretation of the enabled opportunities (Davenport et al. 1990; Gurbaxani et al. 1991; Malhotra 1993; Laubacher et al. 1997)

ICT tools have been classified and distinguished into several ways where each one is based on different and complementary aspects of ICT. Independent of their classification, thanks to the capabilities of reducing the time and costs of processing and communicating information; storing and elaborating great amount of data and information; organizing and structuring data and information on the basis of the user needs, ICT tools can allow data, information, experiences, and the knowledge owned by individuals and organizations instantaneously available and enable easier sharing. ICT tools in this paper have been classified as follows:

- Integration tools: to help in the integration and coordination of the processes supporting the information transfer (LAN, WAN, database, shared elaboration systems, data modeling support systems, information flows modeling support systems, CASE, group working support systems, EDI, groupware, Internet, ERP, DSS, CAD etc.);
- Knowledge management tools: to support the processes of problem solving and organizational learning, as well as the relationships and integration among individuals and among different organizations (Lotus Notes, software agents, groupware, Internet).
- Process tools: to concur in the transformation of the inputs in output (Dedicated software).

The main capabilities of ICT tools and the related advantages of these tools on the organizational processes are as follows (Davenport et al. 1990; Timmers 1999).

Table 1 - ICT capabilities and advantages

Capability	Examples of ICT Tools	Advantages
Analytical	Dedicated software, workstations	To bring complex analytical methods to bear on a process
Automational	Artificial intelligence, CAD, EDI, search engine	To replace or reduce human labor in a process
Geographical	EDI, Internet, Intranet, videoconferencing, tele network	To allow an easy and fast information transfer between large distance, making processes independent of geography
Interactivity	CAD/CAM, EDI, Internet, Intranet	To connect parties that would otherwise communicate through an intermediary
Knowledge management	Artificial intelligence, groupware, shared databases, data mining, videoconferencing	To capture and dissemination of knowledge and expertise

Multimedia	Videoconferencing, audio-conferencing, search engine	To deal with and deliver a great amount of information expressed in several ways: graphics, sound, video
Sequential	Groupware technology, shared databases, Internet, Intranet	To enable changes in the sequence of tasks in a process, often allowing multiple tasks to be worked on simultaneously
Tracking	Artificial intelligence, CAM, sensors, Internet-based applications	To allow the detailed tracking of task status, inputs, and outputs
Transactional	Artificial intelligence, dedicated software, groupware technology	To transform unstructured processes into routinized transactions

(Source: Developed for this research)

ICT and value creating process for SOEs

The adoption of ICT by the SOEs can improve the performance of the organizational and inter-organizational processes and, as a consequence, of the value-creating processes. ICT can follow the existing system of inter firm relationships to implement and automate a number of activities involved in the value creating processes carried out across the supply chains, such as vendor seeking, ordering, inventorying, delivering, co-design, etc (Rayport et al. 1995). The effects of the ICT on three main value-creating processes, namely marketing and customer relations; logistic and networking; and innovation and knowledge management are analyzed in the following.

Marketing and customer relations

The global spread of the Internet and the 24 hour availability of web server have created time and geographical independence and enable customer service to be decoupled from supplier availability (Timmers 1999). Overcoming the geographical constraints and creating time independence, ICT enable the SOEs to get access, promote and sell goods and services (e-commerce) in a global market. Dealing with and delivering great amount of information in different ways (text, graphics, sound, video), ICT enrich the opportunities for the promotion of goods and services and for the provision of in-depth information.

The new intelligent agent software helps to identify the customer profile (taste and characteristics) and the pattern of purchases. All the information can be easily organized and stored in a database that supports customer service, marketing, and new product development processes. Web technology and the related online trading models (business-to-business and business-to-consumer) provide supplier assets and customer benefits, namely lower transaction costs, better prices, reduction of time to market, affirmation of brand image, market share and access to markets, customer orientation, customer choice increasing, and customer-driven design. Supporting application-to-application as well as person-to-person and person-to-application interactions, ICT allow the direct interaction and continuous links with customer. This in turn provides opportunities for better targeting goods & services (Timmers 1999; Venkatraman et al. 1998).

Networking and Logistic

The impact of ICT on networking processes is due to three main effects: (1) the electronic integration effect, (2) the electronic communication effect and (3) the electronic brokerage effect (Venkatraman et al. 1998). The electronic integration effect allows suppliers and procurers to create joint, inter-penetrating processes at the interface between value-adding stages. This effect is due to the combination of different ICT capabilities, such as tracking, sequential, and automational, which enable to link one activity with the others and make real time data created in one activity available both within the company and with outside suppliers, channels, and customers (Porter 2001). ICT allow the supplier and the procuring SOE's inventory management processes to be linked, reducing total inventory costs; the connection between sales activities and order processing as well as manufacturing processes and inventory levels of multiple suppliers, optimizing the supply chain; the integration of the new product development phases carried out in different teams or organizations; and check the status of a payment or a shipping process.

Due to the possibility of communicating more information in the same amount of time decreases the costs of communication, making communication independent of the geographical proximity. This means that ICT enable the SOEs to enrich the content of the information transferred within a client-supplier relationship in the global market. As an example, ICT (CAD/CAM with Web) can support the exchange of complex product models among parties located far away (Porter 2001).

The electronic brokerage effect is due to the possibility of creating an "electronic broker" that electronically connects a large number of potential buyers and suppliers through a central database, filters the different alternatives, and helps to match one party to the other, thereby reducing the need for buyers and suppliers to contact a large numbers of alternative partners individually. Thus, ICT (Internet, software agents, databases, search engines, etc.) increase the number of alternatives that can be considered, increase the quality of the alternative eventually selected, and decrease the cost of the whole selection process (Malone et al. 1987). Low cost and fast expansion of the number of relationships enable the development of new business models based on networking processes, for example, online auction of the machineries of SOEs.

Innovation and knowledge management

The ICT tools supporting knowledge management (i.e. groupware, videoconferencing, Internet, Intranet etc.) are basically aimed at facilitating the inter-connection and integration among individuals through the fast and effective exchange of information and knowledge. SOEs can use the digitization to transmit information, avoiding the contents' modification. The knowledge management technologies allow interactive communication. Besides, thanks to the virtual abolition of the distance, the communication of such kind of knowledge, which has been always limited within a bounded territorial system or a business unit, can now spread in meaningful way. ICT tools can also be used in the new product design and development. It may shorten the development cycle, increase number of alternative designs considered, reduce development costs and produce higher quality products (Malone et al. 1987).

It is argued that the customers contribute greatly to the development of new products. Listening to the customers and, beyond that, engaging them in a dialogue and listening to

their comments on the products are important means of obtaining input for sustained innovation. To that end, SOEs may regularly use, besides traditional means, e-mail response addresses, FAQ lists, discussion forums and online questionnaires. Information for innovation can also be obtained by monitoring online the customer behavior (by tracking visits & downloads) (Porter 2001; Porter et al. 1985).

E-business models for SOEs

The adoption and implementation of ICT tools allow businesses to implement new forms of business models. The most relevant e-business models for SOEs along with their implications are listed in Table 2.

Table 2: E-business models for SOEs

E-business models	Implications
Collaboration platforms	Electronic business process cooperation, e.g. collaborative design
Electronic customer community	Direct access to a wide community of customers that express their needs and give feedback; targeting and customization
E-mail	Promoting on a global scale a company's products and services
E-procurement	Tendering and procurement on a global scale; automation of the tendering and procurement processes; electronic forms of collaboration and negotiation (electronic implementation of bidding mechanisms) on a global scale
E-shops	Promoting the products and services on a global scale
Professional virtual community	Direct access to a wide community of professional expertise; extended network of complementary competencies

(Source: Developed for this research)

Methodology

A paper-based, assisted questionnaire was used in this study. The survey method is appropriate for this study as it provides a quantitative description of ICT capabilities, e-business models and adoption by the sample population. The survey was availed during July to August 2008 and was conducted by the authors themselves in Bangladesh. The survey has been carried out by the authors on twenty five state owned enterprises listed under Privatization Commission and twenty five already privatized SOEs as part of the IDA funded Enterprise Growth and Bank Modernization Project in the financial year 2007-08. The questionnaire survey was directly conducted on senior management of SOEs in order to get direct feedback on any potential issues. It was an efficient way of gathering data using a standard set of questions. After data had been processed through editing, coding and tabulation, a statistical technique was selected where the hypothesis test could be conducted.

Survey Findings

This section presents the findings of the data analysis related to this research.

ICT spread within SOEs: Comparison of privatized and non privatized SOEs listed under Privatization Commission

The survey finds that the process of adoption of ICT within SOE under Privatization Commission is still in the very early stage. A large gap exists between Internet connectivity and e-business models adoption and, more in general, between the possession of ICT and the actual use of it. But SOEs who have already been privatized tend to use Internet and ICT tools for better communication and productivity. It could well be pointed out by the survey that the connection to the Internet does not support the unstructured and informal communication processes within SOEs listed under Privatization Commission. For example, the utilization of e-mails for the inter-firm relationships or for intra-firm informal communications is very limited. In 59% of SOEs surveyed, there are no significant experiences of informal exchanges of e-mail, 30% of SOEs' management have never used Internet for communicating with buyers. These percentages are almost unthinkable in the case of other forms of ICT-based interactions with customers, such as mailing list and discussion forum.

The scenario is quite different in the case of privatized SOEs. Privatized SOEs in the field of financial and mechanical sector are utilizing email for their intra firm relationship at wider scale. More than 75% of the privatized SOEs are using Internet and they are already in the process of using other forms of e-business models. Almost all mechanical sector SOEs are using computer aided design tools in their factories.

Further comparisons on the current spread of ICT-based tools within SOEs are shown in Table 3 by using a scale rising from 1 (low) to 5 (high). It clearly shows that a digital divide exist between the privatized and non-privatized SOEs. Currently, Internet is used as a simple means of communication and, in particular, it is used more for communication outside Bangladesh rather than inside. However, SOEs that is being run by ICT literate individuals were found very enthusiastic about using ICT tools. However, due to the challenges mentioned below that SOEs under Privatization Commission would be seriously lagging when it comes to using ICT tools.

Table 3: spread of ICT based applications

ICT based applications	Privatized	Non Privatized
Production (ERP) Software usage	2.3	1.2
B-to-C activities with on-line sales	0.5	0.0
Managerial Software usage	4.2	3.1
Promotional sites	3.1	1.5
Communications via e-mail, Internet	4.5	2.9
Use of Mobile and other traditional methods	5.0	5.0

(Source: Developed from this research)

The survey also shows that the degree of diffusion of advance software is still very low in non privatized SOEs. These in fact require relevant investment by the management and, above all, the business processes re-engineering. This aspect, more than the economic one, represents a challenge to the adoption for the greater part of SOEs, which consider traditional way of operating as a distinctive competitive asset (Davenport, 1993).

Challenges faced by SOEs to adopt ICT tools

It was found that there are wide range of challenges that SOEs are facing while adopting or using ICT tools in Bangladesh. Challenges do vary widely among sectors but most commonly faced challenges by SOEs in Bangladesh include:

- Lack of Network infrastructure issues
- Lack of availability of ICT skilled personnel
- Cost of developing and maintaining ICT Tools
- Unsuitability for business
- Building security and trust

These challenges are explained below (Davenport et al.1990; OECD OECD):

Lack of Network infrastructure issue

The availability of a wide range of Internet connections and other communication services, preferably at competitive prices, is very important in that it allows SOEs to choose different and appropriate services according to their specific needs and expectations from ICT tools. Telecommunication networks are likely to continue to serve as the primary means of Internet access for many SOEs because of their relatively lower cost. Availability of broadband connections affects SOEs' decisions to adopt ICT tools specially Internet usage. Faster Internet connections improve the overall online experience for both individuals and businesses, encouraging them to explore more applications and spend more time online. Slow Internet connections and data transfer have in fact discouraged some SOEs from adopting Internet: over 75 percent of the SOEs indicated excessively slow or unstable data communication as a major hindrance to Internet use. Both privatized and non privatized SOEs management agrees that if reliable and faster Internet connection would have been available then they would have connected their factories with their head offices. Many privatized SOEs have been using radio link for Internet connectivity.

Lack of availability of ICT skilled personnel

SOEs listed under Privatization Commission generally lack the human resources needed for ICT and e-business, because they focus on day-to-day operations and lack the time to understand the benefits of new technologies. Even when they are aware of the potential benefits of adopting ICT tools, they require know-how or qualified personnel. As private enterprises, privatized SOEs tend to employ ICT skilled personnel for their ICT needs. The non privatized SOEs that adopted ICT tools are likely to have within the SOE someone who has a reasonable amount of knowledge of the specific technology and/or technology in general. Interestingly, the study found that they were not necessarily ICT professionals, but simply people interested in technology. It was also found that ICT are largely adopted by the SOEs which are working in the field of banking and engineering.

Cost of developing and maintaining ICT Tools

Most SOEs will not adopt ICT tools if the benefits do not outweigh the costs of developing and maintaining the system. The issue is costs relative to benefits expected, not cost itself. Nevertheless, SOEs are generally concerned about the costs of establishing and maintaining ICT tools since they generally suffer from budget constraints and are less sure of the expected returns on the investment. The study found that most of the SOEs listed under Privatization Commission cannot afford to adopt sophisticated ICT tools due to severe fund crisis.

Unsuitability for business

Another key reason given by SOEs for not engaging in ICT use is that it is not suited to the nature of their business. Findings of the survey on SOEs showed that among the non-privatized SOEs, around 60% do not use e-commerce for their business because they consider that e-commerce does not suit their type of business and/or products. Other reasons include concerns, such as on-line security. During the survey several SOEs recalled that they frequently receive inquiries regarding orders through emails. Many of their regular customers had used the Internet, and some preferred receiving confirmation of their order via fax or telephone. These concerns come from the practical judgment of SOEs on the benefits of using ICT.

Building security and trust

Survey showed that security issues (viruses, hackers) are among the most important perceived barriers to Internet use by SOEs. Barriers to e-business models included payment uncertainties, contract and delivery guarantee uncertainties.

Conclusions and Discussions

The opportunities offered by the adoption and implementation of ICT lie not only in the improvement of the processes carried out at a local level, but also in the possibility of carrying out the same processes on a global scale independent of the firm size. In particular, for value-creating processes, the implementation and adoption of ICT within SOEs can allow the following positive effects:

- Reinforcing the existing relationships within SOEs, helping the integration of the economic actors operating along global supply chains (business-to-business, electronic data interchange, Intranet, etc.);
- Providing SOEs with new opportunities of networking with firms located outside the country (business-to-business);
- Expanding the business boundaries of SOEs (web sites, electronic portals, etc.);
- Managing the relationships with the end-markets, offering new services and new ways to create value (electronic commerce, on-line marketing, etc.);
- Supporting both the joint innovation processes developed by SOEs and private industries and by the adoption of exogenous innovations.

Shared databases, integrated information systems, and ICT-based applications supporting the marketing and logistic activities can greatly improve the efficiency of the key supply chain business processes such as customer relationship management, customer service management,

demand management, order fulfillment, manufacturing flow management, procurement, product development and commercialization. It is possible to state that the adoption and implementation of ICT by the SOEs in Bangladesh can offer the following main opportunities (IDC 2000):

- favoring interactions & information exchanges among SOEs within same business;
- improving communication channels to allow correspondence with potential buyers;
- optimizing the production processes performance by redefining the relationships with customers and suppliers.

It can be argued that SOEs listed under Privatization Commission need institutional support for their survival in the era of globalization. The adoption of ICT by Indian SOEs is a proof of this point (Annual Report 2008). The burden and risk had been shared with the encouragement given by the Government of India (GOI) for private sector participation in providing technological infrastructure. Consequently SOEs have better access to web-enabled and portal based e-business technologies. Even the SOEs that have already been privatized support this argument. However, the Government of Bangladesh still has to take initiative for providing uninterrupted utility services so that SOEs can become more competitive in international markets. Finally, the study suggests that SOEs in Bangladesh need much greater infrastructural support in order for them to reap the benefits of ICT and to develop the capabilities to contribute to economic development. Proper policies and programs aimed at providing required infrastructure need to be initiated by the Government of Bangladesh in order to make non privatized SOEs more competitive in the domestic and international markets and to minimize the digital divide.

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