Environmental Constraints in Utilizing Information Technologies in Pakistan

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Environment related factors often constrain the utilization of information technologies (IT) in developing countries such as Pakistan. Data from a number of field case studies has been used to identify the major environmental constraints that influence the IT introduction and utilization process. A model has been developed to identify the main dimensions whose interaction determines the effectiveness of IT utilization by a given organization. This model also explains the manner in which these dimensions, and their interplay, is influenced by the environmental constraints. The key dimensions whose congruence is essential for successful introduction and utilization of IT are also discussed. Measures for overcoming these environmental constraints are also presented.

There is growing awareness of the need to understand MIS issues from a global perspective (Palvia, 1992). Given the globalization of businesses and the movement towards free trade, an increasing number of organizations based in developed countries are expanding their operations to the developing countries, and using suppliers located in these countries. Most of the work on understanding the issues involved in information systems (IS) development and IT utilization has focused on situations in developed countries. Studies have been conducted using data from US-based companies to identify IS management issues in the 1990s (Niederman, 1991). Palvia (1992) provides a list of key IS management issues in the US and Europe (examples of developed countries), and in India (an example of a developing country). An analysis of these lists indicates that for US and Europe the key issues relate to use of IT for strategic goals and as a facilitator in organizational integration and change. The MIS applications in India are more operational in nature and the key issues relate more to the environmental aspects. Lederer (1990) has demonstrated how the environment of an organization impacts the manner in which IT is utilized and managed. The environment of an organization is defined as “those physical and social factors that are outside the boundaries of the organization but are still relevant to its success” (Duncan, 1972). Given the difference in the environmental situation of the developed and developing countries, it is important that the frameworks formulated for understanding the IS management issues in developed countries should not be blindly applied to developing countries.

Developing countries offer an opportunity to study certain IS related phenomenon in a manner that is not possible in developed countries. Most organizations in the developing countries have only recently (over the last decade or so) started using IT and thus provide excellent opportunity for understanding the IT introduction related issues. Pakistan, with a population exceeding 120 million and an average annual growth rate of more than 5% in recent years, provides an opportunity to analyze how a developing country’s environment influences IT introduction. The understanding obtained from the study of the IT introduction process in Pakistani companies will also be helpful in further refining our understanding of the IS management issues and definition of the related dependent and independent variables. By comparing results of such studies in different countries these variables could also be categorized as common and country specific.

Over the last two decades, use of IT in Pakistan has grown at a very fast pace. The import of various types of computers in Pakistan increased from 29,468 units worth Rs 238 million (one US$ = Rs 25, approximately) in 1981-82 to
65,387 units worth Rs 857 million in 1989-90 (Memon, 1991). One factor contributing to this rapid growth was the lifting of import duties from computers in 1986 (Kazmi, 1990). The ready availability of hardware (with the advent of affordable personal computers), pirated software and growing awareness of computers, has resulted in a large number of industrial and commercial organizations, from both the private and public sectors, attempting to computerize at least some part of their operations (Hassan, 1991).

There is a general perception that IT introduction and utilization has not been very efficient in Pakistan. This paper focuses on understanding how the organizations in Pakistan have undertaken IT introduction and utilization efforts and what constraints they have faced in this process. Based on the study of the data from the IT introduction and utilization efforts of organizations, a model has been proposed to understand the IT introduction and utilization process.

**Background studies**

A case based research approach has been adopted in this paper. Over the last four years more than two dozen companies in Pakistan have been studied in various areas of business. These included manufacturing units, service organizations such as banks and insurance companies for example, trading companies and government institutions. The companies varied in size from only a dozen employees in the case of an auto spare parts distribution company to a large government corporation with nearly 100,000 employees engaged in generation, transmission and distribution of electric power to the entire country. These studies focused on motivations for IT introduction, the process for its utilization, and the issues faced. Detailed case studies have been prepared on more than one dozen of these companies and are available from the Case Unit of Lahore University of Management Sciences.

The details of the research methodology are provided, followed by the information on the cases studied. The analysis of the four selected cases is presented and a model to depict the influences of environmental constraints is explained and discussed. The final section of the paper focuses on conclusions and discussion of future research ideas.

**Research Methodology**

In this section the methodology followed for collection and analysis of data is presented. There are many approaches to studying IT utilization in an organization (Orlikowski, 1991). The analysis could be performed at various levels - firm and industry, for example (Bakos, 1987). A second approach is to study IT utilization at several companies through case studies and then extract frameworks and theories for further analysis and verification. One such approach is based on the concept of ‘grounded theory’ which involves discovery of theory from data obtained from field research. Generating grounded theory is a way of arriving at theory suited to its supposed uses. In this approach, rather than generating theory by logical deduction from a priori assumptions, theory is derived from data and then illustrated by characteristic examples of data (Glaser, 1967). Several guidelines have been proposed for proper use of case studies as the basis for research in MIS to enable proper selection of cases (Markus, 1989), and collection of all the relevant information (Yin, 1989).

**Data Collection for Case Studies:**

To overcome the possible methodological problems associated with case-based research (Lee, 1989), a three faceted interview process was employed in collecting data for the case studies. Detailed in-depth interviews were conducted with:

a) Top management (CEOs and General Managers);
b) Users (Functional area managers, such as marketing and production managers, and the end-user staff);
c) MIS group (including managers, designers and developers).

Several studies have been conducted to understand how IS managers’ perceptions on the IT’s role and its effectiveness are influenced by different factors, including their relationship with the CEO (Watson, 1990). The input from the functional department managers and staff was employed to overcome possible distortions in perceptions due to the possible ‘IS manager- CEO’ relationship factor. In some cases where there was active involvement of the vendor staff in design or development of systems, vendor perspective was also considered.

**Frameworks for Analysis:**

The data from the case studies has been analyzed using two simple frameworks. One focuses on the components of an IS and the other on the process involved in introducing and utilizing such systems (Kroenke, 1989). An IS has been viewed as consisting of five major functional components:

a) hardware, including all the associated peripherals and communication equipment;
b) software;
c) people, including users, end-user managers, technical staff of IS department, and vendor staff;
d) procedures, including the planning and decision making processes, evaluation and incentive systems, and the culture and norms of the concerned organization;
e) data.

The fifth component, data, is not explicitly addressed in this study as we believe it is influenced very little by environmental constraints.