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# The Impact of Changing Information Technology on Information Technology Management

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# **The Impact of Changing Information Technology on Information Technology Management**

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## **Problem/Research Area**

The business world exists in a constantly changing environment, so it is important to understand the effects of a changing environment on business organizations. The purpose of my dissertation research is to test empirically an environmental impact theory that states that changing dimensions of the environment cause information technology (IT) management problems for organizations. It also states that these organizations apply coping mechanisms to alleviate the problems directly or to alleviate them indirectly by changing the environment. The environment is defined to be made up of both inter-organizational dimensions (such as customers, competitors, IT, and government) and intra-organizational dimensions (such as users of IT). The study will focus on the IT dimension of the environment. It will use a survey instrument to gather data to identify problem and coping mechanism factors and to understand the relationships between them. Stronger relationships are expected between the use of certain coping mechanisms in the presence of particular problem types. Furthermore, it is expected that some relationships will exhibit higher levels of success than others.

## **Theoretical Background**

From a theoretical perspective, no mature and empirically validated theory for this area of research exists. Therefore, as a result of this dissertation, the field of IT management will be a step closer to having such a theory from which to begin to build research in this area.

This dissertation, however, does find its basis in earlier research. As mentioned above, a theory has been proposed that describes the impact of the changing environment on IT management and the organization's response to it [Lederer and Mendelow, 1990]. The theory recognizes both the effects of IT on IT organizations and the changes in the way IT organizations are managed.

That is, while many previous studies have focused on the impact of IT on its environment, this theory incorporates and emphasizes the need to study the impact of the environment on the management of IT. The theory provides a framework that defines the environment as consisting of Inter-Organizational and Intra-Organizational dimensions. Changes in these dimensions of the environment are posited to cause categories of problems. These problems then prompt IT management to use coping mechanisms to reduce them or to try and change the environment to dampen their effects.

A further investigation of this framework resulted in a revised framework that provides more detailed problem types and coping mechanism categories [Benamati, Lederer and Singh 1995]. This framework also posits additional relationships among problem types and coping mechanisms. Coping mechanisms are posited as being problems themselves which may cause other problems, and problems in general can cause other problems. This preliminary study as well as the original study that resulted in the environmental

impact theory were qualitative in nature. Both used a small sample size, 20 in the original and 16 in the more recent, and structured interviewing techniques to gather data from IT professionals.

### Planned Methodology

My dissertation will be an empirical effort and will be done with a much larger sample than the previous qualitative efforts. The sample size will be calculated based on the sample size required to achieve the desired power of the test to be employed. A quantitatively-based survey instrument will be developed to measure problems caused and coping mechanism applied as a result of changing technology. A pilot execution of the instrument that will result in feedback and adjustment. Representative items to measure problem categories and coping mechanisms appear in Figures 1 and 2.

The sample will be selected randomly. A 25% response rate will be assumed. The final instrument will be mailed and responses will be recorded. Follow-up mailings and phone calls will be employed as necessary. All information will be kept in a Microsoft Access database for easy sharing with other tools and for the ability to be viewed in a variety of ways via the query language Access provides.

Data, once gathered, will be analyzed and reported. Both exploratory and confirmatory factor analysis will be used to examine the proposed theory. Once factor analyzed, additional relationships that exist between the factors will be explored using causal analysis.

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#### Figure 1: Problem Type Items

To what extent has each of the following problems of new IT impeded the implementation and/or support provided by your systems organization?

- |    |  |  |
|----|--|--|
| 1. | Insufficient support from an IT vendor           | Very Little Extent 1 2 3 4 5 Very Great Extent |
| 2. | Required training about new IT                   | Very Little Extent 1 2 3 4 5 Very Great Extent |
| 3. | Difficulty retaining staff experienced in new IT | Very Little Extent 1 2 3 4 5 Very Great Extent |
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#### Figure 2: Coping Mechanism Items

To what extent does your organization use each of the following prescriptions to reduce problems caused by new IT? For each that is done, how effective is it in reducing problems causes by new IT?

- |    |   |   |
|----|---|---|
| 1. | Delay acquisition of new IT while awaiting availability of others | Very Little Extent 1 2 3 4 5 Very Great Extent  |
| 2. | Rely on IT vendor for problem resolution                          | Very Ineffective 1 2 3 4 5 Very Effective<br>Very Little Extent 1 2 3 4 5 Very Great Extent |
| 3. | Use a formal IT implementation procedure                          | Very Ineffective 1 2 3 4 5 Very Effective<br>Very Little Extent 1 2 3 4 5 Very Great Extent |
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