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# The Adoption of Information Systems in SMEs: Organizational Issues and Success Factors

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## **Abstract**

*This research approaches the issues of introducing ICTs (Information and Communication Technologies) into Small and Medium Enterprises, with the aim of finding some conditions that make the organizational context able to manage the change process needed to really get the potential benefits of these technologies. The final objective is to propose a theoretical base for a methodology able to improve analytical and diagnostic capabilities of organizational realities before and during planning and evaluation phases of their Information Technology investments.*

*The study is planned to go through two phases. The first one is aimed to look for reliable indicators to forecast readiness and adequacy of a specific organizational context towards the positive adoption of I.T. systems through a deep analysis of five significant cases. The second phase will test such indicators through questionnaire research on a larger sample of Italian SMEs.*

## **Keywords**

Systems Implementation, small and medium enterprises, organizational preconditions, change management, organizational readiness, information awareness.

## **1. Introduction**

Our enterprises, even small ones, are more and more motivated to introduce “integrated information systems” (ERP) in order to improve coordination processes between functions or organizational units, to support decision-making processes, with the final aim to reach new levels of efficiency and effectiveness in satisfying external and internal customers.

But reaching these benefits seems to be an elusive goal. Most of the times organizational difficulties arise, people are unhappy, political and cultural resistance to change is strong. Introducing new information technology is, especially for SMEs (Small and Medium Enterprises), the beginning of a risky transition with uncertain final results, and often, during

the way, new issues arise on top of those already in place, and possibly management complexity increase to new levels (Burgess, 2002).

One of the reasons is, in the authors' mind, the common approach to innovation used by SMEs. Sort of "Let's throw the baby in the pond and see if he learns to swim, someday..." or, in other words, "Let's start this innovation program and try to solve issues that arise day by day..." Another possible approach could be "Let's try to understand beforehand if the baby has, at least, the basic abilities to survive in the new situation..." or even better, let's try to identify the preconditions that can make the specific organizational context ready to positively absorb the change, and develop them.

Starting from these basic considerations, this study is guided by two main questions:

- Can we discover a cognitive path that can lead us to understand whether a given organization is "more ready" or "less ready" than another one to accommodate technological innovations?
- Is there a repeatable and logical way to help organizations to improve their ability to introduce effectively new technological means to manage information and knowledge?

Approaching the study, we refer to theoretical and interpretive perspectives that consider the adoption and implementation of a new technological system as a process of coherent decisions. The main scope of these decisions is organizational, and they are driven by a reciprocal and dynamic interaction between the organizational structure and the technological solution itself (Simon, 1947; Thompson, 1967).

Coherently with this theoretical approach, this investigation cannot have a normative aim, trying to suggest recipes or "how-to" about new information technologies should be correctly introduced inside SMEs.

The object of this work is, in fact, to develop a deeper understanding of this critical issue and to try to contribute, at a methodological level, to the improvement of the general analysis and diagnosis abilities about organizations available during, or even before, the planning and evaluating phases of information technology investments. Along this line of thought, we have two main research directions:

- Define an analytic and descriptive model allowing us to produce an adequate and realistic representation of the complexity of intertwined actions and decisions ruling the adoption and implementation process for new information technologies;
- Recognize factors and specific conditions that should be carefully considered during the planning phase of the program, because of their deep causal interconnections with the phenomena that will happen during the subsequent implementation phase.

In the next paragraph, after a brief description of the mutual relationships between new information systems introduction processes, organizational change management issues, and information flows management, we will specify objectives and hypotheses of this study. The last part of the paper describes the methodology adopted for the empirical research and a provisional schedule for the study.

## **2. Integrated Information Systems, Organizational Change Management and Information Flows Management: research hypotheses**

Thanks to their process orientation and integrated architecture, ERP (Enterprise Resource Planning) systems (sometime called Integrated Information Systems) allow the enterprise to satisfy its growing need for functional integration and enterprise behavior coherency (Barley, 1986; Biffi and Bordogna, 1990). ERP systems, also, promise to support extensively its administrative and operative automation, reducing significantly information processing costs, and improving reliability at the same time (Cerruti, 2000).

Thus they potentially provide a significant jump towards the quality, flexibility and cost reduction targets required to face competitive challenges which are common to both large and small firms. (Oriani and Monti, 1996).

The enthusiastic declarations of the main ERP software suppliers (SAP, Oracle, Peoplesoft, etc.) are one of the possible reasons why the first studies on the advantages expected from the adoption of such systems almost assert a deterministic relationship between technology and structure. This seemed to suggest a direct causal connection linking the introduction of these new systems in a given enterprise, to the self-sustaining change of organizational models towards lean, process based, structures. In this idealistic vision people would have ever been fully prepared to properly feed the system with all the needed information and ready to act properly in the new organizational environment (Ravagnani, 2000).

Real world experiences, on the contrary, show that, after the implementation of such systems, bureaucracy, procedural rigidity, decisional re-centralization can be clearly observed. These factors are, then, cause of further people resistance and organizational inertia (Davenport, 1998; Ravagnani, 2000).

It has been correctly pointed out (Beretta and Polo, 2002) that these systems can produce benefits only as a potential outcome; transforming these in concrete advantages strictly requires adequate and coherent organizational decisions.

This consideration is consistently underestimated by SMEs that, often, decide to invest in complex projects centered around integrated information systems expecting to “force” this way people and structures towards more cooperative and integration oriented behaviors, without putting in place a proper and explicit organizational change program, or even simply to adhere to the organizational mainstream. (van Everdingen, van Hillegersberg, Waarts, 2000; Burgess, 2002).

Recent literature began to analyze the issues connected to ERP and other information and communication technologies (ICTs) introduction projects and pointed out frequent failure causes as organizational diseases (Earl, 1996; Ravagnani, 2000).

Studies on the process of information technology acquisition (Davis et al, 1994) clearly show that these applications go through several evolutionary stages. During this evolution the priority in order to succeed doesn't seem to be tied only to the acquisition process (choosing the right kind of technology, deciding the investment size, information technology suppliers management), but mainly to the paths of learning and organizational change. Experience suggests that these paths should be designed and carefully managed in order to allow the acquisition and effective use of I.T. applications by the users and the whole enterprise.

Starting from this general idea, several studies are being developed to offer prescriptions to effectively manage design and implementation processes and realizing the most of the ICT investment potential (Ravagnani, 2000; Pontiggia, 2001).

Other studies (Marchand et al, 2000; Marchand et al, 2001) focus their attention on information systems considered as tools to gather, classify, and distribute information crucial for the smooth working of the enterprise and for proper decision making. They also identify causes for success, or failure, of new communication technologies in the capability, or lack of, to effectively use information inside the organization, suggest a model to measure this capability and give prescriptions to management on possible strategies to follow in developing these abilities.

Our work starts from considering the Information System as a toolset to manage information. Then we point out the fact that adopting it inside the enterprise impacts the organizational action in a fundamental way, orienting in a specific way choices around the basic coordination of roles, responsibilities and people (Zamarian and Ficco, 2001). Integrated Information Systems impact, in fact, on the way we use to produce and interchange information around activities to be fulfilled, and also on ways and timing of their fulfillment. They seem to represent one of the possible solutions to the issue of the set up and feedback in the social structuring process (Maggi, 1990). This implies, on one side, the organizational transformation potential of these tools (introducing them is a compelling opportunity to rethink and rationalize practices crystallized in the organization over time), on the other side the significant risk of refusal or corruption by impacted people inside the organization. These actors, in fact, can alter implementation timing and sometimes even the direction of the I.T. project.

It seems, then, a fundamental need for the SMEs, to develop diagnosis and interpretation skills around its own organizational reality, to really understand whether adopting an ERP system can or cannot be an adequate solution to its internal activities growing coordination needs.

The objective of the study is to possibly find a set of critical factors useful to measure the readiness and adequacy of a given organizational context at a specific time to get concrete results from a new Information System introduction process.

The said factors should be found, in our hypothesis, in the organization embedded structures and, specifically, in the portfolio of knowledge, competences, behaviors, values of the different agents inside the organization in respect to the issue of effective use of information to fulfill the organization mission. This means to continuously produce, process, store, distribute information to support decisional and operational processes inside the organization and also effectively coordinate resources towards the organization aims.

The statement we want to verify is:

“An organization that is able and used to treat information in a consistent and conscious way, that can analyze, structure and manage its own information flows, has a better ability to approach issues related to new information systems implementation. This causes a much higher probability that the new I.S. can give a positive contribution to satisfy the informational and organizational needs that caused the initiative itself to begin, maximizing its potential and expected benefits”.

Our study positions itself in the research path willing to identify critical success factors in positively introducing ICT in the organization (Holland & Light, 1999). In this context the research try to improve the general knowledge about interconnections between technical design and organizational design decisions, particularly decisions regarding the processes and

organization skills tied to producing, managing, structuring and sharing information inside the enterprise.

Under a prescriptive profile, the research objective is twofold: to enhance the awareness in SMEs' managers of the deep intertwining between the success of IT introduction and organizational decisions precedent and subsequent to the introduction of the new information system. Decisions tied to division of work in general and primarily to coordination and diffusion of information management activities. The second aim is to provide a analysis/diagnosis methodology of organizational contexts to be used during the pre-adoption phase to check and improve the organizational readiness to adopt the new Information System. So the ambition of this study, as that of other recent papers (Holland et al, 2000), is to help managers better understand their organization's strengths and weaknesses in order to productively introduce new technologies inside it.

### **3. Methodology: the exploration and the validation paths**

As said before, we made the initial assumption that some organizational decisions regarding information management practices in terms of procedures, mechanisms, systems and also skills, values and culture of people inside the organization should be considered an indicator of a higher probability to completely realize the potential results of an IT based innovation program. This assumption led us to a two phase methodology: the first one to prepare a tentative list of organizational indicators based on deep study of real life projects and then discover possible interdependence between such information readiness indicators and the specific IT initiative. The second phase could, then, verify the soundness of such indicators testing them in a broader sample of enterprises and projects.

#### **3.1 The “exploration” step: qualitative research**

We are working on this phase through five typical explorative case studies of successful Italian SMEs that have introduced (or are introducing) an integrated information system in part or as a whole. These studies include the analysis of internal documents about the project and the relationship with external parties involved and several semi-structured and informal interviews to people involved in information gathering, managing and use inside the organization. Our aim is to understand quite deeply motivations in the projects and expected results as seen by the different organization roles, to capture the possibly different feeling about the way the project has been carried on, and the level of satisfaction about the project outcome. We are also interested in analyzing the way information was managed, structured, and shared inside the organization before and after the IT project beginning.

This first sample of enterprises has been chosen for two common characteristics: they are in the furniture business, inside the supply chain with no direct connection with the final customer. This kind of firms find themselves in a phase of their business lifecycle in which their ability to gather, manage, and share information is a critical competence for the survival of the firm and the success of their competitive positioning. These companies are part of the Marche Italian region furniture district: open access to them has been made easier because of the relationship network that Urbino University developed during the years within the district.

The acquisition of some structured information and of several personal views of the process is giving us a pretty good vision of organizational dynamics and an idea of the results concretely reached by each I.T. initiative under study.

We want then to use the data collected to give an answer to the following kind of issues for each case:

- Who were the critical actors and teams during the initial decision to start the project, the technology selection phase, the implementation and then the go-live of the system;
- Who decided what, or who was crucial in the decision, and how were responsibilities and behaviors shared;
- Which was the influence on the project of already in place formal and routine procedures;
- What organizational changes were expected and then caused by the project? What about the unexpected evolutions?
- Were there organizational practices (formal or informal) about finding, processing and sharing information before the project? What changed, then?
- How organizational climate and “information openness” changed during the project? Was this evolution somehow stressful?
- Was structured organizational procedures developed during the project or were in place before?
- Did the project require or cause an evolution of people skills and organizational roles? How was this need discovered?
- Was a formal competence assessment put in place? Around which specific skills and roles?

We are going to gather these data during a deep analysis carried on five relevant cases, in each of them we will have several meetings and ask different questions to each available actor. Our current experience shows that, in small/medium size organizations, speaking with 4/5 people gives an open and realistically varied view of the issues we are investigating.

At the end of this explorative phase, we will have a quite clear feeling of perceived success of the I.T. initiative (i.e. meeting organization expectations) and also some factors (possibly the result of specific organizational decisions) potentially affecting the IT introducing process and the results obtained in those cases. It will then be possible to look for some consistencies between decisions, factors and results. We expect to be able to have, at this point, some statements of the kind: “It seems that, given the presence (absence) of this factor, this situation has such probability to arise and this could have increased (decreased) the success probability”.

### **3.2 The “control” step: quantitative research**

Aim of the second step is to prepare a methodological schema for the analysis and diagnosis of the organizational context readiness to fully realize the IT project potential. The dimensions used in the schema will be the factors and organizational indicators tied to information abilities that will present a correlation with the success of the project itself.

The objective of this second step of this study is the validation of these hypothetical success factors.

The aim of the quantitative research is, in fact, to verify on a broader sample of enterprises, the found methodological schema and possibly estimating the relative weight and impact of

each of the found factors on the success of the definition and implementation phases of the ICT project and on its long-term payback.

We will send a closed questionnaire to a larger sample of companies to be treated by statistical analyses.

## 4. The current status and the research schedule

Currently the research group is working on the exploration phase gathering data through interviews and meetings with enterprises people. Perceived management interest in the initiative is even higher than what we expected.

During our contacts, managers often complain that information systems implementation studies and that both academicians and practitioners attention have been by now reserved to large enterprises. They have also pointed out the need for much deeper understanding of SMEs specific characteristics in respect of innovation and Information Technology potentially positive contributions.

We currently plan to finish the qualitative research, case studies preparation and formalization of main factors hypotheses by late 2003.

The quantitative research is forecasted to be launched during 2004.

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