

# Interaction between Enterprise Resource Planning Systems and Organizational Culture

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**Abstract.** Building up on findings of IT culture research and ERP research, the assignment is to investigate organizational cultural variables impacting on changes through enterprise resource planning (ERP) systems. The study suggests seven cultural factors that are influenced by ERP usage. The results are grounded in both a review of the literature on ERP, organizational culture, and an analysis of qualitative data collected from ERP experts. The findings will provide explanations that cultural factors should be considered when using an ERP system.

**Keywords:** Computer-augmented environment, organizational culture, Enterprise Resource Planning (ERP), user behavior, organizational behavior.

## 1 Cultural Battle with Enterprise Resource Planning

Enterprise Resource Planning (ERP) packages are implemented in enterprises with different organizational and national cultures. Culture refers to human practices, in contrast to conditions that are dictated by nature. Human values and behavior or communication patterns result from a cultural character. The latter decides whether certain behavior is accepted in a country or not. Thus, different cultures lead to diverse organizational structures in firms. They influence the culture of debate, the hierarchical understanding, organizational behavior, structures and information processing [3, p. 192; 4, p. 371].

A particular challenge is the introduction of new information systems and their changes since the users are not ready to give up old habits. Therefore, in order to maintain the old workflows they do not rely on the standard components. Ideally, however, the existing processes are not used as a basis for new target processes. Instead, the structure of the organization should base on the established processes of the standard software (reference processes) [12, p. 147,148; 3, p. 185,186].

The technical implementation of ERP systems is accompanied by a behavioral change in work processes, for example, that orders are processed accurately, material is dispatched on time or products are produced as needed [6, p. 231, 12, pp. 45, 55]. For management, it is important to realize that any change in the company also brings a change in corporate culture and sometimes requires it. Since the introduction of an

ERP system has some significant impact on the way people work, the organizational culture is affected. Without a deep understanding of its impact on organizational culture, a company is unlikely to be able to develop with regard to the ERP system.

The maxim of each introduction or adaptation of an ERP system should not be that any resistance by the user is suppressed, punished and therefore useless—in other words a cultural battle—but that the consistent use of ERP systems improves processes and thus leads to a new company and organizational culture in the interest of the company and also its employees.

## 2 Research Gap and Research Questions

The objective of this study is to reveal the clash of cultural forces between the (cultural) practices embedded in ERP software and organizational culture and structure. The aim is to identify organizational culture values related to the meaning of practices embedded in ERP software (information, integration etc.). In detail, what characteristics, behaviors and attitudes counteract in regard to different organizational cultures with the features of an ERP system or what organizational cultures work easier with an ERP system.

Scholars looked at following aspects: Information system development, inter-organizational relationships, IT adoption and diffusion, IT management and strategy, IT use and outcomes, IT culture, IT impact on culture, organizational impact of IT. LEIDNER observes in her literature review that “a strong interest in understanding the relationship of IT and culture and determining how social groups interact with and apply IT in organizational settings“ exists [4, p. 371]. Although culture has been cited widely as a challenge in ERP initiatives, and although many studies have considered the implications of organizational culture on ERP, no study addresses the change of organizational culture through an ERP system in a concrete and observable manner (see figure 1). Studies on ERP and culture generally include the adoption of ERP in different countries in order to explain the role of culture in implementing ERP systems. This article adds to the literature by identifying organizational culture variables that change through ERP systems in an organization.

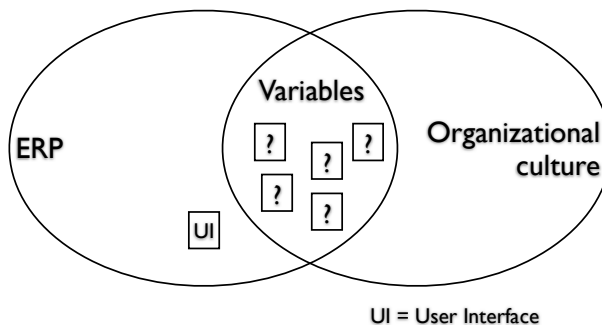


Fig. 1. Interaction between ERP and Organizational Culture

Specifically, the following research questions (RQ) will be answered: What organizational culture variables change by ERP?

This aspect will contribute to the understanding of ERP systems and the associated organizational changes in companies.

### **3 Research Design**

The author pursues to contribute to IT culture research by identifying organizational culture variables that change through ERP systems in organizational settings. An explicit study of variables in order to identify requirements for organizational culture through ERP has not been made yet in any work. For this reason, it is first necessary to develop an understanding of this topic. A qualitative approach, as opposed to a quantitative method, is a suitable research approach, if a topic has not been understood sufficiently. They offer the variety and wealth of data to get an understanding of the context to be examined [5, pp. 19-22].

In the first part, the author strives to provide components and requirements of the ERP system that is necessary for the analysis. The important point is that only components related to the organization are looked at.

The second part has the objective to identify organizational culture variables that change through ERP systems in an organization. In order to understand the interaction between culture values and ERP, this paper reports on an exploratory interview study with ERP experts that identify these values [13, pp. 76; 9] (see table 1). The interview guide provides questions about organizational structure, processes and data as well as information usage and usage in general. The survey of these people allows to get a better understanding of the ERP-cultural relationship and thus to detect causal relationships than it would be possible through a survey. The selected group of experts has years of experience and knowledge in dealing with the implementation and use of ERP software in companies [13, 14].

The third part has the objective to measure the variables before and after ERP introduction. The case study approach is chosen as research method. The case study approach enables to explore and point out those questions with the concurrent lack of knowledge about identify organizational culture variables that change through ERP systems (see table 1). The case studies are based on observing different units of analysis in its natural setting. The filtered data of numerous single observations (each building one case study) is then combined and examined against the study objectives. Propositions are deduced from the results and can, at a later stage, be verified by a large-scale quantitative survey.

The overall objective of the empirical part is to identify requirements for organizational culture through ERP systems based on organizational culture theories (e.g. Schein) and provide recommendations to support the ERP change management process through adaptation of organizational culture (ERP culture alignment).

**Table 1.** Research process

<b>Empirical study</b>	<b>Objective(s)</b>	<b>Method</b>
I (present paper)	Provide ERP components and requirements (unit of analysis)	Literature review
II (present paper)	Identify organizational culture variables that change through ERP systems in an organization (RQ 1).	Interview study (ERP experts)
III	Measurement of the variables before and after ERP introduction (e.g. MM-Module, OTC process, PTP process).	Embedded case study (different units of analysis in an organization and different experts)
IV	Identify requirements for organizational culture through ERP based on organizational culture theories (e.g. Schein) (RQ 2).	Argumentative-deductive
V	Recommendations to support ERP change management process through adaptation of organizational culture (ERP culture alignment)	Argumentative-deductive

## 4 Literature Review

### 4.1 Enterprise Resource Planning

Business software or enterprise systems are different names for Enterprise Resource Planning (ERP) systems. An ERP system is a special type of information systems, which are defined as socio-technical-systems. It is used for the quantitative and time-oriented scheduling of equipment, personnel and capital. The system controls the process depending on the material types, document types, groups of accounts or payment but independent of the people who work in the various areas of the company. Compared to other information systems, ERP is characterized by best-of-breed business processes. These standard software systems were designed and developed for the interaction between different task fields from the very beginning [12, pp. 147, 148].

For the whole research process, the following four components and requirements of ERP system are relevant [3,11, 12]:

- **(Organizational-) structure.** When using an ERP system it is necessary to illustrate the organizational structure of the enterprise in the structure of the standard business software. That means it is necessary to transfer the real organization into system elements like e.g. client, company code, plant and storage location. Besides this the company is divided into functional areas, like materials management, production planning, sales and distribution, financial accounting, controlling etc.

Also, in order to capture process information and the logical structuring of the workflow various functional areas within the company have documents as control and steering elements.

- **Processes.** The usage of ERP systems is meant to improve business processes. These improvements are related to e.g. activities, division of labor, responsibilities and deliverables. Besides, ERP means automation of functionality. For example, transformation rules calculate and derive something in the pricing process.
- **Common data.** ERP systems also share a common database, which enables consistent organizational data collection and processing. A standardized way of communication and information distribution is meant by ERP.
- **User Interface (UI).** The UI is the interface between system and user. Thus, a user interface for humans must be adapted to their needs and abilities in order to be useful to them. Usability criteria analogous to websites are colors, grouping of content and spatial distribution. The culture takes an affect on how the user is dealing with the product and why people from different cultures have different ideas of usability.

Since this paper is about dealing with ERP in the context of different organizational culture dimensions, this rather technical aspect of the UI is not further included in the analysis. It also rather concerns national-specific differences than organizational culture. The organizational culture influences how users work with the ERP system and why people have different understandings of using the system.

## 4.2 Organizational Culture

Companies differ not only by location, size, products and their success; they are also characterized by different objectives, principles, manners and behaviors. Not only the country in which they reside shapes corporate cultures. In turn, corporate culture is the basis for rules, procedures, working conditions, habits, decision-making, knowledge sharing, and information usage [2].

In his organizational culture framework Edgar Schein (1988) describes culture as follows: „Culture is a pattern of basic assumptions, invented, discovered, or developed by a given group, as it learns to cope with its problems of external adaptation and internal integration, that has worked well enough to be considered valid and, therefore is to be taught to new members as the correct way to perceive, think, and feel in relation to those problems.” His model illustrates culture on three different levels, which influences each other: Visible organizational structures and processes, values and beliefs [10, p.9].

Other frameworks include dimensions or values to detect organizational culture. With information technology, in particular the following content areas of corporate culture, denominated as cultural dimensions are put in contact: target orientation, result orientation, cost orientation, open communication, process orientation, ability to learn and adapt. These dimensions are partially interrelated or interdependent or mutually dependent [1, 4, 8, 9].

## 5 Preliminary Results

The interview study was organized on the basis of the factors identified in the literature review. The review leverages these components of ERP: structure, processes and data. The results of the literature review were then discussed in semi-structured interviews with ERP experts who have experienced a high number of ERP implementations and change processes. The interview results revealed the following organizational culture variables that change through ERP systems:

- **Decisions.** In order to make a decision managers need information about all the different enterprise divisions. Through ERP this process has changed. Also the users are confronted with a new situation. For instance the system has automated some process steps changing the work environment of the user. This may influence the way of decision making.
- **Transparence.** An ERP system establishes the principle that information is centrally available. It enables the transfer of information that was previously available only in one place. However, this requires open communication and the willingness to share information. The interview results showed that on the one hand users were sometimes exchanging more information among each other and on the other hand higher transparence were frightening them in the beginning.
- **New skills of user.** With the introduction of an ERP system the user has to learn how to use the system technically, but he also needs to learn new things like thinking in a structured and logical way, accuracy, unambiguity and the ability to abstract.
- **Evaluations.** ERP enables to evaluate transactional data i.e. business transactions. A customer-oriented, objective and logically correct process control takes center stage.
- **Responsibilities and accountabilities.** Working with ERP systems is goal-oriented, structured and systematic according to schedule. Organizational units and employees are assigned clear roles and responsibilities. An organizational culture that includes this already works—a positive effect on the ERP application.
- **Process Owner with a clear mandate and responsibility.** ERP systems provide the basis to overcome divisional thinking and going over to enterprise-wide process thinking. The central information management and consultative information processing enables process integration and collaboration among departments with cross-functional teams. This will only work with a process owner provided with power of decision.
- **Avoidance of central data storage.** ERP systems are based on the idea of data integration. Important information is collected, stored and processed at the origin. This is important for the smooth running, but also for a high level of information security (compliance). For example, every movement of goods triggers changes in accounting and cost accounting. The scheduling and procurement costs, inventory levels and the cost of capital are controlled. Causalities become clear. This new way of data and information usage is new to the user.

**Interaction between ERP and Organizational Culture.** The overall goal of this research was to show how organizational culture values are reflected in relation to the ERP systems. The challenge to use a business information system in the correct way is not only a technical matter but, like the interview results show, a matter of interaction of system requirements and organizational culture like decision making, knowledge sharing, information usage, structures and processes, values as well as beliefs (variables).

Further research should answer the question, how organizational culture influences the understanding for changes induced by ERP. The objective is to design this interaction into practical innovation for a better adoption of ERP systems. Also a organizational culture should be described which fits best the intended usage of ERP systems and how an iterative IT-based change leads to a new ERP culture with its own information and IT values.

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