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## The role of organizational culture on ERP implementation

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# THE ROLE OF ORGANIZATIONAL CULTURE ON ERP IMPLEMENTATION

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## Abstract

*Enterprise Resource Planning (ERP) systems have become a fundamental part of business infrastructure. In an effort to minimize the risk associated with ERP implementation, a number of critical success factors (CSFs) have been developed. However, CSFs are presented as independent from context, under the pretense that all ERP implementations are equal. In this study, we challenged this assumption by focusing on the role of organizational culture on ERP implementation. From a set of representative CSFs, matched to Hofstede's cultural dimensions we studied assumed influences with empirical data. From this we found that organizational culture influence several CSFs associated with ERP implementation. Our findings provide an advantage over a generic conception of CSFs, by showing the importance of culture in ERP implementation.*

*Keywords: Critical Success Factors, CSFs, Culture, ERP, Implementation.*

# 1 INTRODUCTION

The business environment keeps on changing dramatically. In order to stay competitive, organisations must continuously improve their business practices and procedures, meaning that all departments and functions within organisations are pushed to upgrade their capability to generate and communicate accurate and timely information (Umble, Haft and Umble, 2003). This is nowadays usually done through highly complex Enterprise Resource Planning (ERP) systems that automate and integrate all information flowing through an entire organisation into one entity (Davenport, 1998; Umble et al., 2003). Through such systems, organisational information is gathered and stored in one place, optimising business decision-making and operations. ERPs are therefore considered a fundamental component of the current business environment; Kumar and Van Hillegersberg (2000) state that ERPs are considered to be “the price of entry for running a business”.

But at the same time are implementation of ERPs considered to be high-risk projects (Teltumbde, 2000), and chances of successfully implementing an ERP are not encouraging. According to Chen (2001), the failure rate may exceed 50 per cent. Langenwalter (2000) conducted a study that led to similar findings, estimating the failure rate to be between 40 and 60 percent. This high failure rate has driven researchers to attempt identifying critical success factors (CSFs) crucial for implementation of ERPs. Critical success factors (CSFs) are usually seen as a form of guidelines, and are defined by Rockart and Bullen (1981) as “the limited number of areas in which satisfactory results will ensure successful competitive performance for the individual, department or organisation”.

The ERP implementation process is often considered to be homogeneous throughout all organisations (Ngai, Law and Wat, 2008). The majority of studies on the subject exhibit an “unambiguous prescriptive orientation” that does not take into account organisational specificities (Kallinikos, 2004). Consequently, a single set of CSFs is often presented as valid and essentially repeated on different works, disregarding cultural elements (Rabaa’i, 2009). Ngai et al. (2008) stress the importance of conceiving the ERP implementation process as a changing one, and recognise the existence of important differences in CSFs throughout implementations in different countries. In a similar fashion, Shanks et al. (2000) state: “Consulting organisations should be careful when applying ERP systems implementation approaches that have been successful in one culture in another culture.” From this it can be claimed that organizational culture seems to have high influence on ERP implementation CSFs.

It is a fact that studies regarding the role of organisational culture in the ERP implementation process have been conducted, warning on the negative consequences of disregarding culture (Davison, 2002; Kallinikos, 2004; Kayas, McLean, Hines and Wright, 2008; Krumbholz and Maiden, 2001; Ngai et al., 2008; Rabaa’i, 2009). However, with the exception of Shanks et al.’s (2000) case study on ERP implementations in Australia and China, not much research displays what role organisational culture has on ERP implementation CSFs.

The identified problem area led to the following research question: *What role has organisational culture on ERP implementation?*

This study challenges the widespread view that asserts that CSFs are of a universal nature, thus not dependent on the characteristics of the contexts they are being applied in. Our academic contribution will be to provide a novel framework to assess the role of organisational culture on particular CSFs. Furthermore, a better understanding of the topic will potentially allow practitioners to cater the CSFs for the ERP implementation process, taking into account the cultural specificities of the target organisation. This study aims to show the contingent nature of CSFs associated to the ERP implementation process, by illustrating what role organizational culture has on *ERP implementation CSFs*.

The rest of the paper is organized as follows: The next section provides a short introduction to organizational culture and CSFs in the area of ERP implementation. Section 3 then presents the

research method. Section 4 discusses the findings and presents developed propositions and some conclusions.

## 2 A SHORT STORY ON ORGANIZATIONAL CULTURE AND CSFS

### 2.1 Organizational Culture

The starting point for this study was Hofstede's cultural dimensions theory. Hofstede (1980) introduced a framework with four independent cultural dimensions –*Power Distance*, *Individualism*, *Masculinity*, and *Uncertainty Avoidance*.

Later on, Hofstede introduced a fifth dimension referred to as *Confucian Dynamism* –also known as *Long/Short Term orientation*– (Hofstede, 1991) in order to improve the theory's fit to Asian cultures (Jones, 2007). This additional dimension was heavily criticised and considered “fatally flawed” (Fang, 2003). Due to its high questionability and low added value, this study will not rely on the fifth dimension suggested by Hofstede (1991). More recently, Hofstede et al. (2010) added a sixth dimension to the author's model: the *Indulgence* dimension. Due to its lack of maturity and low interest for our particular study, it will also be disregarded. Therefore, our focus was on the four original dimensions of Hofstede's model.

Several elements point out that Hofstede's theory is mature and accepted. Hofstede's research has had a deep effect on academia and practice (Jones, 2007). His work is well cited in the subject within IS literature (McCoy, 2003). The theory is extensively used to describe cultural differences in organisations and how they effectively influence IS (Shanks et al., 2000). Hofstede's research has also served as a starting point for development of alternative methods for characterisation of cultures, such as the work of Dorfman and Howell (1988). However, Hofstede's theory has been the target of a considerable amount of criticism (Jones, 2007). Authors such as Wu (2006) specifically criticise the data, which they consider to be out of date. Hofstede (1998) replied to this apparent flaw, stating that culture will not change overnight. Additionally, many replication studies verified Hofstede's findings. Søndergaard (1994) compiled 61 replication studies of Hofstede's theory, later stating that the analysis showed that the differences predicted by Hofstede's dimensions were largely confirmed.

Simpler alternative models for assessing organisational cultures such as Deal and Kennedy's (1982), which merely enounce different types of cultures, were considered unsuitable for this study because they do not fit our goal of identifying distinct cultural elements and their influence on CSFs. Multidimensional approaches such as Gordon and DiTomaso's (1992) were initially considered suitable. However, the maturity exhibited by Hofstede's model along with its wide acceptance in IS literature (McCoy, 2003) made it preferable to adopt as our frame of reference.

Hofstede's (1980) theory has been chosen because of its multidimensional approach and its high level of maturity; allowing us to easily decompose cultural specificities in highly differentiated dimensions, using a proven framework. Since Hofstede's theory is based on the independence of its cultural dimensions, any extension to the author's model may threaten its consistency. Additionally, extending this model would not allow us to benefit from the proven replicability of Hofstede's model. Therefore, we will only consider the four original cultural dimensions suggested in Hofstede (1980). In the following sections, each of these dimensions: *Power Distance*, *Individualism*, *Masculinity* and *Uncertainty Avoidance* are discussed shortly.

**Power Distance** (PD) is the degree of inequality that exists between a more powerful and a less powerful person. This dimension refers to; up to which point power and wealth inequality is tolerated, and is reflected in organisational hierarchy (Hofstede, 1980). Hofstede's model also implies that individuals from high PD countries would be more task-oriented than people-oriented (Bochner and Hesketh, 1994).

**Individualism** (ID) refers to; up to which degree persons are perceived as a separate entity within a society (Hofstede, 1980). In one extreme, the individual exists as a clearly distinct entity, while in the other extreme of the continuum the distinction between the individual and the group is blurred and the individuals' perception on themselves considers their cultural surroundings (Bochner and Hesketh, 1994). Collectivism has an inverse relationship with individualism –the lower the individualism is, the higher the collectivism is– and therefore should be addressed as a single dimension (Hofstede et al., 2010).

**Masculinity** (MF) indicates to which extent “masculine” (tough) values such as performance and competition prevail over “feminine” (tender) values such as personal relationships and quality of life (Hofstede, 1980). Vitell et al., (1993) suggest that a more masculine society may contribute to the engagement in unethical behaviour. In a similar fashion to individualism and collectivism, masculinity and femininity maintain an inverse relationship –the lower the masculinity is, the higher the femininity is (Hofstede et al., 2010).

**Uncertainty Avoidance** (UA) refers to which degree people avoid a lack of structure or uncertain events (Hofstede, 1980). A high score on UA translates to stronger needs for structure and clear rules and guidelines, while a low UA score translates into a higher acceptance of uncertain events and lax structures.

## 2.2 Critical Success Factors in ERP implementation

It can be stated that implementation of ERPs is a disruptive process that relates to several aspects of an organisation. A successful implementation can bring considerable benefits, while a failed one can have negative, or even disastrous, consequences (Holland and Light, 1999; Markus, Axline, Peterie and Tanis, 2000). Due to the critical nature of the process, organisations interested in implementing ERPs need to devise a clear implementation path. Holland and Light (1999) suggest that organisations should ask themselves two questions: (1) “How can ERP systems be implemented successfully?” (2) “What are the critical success factors (CSFs) for an ERP implementation?” Regarding CSFs it is found that these are defined in numerous ways, slightly disagreeing on the nature of the concept but agreeing on the overall meaning: CSFs provide guidelines to achieve a successful outcome. Table 1 presents three different definitions of CSFs.

Boynlon & Zmud, (Boynlon and Zmud, 1984)	“Critical success factors are those few things that must go well to ensure success for a manager or an organisation, and, therefore, they represent those managerial or enterprise area, that must be given special and continual attention to bring about high performance.”
J.F. Rockart (Rockart, 1979)	"Critical success factors thus are, for any business, the limited number of areas in which results, if they are satisfactory, will ensure successful competitive performance for the organization. They are the few key areas where 'things must go right' for the business to flourish."
Huotari & Wilson (Huotari and Wilson, 2001)	"In any organization certain factors will be critical to the success of that organization, in the sense that, if objectives associated with the factors are not achieved, the organization will fail - perhaps catastrophically so."

**Table 1.** *Different definitions of CSFs.*

Although the definitions presented share the same overall meaning, it is not clear from those definitions where from CSFs emerge. According to Rockart and Bullen (1981), five sources of CSFs exist:

1) *Industry*: Specific characteristics of the industry an organisation operates in will have an impact on resulting CSFs; for example, supply of highly skilled professionals will be of more importance in knowledge-intensive industries such as IT,

2) *Competitive strategy and Industry position*: The resulting set of CSFs will vary along industry position. Organisations leaders in their industry will prioritise different areas than its non-leading peers,

3) *Temporal factors*: Changes within the organisation might raise concern over certain areas, establishing temporal factors; for example, the upraise of a strike might lead the organisation to become increasingly concerned in this area,

4) *Managerial position*: Rockart and Bullen (1981) state that CSFs can be specific to an organisation or to an individual. If CSFs are considered from an individual’s point of view, their managerial position will have an effect on the resulting CSFs. For example, a middle manager will probably be more concerned about subordinate’s performance, while a C-level executive will potentially have their focus on strategic goals,

5) *Environmental factors*: The characteristics of the environment the organisation is immersed in may trigger CSFs. For example, operating in an unstable political environment will raise concern in that area.

What is clear from the list of CSFs sources is that organizational culture is not seen as a specific source, and it is most likely correct not to do so. However, it can be assumed that organizational culture has an indirect impact through the different sources of CSFs.

From this it can be stated that there are some slightly different definitions on CSFs and probably not a total agreement on what CSFs sources that exist. However, it seems to be more coherent agreement on ERP implementation context CSFs. This statement is made from the fact that there exist a lot of research presentations on “the list” of CSFs. What is striking in those lists is that they most often presents the same CSFs and rank them more or less in the same order. In Table 2 we show a compilation of CSFs ranking based on 10 frequently cited articles.

Critical Success Factors	A 1	A 2	A 3	A 4	A 5	A 6	A 7	A 8	A 9	A 10	Freq.
Change Management	•	•	•	•	•	•	•	•	•	•	10
Top Management Support	•	•	•	•	•	•	•	•	•	•	10
Project Management	•	•	•	•	•	•	•	•	•	•	10
User Training	•	•		•	•	•	•	•	•	•	9
Business Plan and Vision	•	•	•		•	•	•	•		•	8
Project Team		•	•	•	•	•			•	•	8
Stable Legacy Systems	•	•	•		•			•	•	•	7
BPR and Customization avoidance	•	•	•	•	•	•			•	•	7
Project Champion	•		•	•	•		•		•	•	7
Effective Communication and Reporting	•	•	•	•	•			•	•		7
System Testing and Troubleshooting	•	•	•		•			•		•	6
Consultant Selection	•	•		•	•						4
Data Conversion		•			•		•		•		4

**Table 2.** Mapping of article concepts to predefined CSFs from literature. A1-Holland and Light [29]; A2- Markus et al. [30]; A3- Nah et al. [34]; A4-Amoako-Gyampah [35]; A5- Finney & Corbett [36]; A6- Hong and Kim [37]; A7- Umble et al. [1]; A8- Al-Mashari et al

From this short expose of organizational culture and CSFs, we can conclude that it would be of interest to further investigate what influence organizational culture has on ERP implementation CSFs. Hence, each CSF was discussed in perspective of Hofstede's model of organisational culture.

### 3 RESEARCH METHOD

The starting point was a literature review on organisational culture and CSFs associated to the ERP implementation process. The review provided us with our initial research framework, a list of factors to be studied in the light of organisational culture. Regarding the empirical data, we did semi-structured interviews with four informants in three organizations; detailed information is given in Table 3.

Company	Country	Business area	Employee position	Interview		
				Number	Date	Duration
A	Serbia	Retail	CIO	1	April 24th, 2012	51 minutes
A	Serbia	Retail	Subordinate	2	April 16th, 2012	40 minutes
B	Bosnia	Energy	CEO	3	April 16th, 2012	71 minutes
C	Bosnia	Automotive	CFO	4	April 19th, 2012	60 minutes

**Table 3.** *Overview of interviews*

After concluding the interview sessions, verbatim transcripts were created. These were later coded using an explanatory effects matrix as suggested by Miles and Huberman (1994). This instrument is aimed at explanatory qualitative studies, and therefore suited our study particularly well. Explanatory effects matrixes rely on interviews for collecting empirical data, contrasting the propositions developed by the researchers with the statements made by the interviewees. The “Assessment” value is not established by the interviewee, but instead constitutes the researcher’s interpretation. After doing this we were able to discuss and draw some conclusions on our research question, which is presented in the next section.

### 4 DISCUSSION AND CONCLUSIONS

Applying the method presented above, we identified influence of organisational culture propositions and developed the framework, shown in Table 4. As it can be witnessed in the table, the cultural dimensions Power Distance, Individualism and Uncertainty Avoidance identified influence. Masculinity was not found to have a considerable impact on any of the selected CSFs. This is consistent with the findings of Gunasekaran (2008), who states that the masculinity dimension does not provide much impact on ERP implementation.

Critical Success Factors	Identified Cultural Dimension
Change Management	Power Distance (PD)
Top Management Support	N/A
Project Management	Power Distance (PD) & Uncertainty Avoidance (UA)
User Training	Individualism (ID)
Business Plan and Vision	N/A
Project Team	Individualism (ID)
Stable Legacy Systems	N/A

BPR and Customization avoidance	Uncertainty Avoidance (UA)
Project Champion	Power Distance (PD)
Effective Communication and Reporting	Power Distance (PD)
System Testing and Troubleshooting	N/A
Consultant Selection	N/A
Data Conversion	N/A

**Table 4.** Relationship between CSFs and identified cultural dimension

From our initial review it can be claimed that the conventional approach towards CSFs does not consider external influences and promotes a generic approach (Ngai et al., 2008). We have challenged that approach, presenting evidence that shows that the relevance of several CSFs changes according to the cultural context the organization is immersed in. It can also be stated that CSFs are guidelines. They are not a recipe for instant success, but rather the result of an evaluation of past implementations. Although valuable, CSFs should be handled with care, since they are detached from the context they emerged from. Thus, it is important to keep in mind that CSFs do not tell the whole story. It is the responsibility of the ERP implementation manager to reinterpret each CSF according to the context in which the implementation will take place. Organizational culture is definitely a major component of this context. In Table 5 we show identified cultural implications on CSFs.

Implication	Description
High PD ⇒ ↓ Change Management	The CSF “Change Management” becomes less relevant as the cultural dimension “Power Distance” increases, because change management becomes easier.
High PD ⇒ ↑ Project Management	The CSF “Project Management” becomes more relevant as the cultural dimension “Power Distance” increases, because project management approach becomes harder to apply.
High PD ⇒ ↓ Project Champion	The CSF “Project Champion” becomes less relevant as the cultural dimension “Power Distance” increases, because project championship becomes less required and less differentiated from top management.
High PD ⇒ ↑ Effective Communication and Reporting	The CSF “Effective Communication and Reporting” becomes more relevant as the cultural dimension “Power Distance” increases, because communication is harder.
High ID ⇒ ↑ User Training	The CSF “User Training” becomes more relevant as the cultural dimension “Individualism” increases, because retaining talent becomes harder.
High ID ⇒ ↓ Project Team	The CSF “Project Team” becomes less relevant as the cultural dimension “Individualism” increases, because the involved employees exhibit less resistance.
High UA ⇒ ↑ Project Management	The CSF “Project Management” becomes more relevant as the cultural dimension “Uncertainty Avoidance” increases, because the project management approach becomes harder to apply.
High UA ⇒ ↓ BPR and Customization Avoidance	The CSF “BPR and Customization Avoidance” becomes less relevant as the cultural dimension “Uncertainty Avoidance” increases, because the organization is better prepared to deal with a rigid structure.

**Table 5.** Cultural implications on critical success factors. Arrow pointing upwards illustrates increased relevance and downward arrow the opposite.

We found that organizational culture creates both culture-specific advantages and disadvantages:



1) Culture-specific disadvantages increase the relevance of their related CSFs, by making those CSFs harder to achieve within the given context. For example, a high level of inequality amongst employees – addressed in this study as high power distance – makes communication more difficult. Thus, the CSF "Effective Communication and Reporting" becomes harder to achieve and therefore more relevant.

2) Culture-specific advantages decrease the relevance of their related CSFs, by making those CSFs easier to achieve within the given context. For example, a high reliance on structures – addressed in this study as high uncertainty avoidance – makes the organization better prepared to deal with a less customized ERP. Thus, the CSF "BPR and Customization Avoidance" becomes less relevant.

Having gained an understanding of the overall relationship between organizational culture and CSFs associated to the ERP implementation process, we are in position to conclude this study.

In this paper we discussed the following research question: *What role has organisational culture on ERP implementation?*

It is clear that ERPs has shifted from being a competitive advantage to constituting a fundamental part of business infrastructure, regardless of industry sector. However, the high failure rate of ERP implementations points out that there are many impediments on the way. Given their critical business role and troublesome implementation, ERPs are given an immense amount of attention. In an effort to minimize the risk associated to the ERP implementation process, a number of CSFs have been introduced. However, CSFs are presented as independent from the context, under the false pretense that all ERP implementations are created equal.

One of the major components of the ERP implementation context is organizational culture. In this study, we have provided evidence that the relevance of several CSFs is not uniform throughout different cultural contexts. We are therefore able to provide the following answer to our research question: *Organizational culture creates culture-specific disadvantages and advantages, which respectively increase or decrease the relevance of their related ERP implementation critical success factors.*

We believe our findings provide an advantage over a generic conception of CSFs, though success is not intrinsic to our approach. Instead, our approach increases the value of CSFs, providing better guidance in the ERP implementation process by improving the cultural fit of the implementation. Through our approach, organizations will be able to allocate their resources more efficiently and thus increase the chances of a successful implementation.

This study serves as a critique of the literature on CSFs associated to the ERP implementation process, which claims that CSFs are of a universal nature and thus independent from the context they are being applied in. In this study, we have illustrated that culture can influence the relevance and importance of CSFs associated to the ERP implementation process, making their contingent nature explicit.

We have provided initial insight on a topic previously unexplored. However, further research on the topic would highly benefit of a quantitative study, building on the qualitative grounds that we have provided, by further test and evaluate our findings.

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