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# THE CORRELATION OF ORGANIZATIONAL CULTURE AND SUCCESS OF BPM ADOPTION

Brina Hribar

*Faculty of Economics, University of Ljubljana, Ljubljana, Slovenia, [brina.hribar@ef.uni-lj.si](mailto:brina.hribar@ef.uni-lj.si)*

Jan Mendling

*WU Wien, Vienna, Austria, [jan.mendling@wu-wien.ac.at](mailto:jan.mendling@wu-wien.ac.at)*

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# THE CORRELATION OF ORGANIZATIONAL CULTURE AND SUCCESS OF BPM ADOPTION

*Complete Research*

Hribar, Brina, University of Ljubljana, Faculty of Economics, Kardeljeva pl. 17, 1000 Ljubljana, Slovenia, brina.hribar@ef.uni-lj.si

Mendling, Jan, Wirtschaftsuniversität Wien, Institute for Information Business, Welthandelsplatz 1, 1020 Vienna, Austria, jan.mendling@wu.ac.at

## Abstract

*Organizational culture has been described as one of the most important factors in BPM adoption, as it is reported to support or hinder BPM efforts in an organization. However, this proposition is still hardly backed up with empirical research. The aim of this paper is to provide a better understanding of the contingent role that organizational culture can play for the success of BPM adoption. To this end, we use a survey design for evaluating the correlation of organizational culture and the success of BPM adoption. Our survey was distributed among top managers and (where applicable) process owners in organizations with more than 50 employees in Slovenia. The results reveal that the highest level of BPM adoption success is achieved in organizations with Clan culture type, whereas organizations achieving the lowest level of BPM adoption success appear to have a Hierarchy culture, as measured by the culture classification of Cameron and Quinn (2006). A significantly negative correlation has been found between Hierarchy culture type and all aspects of BPM adoption success. These insights provide a foundation for further studying on how organizational culture affects BPM adoption success in detail.*

*Keywords: Organizational culture, BPM adoption, Success, Empirical study.*

## 1 Introduction

Business processes are a core part of every organization, and managing the business processes is considered to be among the top priorities for many organizations. However, many organizations fail in their attempt to successfully adopt Business Process Management (BPM) (Trkman, 2009). The question of why certain projects succeed and others fail is an important area of research (Grisdale and Seymour, 2011; Alibabaei et al., 2010; Bandara et al., 2009).

Several studies describe that organizational culture might have a significant impact on BPM adoption (e.g. Rosemann and de Bruin, 2005b; Rosemann and vom Brocke, 2010; vom Brocke and Sinnl, 2011; Alibabaei et al., 2010) or that it might be connected with failure and success (Melenovsky and Sinur 2006; Bandara et al. 2009; Ravesteyn and Versendaal, 2007). However, vom Brocke and Sinnl (2011) find that only few articles discuss or study the role of culture in BPM research. Empirical research on this topic is necessary to gain a better understanding of the role that organizational culture plays for the success of BPM adoption.

In this paper we investigate organizational culture as a contingent factor of BPM adoption success. This proposition is based on the assumption that certain organizational culture types might be more favourable and others less favourable for BPM adoption. This assumption builds on observations in

previous studies such as (Alibabaei et al., 2010). More specifically, it is argued that cultural characteristics in organizations may provide either suitable conditions or hindrances for the success of BPM adoption (Bandara et al. 2009). Also certain values are mentioned to be supportive of BPM objectives or to be road blocks (vom Brocke and Sinnl, 2011). However, these assumptions have not yet been subject to a quantitative investigation. The contribution of this paper is therefore the provision of survey results that help to judge the viability of a potential connection between organizational culture and BPM adoption success.

In line with these observations, we aim to find out which organizations, depending on their dominant culture type, are more or less successful with adopting BPM. More precisely, the research question that this study aims to answer is:

*RQ. How does the success of BPM adoption differ between different types of organizational culture?*

To this end, we use a survey design in order to investigate correlations. Our findings suggest that Hierarchy culture appears to be less supportive for BPM adoption success.

The paper is structured as follows: Section 2 provides a research background and defines the key concepts. Section 3 presents the research model and hypotheses. Section 4 describes the research design and Section 5 the results of empirical research. Section 6 summarizes the findings and highlights implications for research and practice, together with limitations of the study. Section 7 concludes the paper.

## 2 Background

In this section, we discuss the background of our research. We describe BPM, BPM adoption, and organizational culture as a factor of BPM adoption.

### 2.1 Business Process Management

Business process management (BPM) has been one of the top ten issues for CIOs since 2005, yet with varying emphasis (Reiter et al., 2010). The definitions of BPM and viewpoints in terms of its content and extent range from a focus on IT (Harmon, 2003) to BPM as a holistic management approach (Armistead et al., 1999; Rosemann and de Bruin, 2005a; Reiter et al., 2010). BPM definitions often emphasize the analysis and improvement of business processes (Rosemann and de Bruin, 2005a). Also 'process thinking' has been stressed as a focal point (Grover et al., 2000).

For the purpose of this paper, BPM is defined as an approach for managing an organization from a process perspective (de Bruin and Doebeli, 2010). It requires the consideration of various aspects in order to be successfully and sustainably adopted, including strategic alignment, governance, methods, information technology, people, and culture (Rosemann and vom Brocke, 2010). It includes a strategic and an operational perspective, and requires the use of modern techniques and the involvement of people in order to effectively satisfy customer needs (Zairi, 1997). If successfully adopted, BPM can bring significant benefits to the organization, such as a better understanding of its business processes, better control, better business performance (Škrinjar et al., 2008), and an agile adaptation to changing business requirements (Neubauer, 2009).

### 2.2 Business Process Management Adoption

The term *BPM adoption* has not yet been clearly defined in literature; therefore, it can be understood in different ways. For the purpose of this paper, BPM adoption is defined as *the use and deployment of BPM concepts in organizations* (Reijers et al., 2010). These concepts range from governance structures, role definitions, and performance indicators to modelling tools and redesign techniques (Dumas et al. 2013). BPM adoption is recognized as a complex process that requires effort, time, resources and discipline. Because of its scope BPM adoption is likely to trigger widespread

organizational changes. Organization-wide BPM adoption tends to go through multiple stages, such as (1) awareness and understanding of BPM, (2) desire to adopt BPM, (3) setting up, executing and monitoring BPM projects, (4) converting BPM projects into a BPM program, and (5) ensuring that all BPM-related activities are consistently delivered in a cost-effective way (Rosemann, 2010).

## 2.3 Organizational Culture as a Factor of BPM Adoption

One of the key factors being discussed as an important success factor of BPM adoption is organizational culture. Culture is composed of values, beliefs, attitudes and behaviours (Hofstede, 1993; Schein, 1996). Organizational culture provides unwritten and unspoken rules for how to get along in the organization and conveys a sense of identity to employees (Cameron and Quinn, 2006).

Organizational culture is an emerging topic of high relevance to both academia and practitioners in business and IT (Reiter et al., 2010) and is considered to be important when organizations are trying to improve their organizational performance by business process change (Škerlavaj et al., 2007; Clemons et al., 1995; Guimaraes, 1997; Terziovski et al., 2003). Any company choosing to adopt change concepts must redefine its culture to some extent (Lewis, 1996; Abraham et al., 1997; Pool, 2000; Kekäle et al., 2004), which makes its success dependent on the organizational culture (Laszlo, 1998; Prajogo and McDermott, 2005). Although culture is commonly considered a “soft-factor”, its strong impact on the success of BPM adoption has been established (de Bruin, 2009).

Despite its relevance, culture is mostly superficially covered in literature as one aspect out of many that are relevant in BPM, with little research systematically addressing culture in the context of BPM (Jayaganesh and Shanks, 2009; Zairi, 1997). Vom Brocke and Sinnl (2011) provide a summary of how culture is perceived in BPM research. They identify the following four relationships:

- *Culture as an independent factor influencing BPM*: culture is perceived as a success factor or a barrier for BPM.
- *Culture as a dependent factor influenced by BPM*: BPM systems or general BPM initiatives are recognized as affecting culture through structure changes.
- *Culture as BPM culture*: BPM culture generally describes a culture supportive of BPM objectives and can be understood as a specific aspect of an organizational culture.
- *Culture as an aspect of BPM*: BPM requires attention to culture (vom Brocke and Sinnl, 2011).

All these prior works emphasize the importance of organizational culture for BPM adoption success; however, they do not explicitly examine this connection by using statistical methods.

## 3 Research Model and Hypotheses

In this section, we develop a research model for studying the connection between organizational culture and BPM adoption success. First, we describe which organizational culture types exist, according to the selected measurement model. Second, we discuss the measurement of BPM adoption success. Finally, we present the research model. Our point of view in this study is that organizational culture always exists within an organization, irrespective of BPM adoption. Therefore, we approach organizational culture as an independent factor that influences the success of BPM adoption.

### 3.1 Organizational Culture Assessment Instrument

A well-established instrument for measuring organizational culture is the Organizational Culture Assessment Instrument (OCAI), developed by Cameron and Quinn (2006). This instrument diagnoses the dominant orientation of the organization based on four core culture types: Clan, Adhocracy, Market and Hierarchy.

*Clan culture* is characterized by a friendly workplace, where teamwork and employee development are emphasized and the organization promotes loyalty, tradition, participation, and commitment.

*Adhocracy culture* is characterized by a dynamic, entrepreneurial, and creative working environment, where people take risks and value innovation, agility and experimentation. Such organizations emphasize acquiring new resources, creating new opportunities and rapid growth. *Market culture* is a result-oriented workplace focused on goals and creating the competitive advantage. The main values that dominate market-type organizations are profitability, competitiveness, productivity, and goal achievement. *Hierarchy culture* is characterized by a formal work environment, where structure, control, coordination, and efficiency are emphasized and procedures govern people's activities. Stability, predictability, and efficiency characterize the long-term concerns of this organization (summarized from Cameron and Quinn, 2006).

### 3.2 BPM Adoption Success

To be able to draw conclusions on the success of BPM adoption, we need to operationalize it on a measurable level. The literature offers general definitions of BPM adoption success, such as *continuously meeting pre-determined goals* (Trkman, 2009) and *sufficiently satisfying intended goals of the BPM initiative* (Bandara et al., 2009). It has been criticized though, that a comprehensive definition is still missing (Trkman, 2009).

Due to this absence of an instrument, we follow Škrinjar and Trkman (2013), Thompson et al. (2009) and Dabaghkashani et al. (2012), who use proxies for measuring the success of BPM adoption. For this study, we consider the Business Process Orientation maturity model (BPO maturity model), developed by McCormack and Johnson (2001), and the Process Performance Index (PPI), developed by Rummler-Brache Group (2004). Although there are numerous BPM/BPO maturity models available, these two models stand out for several reasons. Both models have been empirically validated, are generic (i.e. used for business processes in general), produce quantitative data (can be easily statistically analysed and compared, independent of the assessors' interpretations), and take into account all business processes in the involved organisations (van Looy et al., 2012). In addition, the assessment does not take long, and the assessment questions and corresponding level calculation are well-established and publicly available free of charge. In the selection process we made use of the freely available BPMMM Smart-Selector tool, developed by van Looy et al. (2012).

The BPO maturity model is used in line with Škrinjar and Trkman (2013) who argue that "BPM is an approach for increasing BPO" and that the proper BPM adoption directly affects business process orientation (BPO). When an organization adopts BPM, it should become more process-oriented; and therefore BPO can be used to measure the success of BPM adoption (Škrinjar and Trkman, 2013). In addition to the BPO maturity model we also use PPI. It serves as an overall measure of process management environment in an organization and suggests how well an organization is managing its key business processes (Rummler-Brache Group, 2004). For BPM adoption to be successful, the organization should have a high level of BPO and PPI. In other words, the higher the level of BPO and process performance, the more successful BPM adoption is.

### 3.3 Definition of the Research Model and Hypotheses

We now describe hypotheses regarding the effects of organizational culture on BPM adoption success. Figure 1 shows our research model. The model proposes that the success of BPM adoption (in terms of BPO and PPI) is a function of the organizational culture (Clan, Adhocracy, Market, Hierarchy).

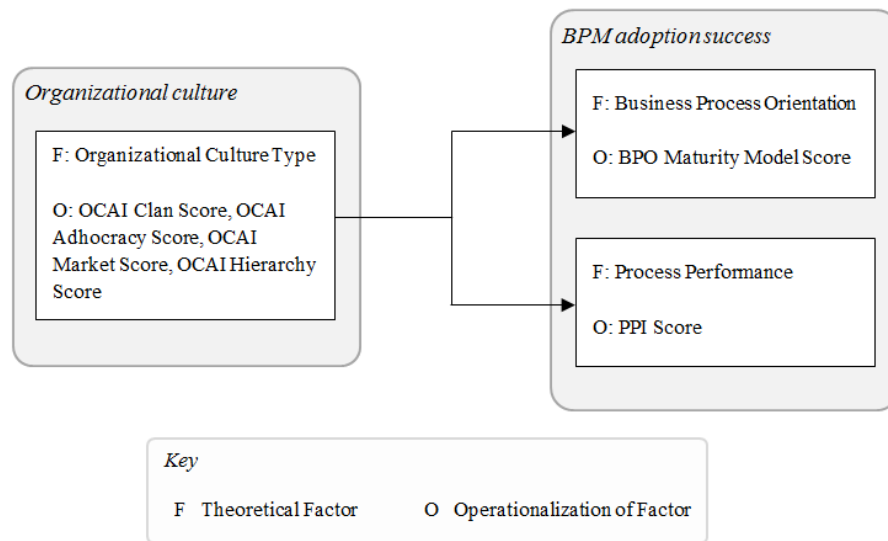


Figure 1. Research model

Our hypotheses address organizational culture types and how they affect BPO and process performance. Previous studies argue that organizational culture can have a supporting or hindering effect on BPM adoption in an organization (Tsai, 2003). Thus, we suppose that organizations with different organizational culture types will have different success with BPM adoption (see  $H^1$  and  $H^2$ ). Since BPO and PPI are both used as proxies for measuring BPM adoption success, we expect that organizations with a high level of BPO will also have a high level of PPI (see  $H^3$ ).

We formalize these expectations in three main hypotheses:

- $H_0^1$  The organizational culture type will have no impact on BPO.  
 $H_a^1$  The organizational culture type will have a significant impact on BPO.  
 $H_0^2$  The organizational culture type will have no impact on PPI.  
 $H_a^2$  The organizational culture type will have a significant impact on PPI.  
 $H_0^3$  BPO and PPI are not correlated with each other.  
 $H_a^3$  BPO and PPI are positively correlated with each other.

More specifically, we expect that the cultural dimensions, and BPO and PPI, respectively, are correlated as shown in Table 1. We find arguments for this in the work by Schmiedel et al. (2013), who identify four key cultural values supporting BPM, namely customer orientation, excellence, responsibility, and teamwork. They stress the need for teamwork, which we see supported in Clan culture, but not in Hierarchy culture. Indeed, it has been observed that “hierarchical organizations have different policies and procedures that are clearly in contrast with business process concepts” (Alibabaei et al., 2010). Thus, we expect the correlation between Hierarchy type and BPM adoption success to be negative. All other culture types (Clan, Adhocracy, and Market) contain at least two of the core BPM values and therefore we expect the correlations between them and BPM adoption success to be positive.

	BPO	PPI
OCAI Clan Score	$H_a^{1A}$ : positive	$H_a^{2A}$ : positive
OCAI Adhocracy Score	$H_a^{1B}$ : positive	$H_a^{2B}$ : positive
OCAI Market Score	$H_a^{1C}$ : positive	$H_a^{2C}$ : positive
OCAI Hierarchy Score	$H_a^{1D}$ : negative	$H_a^{2D}$ : negative

Table 1. Specific hypotheses

## 4 Research Design

In this section, we discuss survey design and survey execution.

### 4.1 Survey Design

To test our hypotheses, we use a survey-based research design for evaluating organizational culture and for measuring the success of BPM adoption. Our questionnaire also includes questions to assess the respondents' knowledge of and interest in BPM. We pre-tested the survey instrument using several IS professors and IS practitioners to ensure that the questionnaire is understandable.

#### 4.1.1 Measuring the Organizational Culture (Independent Variable)

For measuring the organizational culture we adopt the OCAI (Cameron and Quinn, 2006, p. 26-28), but focus our attention on the current culture. This means that data for the preferred culture is not collected. The OCAI is an instrument in the form of a questionnaire that requires the respondent to self-report perceptions of the organization's current culture by responding to 24 declarative statements arranged in six sections representing the content dimensions of organizational culture. These include *dominant characteristics*, *organizational leadership*, *management of employees*, *organizational glue*, *strategic emphasis*, and *criteria for success* (Cameron and Quinn, 2006).

The OCAI utilizes the use of a 100 point summative scale. The respondent is asked to divide 100 points among four alternatives for each content dimension of organizational culture mentioned above, depending on the extent to which each alternative is similar to his or her own organization. A higher number of points should be given to the alternative that is most similar to the respondent's own organization. Based on the scores of the respondent, the averages are then computed for different alternatives representing the respective culture type of the respondent's organization.

#### 4.1.2 Measuring the Success of BPM Adoption (Dependent Variables)

For measuring the success of BPM adoption we adopt the BPO maturity model (McCormack and Johnson, 2001, p. 176) and the PPI (Rummler-Brache Group, 2004, p. 15) at 100 %.

The BPO maturity model consists of twelve question items that relate to three dimensions: *Process View*, *Process Jobs*, and *Process Management*. The respondent is asked to express his or her agreement with the question regarding the respondent's organization by rating the twelve items using a 5-point Likert scale, with 1 indicating complete disagreement with the relevance of the question and 5 indicating complete agreement. The respondent also has the option to choose the answer "cannot judge", which is marked with the letter "X" in the questionnaire.

The PPI is comprised of ten success factors, namely *Alignment with strategy*, *Holistic approach*, *Process awareness by management and employees*, *Portfolio of process management initiatives*, *Process improvement methodology*, *Process metrics*, *Customer focus*, *Process management*, *Information systems*, and *Change management*. The respondent is asked to rate the organization's performance on each success factor using a 5-point Likert scale with anchors of 1 ("Strongly Disagree") and 5 ("Strongly Agree"). An organization's ranking on this scale suggests its business process management maturity. The cumulative PPI score ranges from a minimum of 10 to a maximum of 50 points (Rummler-Brache Group, 2004).

### 4.2 Survey Execution

A survey was conducted in organizations from the public and private sector with more than 50 employees in Slovenia. A mailing list of all the organizations that met our criteria was compiled from the on-line business directory *bizi.si*. We eliminated those organizations that are in bankruptcy from the sample participants' list, so that the final mailing list consisted of 2180 organizations. The

advantage of using Slovenia as a target population is that approaching the complete population is still feasible and its economy is known to be diversified.

We prepared an on-line survey as well as printed copies of the questionnaire in Slovene. We sent the printed copies to all 2180 organizations by postal mail, together with the cover letter and a smaller envelope for return mail. In the cover letter we provided the link to the on-line survey, explained its purpose and who the intended addressee was, as well as stated the approximate time needed to complete a survey (20 minutes). Furthermore, all participants were guaranteed complete anonymity.

The questionnaire was addressed to top managers and (where applicable) process owners, who should have the best understanding of BPM adoption in their company. The data collection period lasted from the beginning of March to end of May 2013. Out of 2180 questionnaires sent, a total of 159 survey responses were received (47 on-line and 112 paper-based responses), yielding a 7.3 % response rate. The results of the survey were analysed using IBM SPSS Statistics 20.

## 5 Results

In this section, we first clarify how we cleansed the data and present the demographics. Then, we summarize the results of scale reliability and validity before we turn to hypotheses testing.

### 5.1 Demographic Data

We started our data analysis by cleansing the data based on the respondents' interest in BPM and knowledge of BPM. From the respondents, 7% stated they are not interested in BPM. These were excluded from further analysis, because they apparently have not adopted BPM nor plan to. To be able to draw reliable conclusions from our analysis, we also captured the respondents' knowledge of BPM. 22.0% of all respondents indicated that they have no knowledge of BPM, and were therefore excluded from further analysis. Altogether, a total of 44 responding organizations were excluded from further analysis due to lack of interest in BPM or knowledge of BPM, leaving us with 115 organizations. In our data analyses, we treated the missing values by excluding cases on a "pairwise" or "analysis by analysis" basis, which means that if a respondent has a score missing for a particular variable or analysis, then their data are excluded only from calculations involving the variable for which they have no score (Field, 2009, p.177).

	Frequency	Percent	Valid Percent	Percent (Population)
<b>Number of Employees</b>				
< 250	91	79.1	79.8	77.5
≥ 250	23	20.0	20.2	14.2
Total (Valid)	114	99.1	100.0	91.7
Missing (not answered question or not available information)	1	0.9		8.3
Total	115	100.0		100.0
<b>Business Sector (Industry Distribution)</b>				
Service industry	72	62.2	63.2	55.8
Non-service industry	42	36.5	36.8	28.4
Total (Valid)	114	99.1	100.0	84.2
Missing (not answered question or not available information)	1	0.9		15.8
Total	115	100.0		100.0

Table 2. Demographic data

Table 2 shows the demographic data from the 115 remaining responding organizations, which indicate no substantial difference from the data of 2180 organizations representing the target population



(compare right-hand side column on percentages of the overall population). Since the data are consistent with the data in the entire population (regarding organizational sizes and industry distribution) we can be confident that the sample is representative.

## **5.2 Scale Reliability and Validity**

Instrument reliability and validity are important for establishing confidence in the quality of the data gathered in any research study. Reliability is the ability of the measure to produce the same results under the same conditions and validity refers to whether an instrument measures what it is supposed to measure (Field, 2009). The reliability of the scales used in the questionnaire is tested using Cronbach's Alpha as the coefficient of reliability or consistency. Cronbach's Alpha is calculated for statements relating to each culture type on the OCAI, for BPO and for PPI.

The value of Cronbach's Alpha should be above 0.7 to indicate good overall reliability of the scale (Nunnally and Bernstein, 1994). BPO and PPI have high reliabilities with Cronbach's  $\alpha > 0.9$  (for BPO  $\alpha = 0.917$ , for PPI  $\alpha = 0.913$ ). All four culture types also have sufficient reliability, Cronbach's  $\alpha > 0.7$  (for Clan  $\alpha = 0.745$ , for Adhocracy  $\alpha = 0.751$ , for Market  $\alpha = 0.798$ , for Hierarchy  $\alpha = 0.842$ ). All alphas exceed the minimum, indicating sufficient reliability of scales used in the questionnaire.

The validity of the OCAI, the BPO maturity model and the PPI has been established through a number of previous studies. Cameron and Quinn (2006) report on three studies, which tested and established the validity of the OCAI (Cameron and Freeman, 1991; Quinn and Spreitzer, 1991; Zammuto and Krakower, 1991). Some of the studies that established the validity of the BPO maturity model are studies by McCormack and Johnson (2001), McCormack (2001), and Škrinjar et al. (2008). Validity of the PPI was established in a study by Rummeler-Brache Group (2004).

## **5.3 Hypotheses Testing**

For each organization we calculate the OCAI score and then analyse the data using two different approaches: (1) the group comparison approach, and (2) regression analysis. While the group comparison approach is popular (Aier, 2012) and has been used by many studies (e.g. Bradley et al., 2006), there has been some criticism regarding the allocation of a case to one cultural group based on the case's dominant culture. Namely, this approach reduces the available data to only the dominant type of culture and thus ignores that an organization typically has some score in all four types of culture (Aier, 2012). However, group comparison is useful for answering our research question and for identifying which organizations, depending on their dominant culture type, are more or less successful with BPM adoption.

### **5.3.1 Group Comparison**

For group comparison, we categorize the organizations into four groups (A, B, C, and D), depending on their dominant culture type. Group A represents the organizations with predominant Clan culture, in group B are the organizations with Adhocracy culture, group C has organizations with Market culture, and group D contains organizations with Hierarchy culture. The results reveal that the prevalent organizational culture type in our target population is Clan culture (42.6%,  $N = 49$ ), followed by Hierarchy (33.9%,  $N = 39$ ), Market (16.5%,  $N = 19$ ) and Adhocracy culture (7.0%,  $N = 8$ ).

For this data, we check the assumptions of parametric tests, i.e. the assumption of normality of distributions and the assumption of homogeneity of variance. Normality of distributions for BPO and PPI within each of the four culture groups is tested using the Kolmogorov-Smirnov (K-S) test. For both, BPO and PPI within groups B, C and D the K-S test is non-significant, indicating that the distribution is normal. However, in group A the K-S test is significant. Thus, BPO and PPI are

significantly normal within Adhocracy, Market and Hierarchy culture groups, but not in Clan culture group.

The homogeneity of variance is tested using Levene's test, which is testing whether the variances of the four groups are significantly different. If Levene's test is non-significant (i.e.  $p > 0.05$ ), the variances are not significantly different and the homogeneity of variance assumption is tenable. The results of Levene's test show that variances are significantly different for PPI ( $F(3, 109) = 4.913$ ,  $p < 0.05$ ) but not for BPO ( $F(3, 111) = 1.813$ ,  $p > 0.05$ ). For BPO the variances are equal for all four groups, whereas for PPI the assumption of homogeneity of variance is not tenable.

Since our data do not adhere to the assumptions of parametric tests for all culture groups (distribution in group A is not normal) and for both dependent variables (for PPI the variances of the four groups are significantly different), we use non-parametric tests in our further group comparison analysis. Most of these tests work on the principle of ranking the data (high scores are represented by large ranks, and low scores are represented by small ranks) and carrying out the analysis on the ranks rather than the actual data (Field, 2009, p. 540).

We use the Kruskal-Wallis test to analyse the differences in BPM adoption success between the four culture groups. Table 3 shows a summary of the ranked data in each culture group. Because the Kruskal-Wallis test relies on scores being ranked from lowest to highest, Table 3 can be used to ascertain which group has the highest scores, and which has the lowest scores. We see that the highest scores for BPO and PPI are in group A (Clan culture), whereas the lowest scores for BPO and PPI are in group D (Hierarchy culture).

	Dominant culture type	N	Mean Rank
BPO	group A (Clan)	49	71.86
	group B (Adhocracy)	8	57.75
	group C (Market)	19	61.29
	group D (Hierarchy)	39	39.04
	Total	115	
PPI	group A (Clan)	47	69.36
	group B (Adhocracy)	8	46.00
	group C (Market)	19	60.84
	group D (Hierarchy)	39	42.49
	Total	113	

Table 3. Ranked data for the Kruskal-Wallis test

The Kruskal-Wallis test indicates that BPO and PPI are significantly affected by dominant culture types,  $H(3) = 21.30$ ,  $p < 0.05$  for BPO, and  $H(3) = 15.55$ ,  $p < 0.05$  for PPI. Mann-Whitney tests are used to follow up this finding. A Bonferroni correction is applied and so all effects are reported at a 0.0083 level of significance. The results show that BPO and PPI are not different when group B ( $U = 138$ ,  $r = -0.18$  for BPO, and  $U = 95$ ,  $r = -0.30$  for PPI) or group C ( $U = 362$ ,  $r = -0.17$  for BPO, and  $U = 378$ ,  $r = -0.12$  for PPI) are compared to group A. However, group D has significantly lower BPO and PPI than group A ( $U = 437$ ,  $r = -0.46$  for BPO, and  $U = 496$ ,  $r = -0.39$  for PPI). Again, BPO and PPI are not different when group C ( $U = 72$ ,  $r = -0.04$  for BPO, and  $U = 52$ ,  $r = -0.24$  for PPI) or group D ( $U = 96$ ,  $r = -0.25$  for BPO, and  $U = 128$ ,  $r = -0.12$  for PPI) are compared to group B. A significant difference is found between group C and group D in terms of BPO ( $U = 208$ ,  $r = -0.35$ ), but not for PPI ( $U = 252$ ,  $r = -0.26$ ). Based on these results we can conclude that organizations with dominant Hierarchy culture (group D) appear to have significantly lower levels of BPO and PPI (and are thus significantly less successful with BPM adoption) than organizations with dominant Clan culture (group A). In addition, organizations with dominant Market culture (group C) appear to have significantly higher BPO than organizations with dominant Hierarchy culture.

### 5.3.2 Correlations and Regression Analysis

We further analyse our data using correlations and regression analysis. For this analysis, we follow Aier (2012) and measure each of the four alternatives (i.e. each of the four culture types) with separate variables, instead of splitting the dataset into four culture groups.

The K-S test for BPO and PPI in this case is non-significant, indicating that the distribution is normal. Table 4 gives the correlation matrix. The Pearson Correlation is calculated to test for correlations between the four culture types and the BPM adoption success (measured with BPO and PPI). In addition, the correlation between BPO and PPI is calculated and shows that they are positively related to each other ( $p < 0.001$ ). This means that the organizations with a high level of BPO also have a high level of PPI.

		BPO	PPI	Clan	Adhocracy	Market	Hierarchy
BPO	Pearson Correlation	1					
	Sig. (2-tailed)						
	N	115					
PPI	Pearson Correlation	<b>0.787**</b>	1				
	Sig. (2-tailed)	0.000					
	N	113	113				
Clan	Pearson Correlation	<b>0.334**</b>	<b>0.279**</b>	1			
	Sig. (2-tailed)	0.000	0.003				
	N	115	113	115			
Adhocracy	Pearson Correlation	<b>0.275**</b>	0.083	-0.009	1		
	Sig. (2-tailed)	0.003	0.379	0.926			
	N	115	113	115	115		
Market	Pearson Correlation	0.051	0.053	-0.569**	0.203*	1	
	Sig. (2-tailed)	0.587	0.575	0.000	0.030		
	N	115	113	115	115	115	
Hierarchy	Pearson Correlation	<b>-0.465**</b>	<b>-0.311**</b>	-0.394**	-0.713**	-0.377**	1
	Sig. (2-tailed)	0.000	0.001	0.000	0.000	0.000	
	N	115	113	115	115	115	115

Table 4. Correlation matrix:

\* Correlation is significant at the 0.05 level (2-tailed)

\*\* Correlation is significant at the 0.01 level (2-tailed)

The test shows that Clan culture is significantly correlated with BPO ( $r = 0.33$ ) and PPI ( $r = 0.28$ ), Adhocracy culture is significantly correlated with BPO ( $r = 0.28$ ), and Hierarchy culture is significantly correlated with BPO ( $r = -0.47$ ) and PPI ( $r = -0.31$ ). All of these correlations are significant at the 0.01 level (2-tailed). Since the Hierarchy culture negatively relates to both measures of BPM adoption success (BPO and PPI), we can conclude that the stronger the Hierarchy culture, the less successful is the adoption of BPM in an organization.

The strength of this connection can also be assessed using the coefficient of determination  $R^2$  as the proportion of variance explained by organizational culture. The value of  $R^2$  for Hierarchy culture and BPO is 0.216 and between Hierarchy culture and PPI 0.097. This is classified as a medium explanatory power (Cohen, 1988). However, this explanatory power has to be related to the fact that we did not take any other independent factors into account, such as industry sector, company size or profit margin, to name but a few.

To test the remaining two classes of hypotheses we use the stepwise method of linear regression with the set of OCAI score variables as independent variables and the dependent variables BPO and PPI.

Dependent	Clan	Adhocracy	Market	Hierarchy	Adj. R <sup>2</sup>	Supporting
BPO	0.179 (0.048)	--	--	-0.395 (0.000)	0.230	$H_a^{1A}$ : positive, $H_a^{1D}$ : negative
BPO (size < 250)	--	--	--	-0.420 (0.000)	0.167	$H_a^{1D}$ : negative
BPO (size ≥ 250)	--	--	--	-0.618 (0.002)	0.352	$H_a^{1D}$ : negative $H_a^{1A}$ : positive,
BPO (not service)	0.262 (0.025)	--	--	-0.190 (0.000)	0.338	$H_a^{1D}$ : negative
BPO (service)	--	--	--	-0.374 (0.004)	0.125	$H_a^{1D}$ : negative
PPI	--	-0.278 (0.030)	--	-0.508 (0.000)	0.119	$H_a^{2D}$ : negative
PPI (size < 250)	0.287 (0.006)	--	--	--	0.072	$H_a^{2A}$ : positive
PPI (size ≥ 250)	--	--	--	-0.447 (0.033)	0.162	$H_a^{2D}$ : negative
PPI (not service)	--	-0.404 (0.029)	--	-0.649 (0.001)	0.174	$H_a^{2D}$ : negative
PPI (service)	0.357 (0.006)	--	--	--	0.112	$H_a^{2A}$ : positive

Table 5. Standardized Beta coefficients for those OCAI score variables that are significant

Table 5 summarizes the results of the linear regression analysis. In general, the analysis provides further evidence that OCAI Hierarchy score appears to be negatively connected with both BPO and PPI. The standardized Beta coefficients are -0.395 and -0.508. The share of variable being explained, as expressed by  $R^2$ , is 0.230 and 0.119, respectively. This data lends to the observation that BPO seems to be stronger negatively associated with Hierarchy than PPI, which is in line with what can be seen in the correlation analysis.

Here, it has to be noted that we find diverging evidence on the connection between Adhocracy and BPM adoption success (positive in the correlation and negative with PPI in the regression). As our sample includes hardly any organization with dominant Adhocracy and many with low values in this dimension, there is a need to study this connection by gathering new data in future research.

In order to clarify the potential effect of firm size and industry sector, we conduct additional analysis. First, we use dummy variables for size greater than 250 (yes/no) and service industry (yes/no) in the regression model, which does not lead to these dummies showing up in the equation. Second, we split the data according to these two dummy variables and repeat the regression estimation (see Table 5). It is interesting to note that the negative connection between Hierarchy and BPO and PPI is significant for each of the subsamples. For the bigger firms of more than 250 employees, the explanatory power rises to an  $R^2$  of 0.352 and 0.162, respectively. For the firms from the non-service industry (mostly manufacturing in our sample), the connection appears to be stronger than for the service industry. This result could be due to the fact, though, that the firms from the service industry to a good share belong to those of small size.

## 6 Discussion

In this section, we briefly summarize the findings (Section 6.1) and discuss implications for research (Section 6.2) and for practice (Section 6.3). Last, we discuss the limitations of the study (Section 6.4).

### 6.1 Summary of the Findings

This study proposes that the dominant organizational culture has a significant impact on the level of BPO and on the level of PPI, and that BPO and PPI are positively correlated with each other. The results of our study provide support for all three main hypotheses (see Table 6) and confirm that organizations with different organizational culture types do have different success with BPM adoption.

Hypothesis	Result
$H_a^1$ The dominant organizational culture type will have a significant impact on BPO.	Supported
$H_a^2$ The dominant organizational culture type will have a significant impact on PPI.	Supported
$H_a^3$ BPO and PPI are positively correlated with each other.	Supported

Table 6. Summary of Hypotheses tests

According to the results, the prevalent organizational culture type in our target population is Clan culture, followed by Hierarchy, Market and Adhocracy culture. The highest level of BPM adoption success is achieved in organizations with Clan culture type, whereas organizations with Hierarchy culture type achieved the lowest level of BPM adoption success. Thus, we identify Clan culture to be the most favourable and Hierarchy culture as the least favourable for BPM adoption.

## 6.2 Implications for Research

The findings presented in this paper have two major implications for research. First, we investigate how the success of BPM adoption differs according to different organizational cultures. While previous studies point to the relevance of organizational culture for BPM adoption success, hardly any research studied the impact of organizational culture on BPM adoption success in a quantitative way. Only recently, a framework for measuring cultural aspects related to BPM has been established (vom Brocke and Sinnl, 2011); however, without studying its consequences. Therefore, our findings address an important research gap as they show that organizational culture influences the success of BPM initiatives and resulting process performance.

Second, we identify which organizational culture types are more favourable and which are less favourable for BPM adoption. Our findings show that organizations with dominant Clan culture appear to be more successful with BPM adoption than organizations with dominant Hierarchy culture. This can be explained by comparing the characteristics of Clan and Hierarchy cultures to the core values of the BPM culture (key cultural values supporting the BPM initiative), namely customer orientation, excellence, responsibility and teamwork (Schmiedel et al., 2013). While Clan culture is complementary to these values, Hierarchy promotes functional orientation, control and formal rules instead.

On a more general level, the number of studies in information systems research that approach organizational culture and national culture using surveys as a research method is still limited and the providing evidence not fully conclusive (Lowry et al., 2010; Zhang et al., 2013; Macredie and Sandom, 1999; Keil et al. 2000). For instance, Zhang et al. (2013) find no evidence for cross-cultural differences between China and USA in how far IT capabilities are influenced by various factors. Also Macredie and Sandom (1999) find no impact of organization type, customer dissatisfaction and improvisation. In our study, we find a significant connection of BPM adoption success with organizational culture. In this way, we contribute to cultural studies in IS and inform research on BPM.

## 6.3 Implications for Practice

Our research provides a better understanding of the relationship between organizational culture and BPM adoption success. Our findings can help organizations to prepare their BPM initiative by including a culture analysis in the preparatory phase of their BPM adoption. This is especially important for organizations with dominant Hierarchy culture for the significant negative correlation of Hierarchy culture with BPM adoption success. The relevance of this finding is emphasized by the fact that Hierarchy culture is the second most common organizational culture type in our target population.

Since organizational culture has a significant role in the success of BPM adoption, organizations should be aware of their dominant culture type and its characteristics, and choose the appropriate approach towards BPM adoption. Apparently, organizations with predominant Hierarchy culture would have to consider a higher effort to establish successful BPM adoption. This may involve a stronger emphasis on change management activities and a less ambitious schedule. However, further empirical research is needed to investigate which specific measures are likely to support BPM adoption success in different organizational cultures.

## **6.4 Limitations**

We identify three limitations to the work carried out. First, our operationalization of BPM adoption success is focused on the level of BPO and PPI, which we use as proxies for measuring the success of BPM adoption. Future work could investigate other aspects of BPM adoption success, for instance, improvement in terms of quality, time and costs. Also, items could be developed for measuring the degree of BPM adoption more directly.

Second, our results could only show that there is a statistically significant difference between BPM adoption success (in terms of BPO and PPI) in group A (dominant Clan culture) and group D (dominant Hierarchy culture). Significant difference in terms of BPO is also found between groups C (dominant Market culture) and D. Group B (organizations with dominant Adhocracy culture) is not significantly different from other culture groups, which might be due to the small sample size ( $N = 8$ ).

Third, we approach our research question with a survey design. This means that the conclusions of our research are subject to the general weaknesses of correlational studies. Still, we find correlations which are in line with our propositions. The interpretation of the potential direction of this connection builds on theoretical arguments and on anecdotal evidence from the BPM literature, where positive effects of BPM adoption on process orientation and performance have been reported, e.g. Škrinjar and Trkman (2013) and Škrinjar et al. (2008). Also, because organizational culture is known to be a sluggish variable (Grugulis & Wilkinson, 2002), we see good reasons that the significant connection we found is not caused by some hidden factor.

In spite of the boundaries set by these limitations, we believe our work offers important implications to research and practice, which we discussed in the previous section.

## **7 Conclusion**

In this paper we analyse the role of organizational culture in the success of BPM adoption. The results of our study indicate that the organizational culture has a significant effect on BPM adoption success. This finding has strong implications for research and practice. Specifically, organizations should be aware of their dominant culture type and its characteristics, and choose the appropriate approach towards BPM adoption. Our work extends the body of knowledge regarding the cultural issues in BPM, and thereby paves the way to more successful BPM adoption – which will significantly increase the benefits of BPM in organizations.

This study investigates organizational culture. Also other cultural factors might play a role in BPM adoption. It will be an important objective for future research to study the impact of organizational culture on BPM adoption success in different countries, thus including the national culture in the research. To our knowledge, there is no research to date that studies BPM adoption in different countries. Furthermore, an important question is also which measures can be taken to configure BPM adoption so that it has better chances of being successful in companies with different types of culture.

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