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Emerald Article: Which cultural values matter to business process management? Results from a global Delphi study

Theresa Schmiedel, Jan vom Brocke, Jan Recker

Article information:

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Author Details

Author 1 Name: Theresa Schmiedel
Department: Institute of Information Systems
University/Institution: University of Liechtenstein
Town/City: Vaduz
State (US only):
Country: Principality of Liechtenstein

Author 2 Name: Jan vom Brocke
Department: Institute of Information Systems
University/Institution: University of Liechtenstein
Town/City: Vaduz
State (US only):
Country: Principality of Liechtenstein

Author 3 Name: Jan Recker
Department: Information Systems School
University/Institution: Queensland University of Technology
Town/City: Brisbane
State (US only):
Country: Australia

*NOTE: affiliations should appear as the following: Department (if applicable); Institution; City; State (US only); Country.
No further information or detail should be included*

Corresponding author: Theresa Schmiedel
Corresponding Author's Email: theresa.schmiedel@uni.li

☐ *Please check this box if you do not wish your email address to be published*

Biographical Details (if applicable):

Theresa Schmiedel is Research Assistant at the Hilti Chair of Business Process Management at University of Liechtenstein. She holds a Diploma in economics from University of Hohenheim, Stuttgart, Germany, and conducted her studies focused on sociology partially at York University, Toronto, Canada. She worked as a Research Assistant at the Department for Sociology and Empirical Social Research, University of Hohenheim, and the Centre for Cultural and General Studies, Universität Karlsruhe, Germany. Her research focuses on the interconnection of culture and business process management. Her work has been published in the Business Process Management Journal, respective books and academic conferences.

Jan vom Brocke is Full Professor for Information Systems and Hilti Chair of Business Process Management at University of Liechtenstein. He is Director of the Institute of Information Systems and President of the Liechtenstein Chapter of the AIS. His research focuses on IT-enabled business innovation and IT-driven business transformation. His work is published in MIS Quarterly, Communications of the Association for Information Systems, Business & Information Systems Engineering, and others. Jan is Associate Editor of Information Systems and e-Business Management, co-editor of the International Handbook on Business Process Management, and serves on the program committee of various academic conferences.

Jan Recker is Full Professor and Woolworths Chair of Retail Innovation at Queensland University of Technology in Brisbane, Australia. Jan's research interests focus on the use of process design in organizational practice, business transformations and organizational innovations. Jan has authored and edited several books, including one on BPMN and one on Green BPM. He also co-authored over 100 academic papers in journals and conferences and presented his research all over the globe. His research has appeared, amongst others, in the MIS Quarterly, Journal of the Association for Information Systems, Information Systems, European Journal of Information Systems, Information & Management, Scandinavian Journal of Information Systems and others. He is Associate Editor for Communications of the AIS, and a Senior Editor for the Journal of IT Theory and Application. He holds a PhD in Information Systems from Queensland University of Technology and a MS in Information Systems from the University of Muenster, Germany.

Structured Abstract:

Purpose – Business Process Management (BPM) requires a holistic perspective that includes managing the culture of an organization to achieve objectives of efficient and effective business processes. Still, the specifics of a BPM-supportive organizational culture have not been examined so far. Thus, the purpose of our paper is to identify the characteristics of a cultural setting supportive of BPM objectives.
Design/methodology/approach – We examine the constituent values of a BPM-supportive cultural setting through a global Delphi study with BPM experts from academia and practice and explore these values in a cultural value framework.
Findings – We empirically identify and define four key cultural values supporting BPM, viz., customer orientation, excellence, responsibility, and teamwork. We discuss the relationships between these values and identify a particular challenge in managing these seemingly competing values.
Research implications – The identification and definition of these values represents a first step towards the operationalization (and empirical analysis) of what has been identified as the concept of BPM culture, i.e. a culture supportive of achieving BPM objectives.
Practical implications – Identifying these cultural values provides the basis for developing an instrument that can measure how far an existing cultural context is supportive of BPM. This, in turn, is fundamental for identifying measures towards achieving a BPM culture as a necessary, yet not sufficient means to obtain BPM success.
Originality/value – We examine which cultural values create an environment receptive for BPM and, thus, specify the important theoretical construct BPM culture. In addition, we raise awareness for realizing these values in a BPM context.

Keywords:

Cultural Values, Business Process Management, Delphi Study, Construct Development, BPM Culture, Organizational Culture

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Results from a global Delphi study

Abstract

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Keywords

Introduction

Business Process Management (BPM) has evolved into an established research area that concerns the continuous improvement and the fundamental innovation of business processes to increase an organization's efficiency and effectiveness (Smith and Fingar, 2004). In recent years, many organizations increasingly streamlined and aligned their business processes through tremendous efforts in organizational BPM initiatives (vom Brocke *et al.*, 2010; Bharadwaj *et al.*, 2010). At the same time, research on BPM developed and intensified a growing awareness that BPM not only concerns technological aspects but requires a holistic organizational perspective including personal and cultural aspects related to business processes (Hammer, 2010).

The culture factor, specifically, has often been alluded to as a key driver of BPM initiatives (Rosemann and vom Brocke, 2010; Harmon, 2010; Spanyi, 2003). Culture refers to the shared basic assumptions, values, or beliefs of a group (Schein, 2004). While research to date has mainly addressed cultural barriers towards successful BPM implementation or the need for cultural change due to BPM initiatives, little research can be found on what kind of culture supports a BPM approach, i.e. reduces respective cultural barriers and gives directions for cultural change (vom Brocke and Sinnl, 2011).

Some authors refer to the cultural requirements for a successful BPM approach with the concept of BPM culture (Zairi, 1997; Jesus *et al.*, 2010). It is defined as a facet of organizational culture which consists of a certain set of values that are directly supportive of BPM objectives, i.e. efficient and effective processes (vom Brocke and Sinnl, 2011). While this general understanding of the BPM culture concept can be identified in the literature, it has not been empirically examined which exact cultural values actually define the concept of BPM culture.

In this paper, we intend to address this research gap and, more specifically, the research question *Which cultural values create an environment receptive for BPM?* Addressing this question, the purpose of this paper is to specify the important theoretical construct *BPM culture* on the basis of a global Delphi Study as previous research suggested (vom Brocke and Schmiedel, 2011). Since BPM is a widely practiced management approach around the globe, we follow a Delphi study approach that includes BPM experts worldwide to gain a most general understanding of what can be called the BPM culture construct.

In the following, we present the research background underlying our Delphi study and introduce our understanding of the major concepts our study builds on. We then take a closer look at the methodological approach chosen to address the identified research gap before we present and discuss the findings of our Delphi study against the background of existing literature. Determining the implications of the results for research and practice, we also point out limitations and derive areas for future research. Concluding the paper, we provide a summary and outlook.

Research Background

Business Process Management

Business Process Management can be described as a holistic management approach focused on organizational processes as opposed to organizational functions. The function-oriented view on business was to a large extent based on Taylorism, which promoted the division of

labor in the last century. Only in the 1980s/1990s, awareness for a process-oriented view on organizations increased. This perception meant cutting through the isolated task-related silo mentality and calling for a cross-functional orientation on customer value.

Early research on BPM focused on technical aspects, highlighting ways to support business processes and their design via technology (Reijers, 2003; van der Aalst *et al.*, 2003). The focus on modeling workflows and using information technology (IT) for automation purposes may have been substantiated through a number of IT solutions that emerged along with the concept of BPM (Jeston and Nelis, 2008). While obviously IT may serve as an essential driver of organizational change towards process-orientation (Davenport, 1993; Willcocks and Smith, 1995), BPM goes beyond a focus on IT systems (Lee and Dale, 1998) and is increasingly discussed as an integrated management approach (Chang, 2006; DeToro and McCabe, 1997; Pritchard and Armistead, 1999).

This change in focus is also evident in recent BPM maturity models, such as the one by Rosemann and de Bruin (2005) which includes several core factors beyond IT, i.e. strategic alignment, governance, methods, people, and culture. More importantly, since this model was developed on the basis of several case studies and Delphi studies (de Bruin and Rosemann, 2007), it provides empirically well-grounded evidence for the relevance of culture as a core factor in BPM.

While culture has been characterized as a source of both failure and success (Ravesteyn and Versendaal, 2007; Majchrzak and Wang, 1996; Singh *et al.*, 2009) and while early academic contributions on BPM already pointed out the importance of cultural aspects in BPM practice (Llewellyn and Armistead, 2000; Spanyi, 2003; Zairi, 1997), culture seems not to have played a prominent role in BPM research until recently (Fisher, 2004; Hammer, 2007; Kohlbacher *et al.*, 2010). Despite this increasing attention, it has not yet been empirically analyzed which specific cultural values prove to be supportive of BPM.

Cultural Values

While various definitions of the culture concept exist (Kroeber and Kluckhohn, 1952), our study follows the understanding that the concept of culture is mainly defined through invisible values, that manifest themselves in visible actions and structures, such as ceremonies, manners, technology, products, organization charts, etc. (Parsons and Shils, 1951; Schein, 2004; vom Brocke and Sinnl, 2011). In fact, many scholars have identified shared values as the core element of culture (Straub *et al.*, 2002). Hofstede's culture onion, for example, displays layers of culture "around a core that consists of values" (2005). A recognized definition of the value concept is provided by Kluckhohn who describes values as a conception of the desirable, i.e. "what is felt or thought proper to want" (1951). Against this background, we define values as what a group considers as desirable, i.e. ideals that influence behavioral and organizational patterns of a group.

It is important to notice that a cultural group sharing common values refers to a plurality of individuals, be it a nation, a region, an ethnic group, an organization, a department, or a work-group, and that a person can have a number of cultural identities, respectively belong to various cultural groups, simultaneously (Kluckhohn, 1951; Tajfel and Turner, 1986; Huntington, 1997). Culture research commonly differentiates between national, organizational, and sub-unit culture, but apart from the referenced group, the concept of culture does not differ fundamentally (Leidner and Kayworth, 2006) but mostly builds on a value-based conceptualization of culture (Lenartowicz and Roth, 1999).

Taking a closer look at culture in BPM research, topics comprise, in fact, country-specific cultures influencing process management (Agrawal and Haleem, 2003; Baba *et al.*, 1996; Martinsons *et al.*, 2009; Peppard and Fitzgerald, 1997), difficulties due to organizational culture (Al-Mashari and Zairi, 1999; Armistead and Machin, 1997; Pritchard and Armistead, 1999; Smart *et al.*, 2009; Trkman, 2010), and influences of work group cultures on business processes (Baba *et al.*, 1996), often visible in a *clash* between business and IT (Reich and Benbasat, 1996). While a strong focus on cultural challenges in BPM can be identified in the literature, there is also evidence of a lack of research on the specifics of a cultural setting that is supportive of BPM (vom Brocke and Sinnl, 2011). In the following, we present our methodological approach to address this research gap.

Methodological Approach

Delphi Study Design

To conduct our research, we decided to employ a Delphi study design. The Delphi method relies on the use of expert opinions "to obtain the most reliable consensus" via a series of questionnaires with controlled feedback (Dalkey and Helmer, 1963). The purpose of this technique is either forecasting/issue identification or concept/framework development (Okoli and Pawlowski, 2004). It is applied to structure group communication when dealing with a complex issue that requires diverse backgrounds regarding expertise and geography (Linstone and Turoff, 1975; Czinkota and Ronkainen, 1997; Czinkota and Ronkainen, 2009). Therefore, we chose to apply the Delphi method to develop a deeper understanding of the BPM culture concept, i.e. to examine which cultural values support a BPM approach.

Participants of the Delphi study were selected on the basis of their levels of BPM expertise. Two types of BPM experts were distinguished: academics and practitioners. This was done to balance opinions from academia and practice as both have an influence on the development and diffusion of BPM as a management approach. The involvement of the two expert groups allowed us to avoid potential biases from each of the two groups alone, and include perspectives supporting both rigor and relevance of the study results.

To identify Delphi participants with profound knowledge in the area of BPM, specific selection criteria for potential panelists from academia required them to be actively engaged in research on BPM and to hold at least a PhD. Our participation requirements for practitioners included holding a senior position or key role in organizational BPM initiatives or BPM consulting, but also included contributions to BPM-related discussions, e.g. through publications. The latter requirement was posited to ensure the ability to actively engage in the discussion and consensus-building activities in the Delphi study. Furthermore, a geographically widespread distribution of panel members was targeted to include diverse perspectives from various countries that may contribute to the generalizability of our findings.

We aimed to identify leading experts contributing to the contemporary body of knowledge in BPM. Therefore, we reviewed the authors of seminal BPM literature with regard to the above selection criteria. The recently published International Handbook on BPM (vom Brocke and Rosemann, 2010a; vom Brocke and Rosemann, 2010b) served as a premier source for identifying potential panelists as it represents a collection of perspectives by "the world's leading experts in the field" (p. viii). In addition, we addressed authors of seminal contributions regarding culture in BPM; they were identified by means of a recent literature review published in the Business Process Management Journal (vom Brocke and Sinnl, 2011). The invited experts were allowed to suggest further BPM professionals to identify additional

key academics/practitioners in the field. Based on recommendations, further potential panel members were addressed, provided that their profile added to the diversity of the panel. Overall, 60 top BPM-experts (30 academics, 30 practitioners) from 21 countries were invited for participation.

More experts generally increase reliability (Murphy et al., 1998). However, some researchers warn that a large number of experts is not only difficult to manage but also does not guarantee better results than from smaller groups of experts (Keeney *et al.*, 2011). Though there is no consensus among researchers regarding the panel size for Delphi studies (Akins *et al.*, 2005), a group of 10-18 experts is recommended (Okoli and Pawlowski, 2004). Against this background, we aimed at a minimum of 20 responses throughout our study and thus targeted an initial expert panel of around 30 members to account for dropouts during the course of the study. With an acceptance rate of 60 %, 36 experts committed themselves to support our study. Actual participants were defined through their response in the first round, i.e. over six rounds, 27 experts (see Table 1 for details) supported our study.

	Countries	# of participants	Positions	# of participants	Total # of participants
Academics	Australia	3	Professor	7	
	Austria	1	Associate Professor	2	
	Brazil	1	Assistant Professor	2	
	Estonia	1	Scientific Assistant	1	
	Germany	3	Senior Lecturer	2	14
	Hong Kong	1			
	Iran	1			
	Slovenia	1			
	South Africa	1			
	Sweden	1			
Practitioners	Australia	2	Enterprise Architect	1	
	Austria	1	Business Architect	1	
	Brazil	1	CIO	1	
	Canada	2	Head of IT Business Process Comp. Centre	1	
	Germany	2			13
	Liechtenstein	2	Director	2	
	USA	3	Consultant	5	
			Executive Partner	1	
			Analyst	1	

Table 1.   Delphi study participants

Delphi Study Procedure

The Delphi study was conducted between February and May 2011. Data was collected via email communication in six rounds over 12 weeks. As to the optimal number of rounds, the classic Delphi technique consists of four rounds (Erffmeyer *et al.*, 1986). Still, some authors recommend between two and six rounds (Bradley and Stewart, 2003), depending on situational factors such as the meaningfulness of results and sample fatigue (Hasson *et al.*, 2000). In our study, we executed six rounds. The first five rounds were used to identify, condense, and rank core cultural values supportive of BPM objectives, including the definitions of these values, while the last (sixth) round served to critically evaluate the findings. The total number of rounds was determined by the level of consensus reached on the condensed values and the amount of input given by the experts to further improve the findings. After the fifth round, no additional insights were provided by the experts in this

regard and the targeted level of consensus was reached. While references on how to determine consensus can hardly be found in the literature, we followed recent Delphi studies that measured the expert's level of satisfaction with the codification on a scale from 1 (highly dissatisfied) to 10 (highly satisfied) and take a level of satisfaction of at least 8.0 points and a standard deviation of below 2.0 as an indication for consensus (de Bruin and Rosemann, 2007; Indulska *et al.*, 2009). To ensure an even higher level of agreement through less variability of opinions, we chose to set the target level for the standard deviation to below 1.5 points. Table 2 provides an overview of the six Delphi study rounds.

Round	1	2	3	4	5	6
Theme	Collection of initial values	Validation of initial values	Discussion and validation of condensed values		Rating of value importance	Evaluation of results
Responses	27	25	24	24	24	22
Response rate	100%	93%	89%	89%	89%	81%
Level of satisfaction	-	8.6[a]	7.4	8.2	8.3	-
Standard deviation	-	1.2[a]	1.6	1.9	1.4	-
Number of values	135	42	8	6	5	4

Table 2.   Overview on Delphi study procedure

[a] Please note that, in the second round, the experts had only evaluated the codification of their individual responses, not the overall list of values. For this reason, we perceive the level of satisfaction and the standard deviation in the second round not as a consensus among the panelists but as a validation of the aggregated list of individual responses.

Experts were given one week for responding to the current round and received feedback on the findings together with the task for the new round after an additional week. During this time, only the research team could follow up for clarifications if necessary. Panel members were anonymous to each other and to the coder team. Three independent coders from three different countries analyzed the qualitative data during every second week. Selection criteria for the coders included an academic degree, experience with rigorous empirical research, familiarity with the research domain, non-involvement in the research topic, sufficient time resources, and motivation for the coding task. With these criteria, we aimed to identify coders that are capable, unbiased, and committed to pursue their task. These criteria were met by three research assistants from two universities who were also doctoral students engaged in BPM research. The independence of the three coders from each other and the communicable criteria for their selection are perceived as two important conditions for generating reliability data (Krippendorff, 2004). A third requirement refers to unambiguous coding instructions. We conducted an exemplary codification round prior to the study to ensure that the coding instructions were clear to the coders, thus adding to reproducibility, i.e. inter-coder reliability (Weber, 1990).

The response items were coded in iterative loops (Krippendorff, 2004). All coders started each Delphi round with an individual codification of the response items, i.e. identifying categories plus their definitions. This was followed by an iterative consolidation of the individual results which usually needed three cycles to ensure consistent and sufficiently refined data. Differences in the individual codifications, which manifested in the use of diverse concepts and differing corresponding term definitions, were discussed intensively until consensus was reached. In the first consolidation cycle, at least two of three coders

needed to find an agreement on abstract categories and their definition. In the second cycle, two of two coders needed to agree and in the third cycle, one coder did a final check on the consistency of the data. In between these cycles, the research team served as a mirror, asking for clarification of classification conflicts to improve the iterative coding process. An extract of the codification details is provided in Tables 6 through 9 in the appendix.

The continuous verification and evaluation of the codification results (after each round) through the study participants was critical to ensure the reliability and validity of the findings (Keeney *et al.*, 2011; Skulmoski *et al.*, 2007). Compared to other research methods, a Delphi study has a major advantage regarding the validity of its findings in that experts can be asked to validate the categorization of their responses (Okoli and Pawlowski, 2004).

Round 1 – Collection of Initial Values. Starting the Delphi study, we posed the following question in the first round: *Which organizational values do you consider directly supportive of achieving BPM objectives?* The experts were provided with our understanding of the major concepts in this question. We defined values as what a group considers as desirable (ideals that influence behavioral and organizational patterns of a group), and we identified two major BPM objectives (DeToro and McCabe, 1997; Smith and Fingar, 2004; Drucker, 2002): (1) efficient processes that meet internal requirements (executing processes right) and (2) effective processes that meet external requirements (executing the right processes). The experts were asked to name up to five values and provide a brief explanation of each in one sentence. Following other researchers (Saunders and Benbasat, 2007; Dickson *et al.*, 1984), we limited the number of possible responses with the intention that the experts focus on the most important values for BPM only. While a minimum number of responses may have enforced artificial answers, and while no quantitative requirements may have led response bias, the upper limit of responses was further thought to encourage participation through a short and precise task (Lummus *et al.*, 2005; Schmidt *et al.*, 2001). The first round resulted in a total of 135 individual response items. These were given to the coding team in a standardized coding spreadsheet that provided room for the individual codes and their explanation, and for the consolidated results. Coding was performed in an inductive approach (Saunders *et al.*, 2009). The response items were categorized at a basic level as suggested by the descriptive/topic coding method (Saldaña, 2009). This so-called first cycle coding method resulted in 42 initial values. For each value, the coding team agreed on a description based on the explanations provided by the experts.

Round 2 – Validation of Initial Values. The purpose of this round was to validate the initial categorization of the response items. Through this round, we could ensure construct validity already at a very early point in time (Okoli and Pawlowski, 2004). We also perceived this step to be crucial for the commitment of the experts as it demonstrated concern for understanding their input in the intended way (Lummus *et al.*, 2005). Each participant received a personalized email that contained the personal original response (values and explanations), the corresponding coded classifications, and their descriptions. We asked the experts to state their level of satisfaction with the codification, and to provide any clarifications or suggestions for improvement. Throughout the study, the expert's level of satisfaction with the codification was indicated on a scale from 1 (highly dissatisfied) to 10 (highly satisfied).

Round 3 and 4 – Discussion and Validation of Condensed Values. In rounds 3 and 4, it was our intention to grasp the essence of the list of values identified before and find consensus on a clear, distinct core of values supportive of efficient and effective business processes. Thus, the list of initial values was condensed through the elimination of overlapping and a consideration of most frequently coded response items as frequency is considered to indicate the importance of the provided ideas (Krippendorff, 2004). In both

rounds, the experts were provided – where appropriate – with a report on how their personal input had been addressed together with an overview of the (revised) value lists. They were asked to indicate whether they deem the condensed codification appropriate and clear, and to discuss possible shortcomings, i.e. provide suggestions or clarifications for the refinement of the codification. Regarding the latter, experts entered their improvement ideas on concepts and related definitions in provided spaces. Regarding both appropriateness and clarity of definition, perceptions were indicated on a 5-point scale from 1 (not appropriate/unclear) to 5 (appropriate/clear) with a required target level of appropriateness/clarity of at least 4 points. This was realized in round 4. In addition, the overall satisfaction with the codification was examined as described before.

Round 5 – Rating of Value Importance. At the end of round 4, the experts' responses seemed ambiguous with respect to *commitment* as one of the identified values (see Table 3). Some experts perceived it as a vague concept that is not distinct from some of the other identified values; others were content with the codification. Thus, we took the chance in round 5 to directly ask whether this specific value should be kept as a separate value or taken from the list. The main purpose of this round was yet to rate the defined values. Therefore, we asked the experts to indicate how relatively important they deem the identified values by allocating a total of 100 points among each of two lists of values (Arnold and Feldman, 1981; Indulska *et al.*, 2009). We used two lists of values as it was, at that point, unclear whether the final list would consist of four or five values. In addition, we asked the panelists again to indicate their overall satisfaction with the codification.

Round 6 – Evaluation of Results. While the first five Delphi study rounds were continuously supported by around 90 % of the panelists, participation in the sixth round slightly dropped but still remained at over 80 %. In the final round, the experts were provided with the results of the Delphi study. Aiming at an evaluation of the results through the panelists themselves, we posed some open-ended questions, such as "What do you think are the implications of the identified values for BPM research / BPM practice?" The resulting responses were analyzed by the authors through categorization and condensation of the statements the panelists provided. This codification of the experts' reflections provides the basis for our own examination of the study's outcome.

Delphi Study Results

The findings of our Delphi study were developed over several stages. Table 3 provides an overview on how the condensed values developed during the course of our study. After the initial individual responses had been validated by the experts, consensus finding started with a number of eight condensed values that were discussed in round three. Major critiques in this round referred to the perceptions that the concepts partially did not refer to values, that other concepts were overlapping, and that the definitions included too many concepts. Apart from improving definitions and value terms (e.g. *development* was renamed into *improvement*, *determination* was called *commitment*), some major changes are based on the following perceptions. The experts understood *leadership* not as a value but as a personal capability to transfer values in a group. Instead, *responsibility* was considered an important value. *Entirety* was understood as mainly overlapping with *cooperation* which resulted in the value *collaboration* in the next round. And *strategy awareness* was resolved as it was perceived unspecific to BPM and partially overlapping with *customer orientation*.

The revision of the values resulted in six condensed values in round four. These were then further refined by the panel experts and coders. One major aspect concerned the fact that

improvement was considered overlapping with *excellence*. Further, *collaboration* was not perceived as an appropriate value term and therefore was renamed into *teamwork*. Apart from addressing these points, the definitions of the values were refined. This resulted in five condensed values. Yet, with regard to *commitment*, the experts' responses seemed ambiguous as to whether this value is distinct from the other values. In fact, direct feedback on this question revealed that only around one third of the experts supported keeping *commitment* as a separate value. On the basis of the experts' feedback, the coders merged *commitment* with *responsibility*. This resulted in a list of core values supportive of BPM objectives (see Table 4), which represents the main findings of our Delphi study.

Value	Definition
8 Condensed Values (round 3)	
Customer orientation	refers to the responsiveness for internal and external customers' needs.
Excellence	refers to the orientation towards optimality in process performance through discipline, quality awareness and sustainability.
Development	refers to the orientation towards continuous change and innovation through open-mindedness, creativity and risk awareness.
Leadership	refers to professional integrity, responsibility, competence and pragmatism.
Determination	refers to the feeling of ownership, ambition, motivation and commitment towards process objectives.
Cooperation	refers to transparency amongst stakeholders, cross-functionality and the orientation towards constructiveness in communication.
Entirety	refers to an integrated view on an organization oriented towards business processes as opposed to functional units.
Strategy awareness	refers to the orientation towards growth and competitive advantage through awareness for the alignment of resources.
6 Condensed Values (round 4)	
Customer orientation	refers to the proactive and responsive attitude towards product and service recipients.
Excellence	refers to the orientation towards perfection in process performance.
Improvement	refers to the orientation towards constant advancement and innovation.
Responsibility	refers to the orientation towards accountability for the consequences of one's actions.
Commitment	refers to the motivation to actively contribute towards the achievement of process objectives.
Collaboration	refers to the positive attitude towards cross-functional cooperation.
5 Condensed Values (round 5)	
Customer orientation	refers to the proactive and responsive attitude towards the needs of process output recipients.
Excellence	refers to the orientation towards continuous improvement and innovation to achieve superior process performance.
Responsibility	refers to the positive attitude towards empowerment and accountability for process decisions.
Commitment	refers to the desire and willingness to contribute towards the achievement of process objectives.
Teamwork	refers to the positive attitude towards cross-functional collaboration.

Table 3.   Overview of preliminary results during the Delphi study rounds

Consensus on the condensed list of values was initially relatively low (level of satisfaction at 7.4 with standard deviation 1.6), considering the targeted value for the level of satisfaction (8.0 with a standard deviation below 1.5) (de Bruin and Rosemann, 2007). Yet, consensus

constantly increased to 8.3 (1.4) during the course of the study until consensus was reached on a condensed list of core values supportive of achieving BPM objectives and on respective definitions of these values. Based on the acronym of these values, we also refer to them as CERT values. Table 4 provides an overview on this final list of cultural values, including the average relative importance which the Delphi panelists attributed to each value through allocating a total of 100 points among the four values.

Value	Definition	Average # of allocated importance points
Customer orientation (C)	refers to the proactive and responsive attitude towards the needs of process output recipients	34.47
Excellence (E)	refers to the orientation towards continuous improvement and innovation to achieve superior process performance	34.11
Responsibility (R)	refers to the commitment to process objectives and the accountability for process decisions	26.32
Teamwork (T)	refers to the positive attitude towards cross-functional collaboration	26.16

Table 4.   Consensus on core values supportive of BPM objectives: The CERT values

Further results of the Delphi study include the reflections of the panel members on the study output. One of the experts summarized the results after the fourth round, identifying "a nice 'credo' of an ideal employee in a process oriented company: 'I am committed to work with others to continually improve the performance of my business process to deliver excellent service/product to the customer and I take full responsibility for my actions'.". Even though the average level of satisfaction with the codification in the fifth round led to a consensus on core values supportive of BPM, responses varied largely, ranging from "I like the revised codification a lot" to "I am not too happy with the result". Therefore, we perceived it even more necessary to critically reflect on the study results in round six.

Examining face validity of the findings in the sixth round, we revealed further insights on the perceived impact of the study findings. It is interesting to notice that there are differences in perception between academics and practitioners. Academics tend to either respond very positive ("I think that your research will have great impact on both BPM research and practice as culture is an important [...] determinant of firm performance.") or balance their arguments ("I think the reduction of the initial factors to 4 generic values is both good and bad."), while practitioners tend to take extreme positions on both positive ("The values are the key to the success of BPM in practice.") and negative ("I don't see a specific impact of these findings.") sides or suggest specific ideas ("We need to further study how to develop those values in an organization."). Overall, the face validity of the study results was particularly emphasized by the experts. We further discuss the perceived implications for research and practice in the implications sections.

Discussion

Analysis of the Findings against the Background of Related Work

Comparing the findings of our Delphi study to existing findings in the literature provides us with the opportunity to analyze the validity of our results (Powell, 2003; Skulmoski *et al.*, 2007). More specifically, we examine our results against the background of a recent literature

review (vom Brocke and Schmiedel, 2011). This review has been conducted with the intention to examine the concept of BPM culture on a theoretical basis and to identify cultural values that serve as a basis for the specification of this culture concept. The authors derive BPM values from few source referring to the concept of BPM culture. While the findings of this literature review are mainly based on the authors interpretation of extant work, the results provide first insights on the concept of BPM culture.

In Table 5, we contrast the core values supportive of BPM (CERT) that resulted from the Delphi study and the values derived from the literature (vom Brocke & Schmiedel, 2011). On the basis of their definitions, we compared all values and mapped them to the four core values identified in the Delphi study. This mapping was also performed by two additional coders. Both comparisons resulted in the same classifications. While customer orientation and responsibility are present in both lists, teamwork is named differently in the literature review and excellence serves as higher level category in the list of Delphi CERT values.

Delphi Study: CERT Values	Literature Review: BPM Values (vom Brocke & Schmiedel, 2011)	
Customer orientation	Customer orientation	the focus on customers as the driver and goal of business processes
Excellence	Continuous improvement	the focus on the constant revision of extant conditions and processes to eliminate possible shortcomings
	Innovation	the focus on creative changes that fundamentally renew business processes and/or their outcomes
	Leanness	the focus on the efficiency of business processes, i.e. the streamlining and simplification of business processes
	Quality	the focus on excellence and optimum performance
Responsibility	Responsibility	the focus on commitment, inner engagement and duty
Teamwork	Cross-functional orientation	the focus on processes rather than functional departments, i.e. the all-encompassing perception of various organizational functions along the core business process

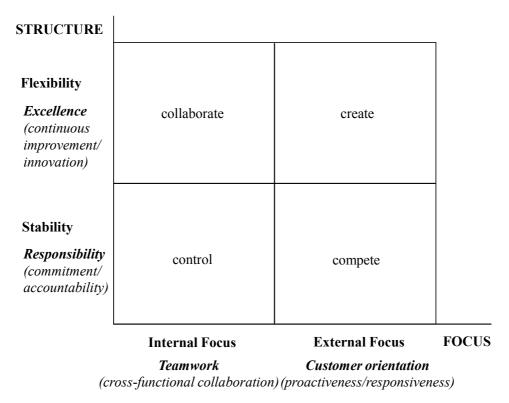*Table 5.   Comparison of identified BPM-supportive cultural values*

Though differences exist with regard to the granularity and particularly the definitions of the value concepts, our study revealed partially identical value terms (e.g., customer orientation and responsibility). Regarding methodology, however, the approaches differ largely: While vom Brocke and Schmiedel (2011) rely on a literature review, our findings are based on a rigorously conducted empirical study. In fact, our Delphi study was able to substantiate and confirm the findings of the literature review. In turn, we received evidence for the validity of our results. Thus, we conclude that the four core values identified in our Delphi study represent essential and distinct elements of what is called the BPM culture concept.
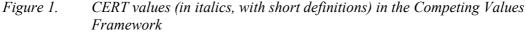
Analysis of the Relation between the Identified CERT Values

As challenges in BPM due to organizational culture have often been reported (Al-Mashari and Zairi, 1999; Pritchard and Armistead, 1999; Smart *et al.*, 2009; Trkman, 2010), the identified CERT values appear to be difficult to manifest consistently in BPM practice. In order to find possible explanations for the difficulties in realizing a BPM culture, we sought to analyze the relationships between the identified CERT values. To that end, we discuss our findings against the background of the Competing Values Framework (CVF) (Cameron and Quinn,

2006; Quinn and Rohrbaugh, 1983) as it has been reported "one of the most influential and extensively used models in the area of organizational culture research" (Yu and Wu, 2009) that illustrates relationships between organizational culture values.

The framework consists of two dimensions: focus (internal vs. external) and structure (flexibility vs. stability). The two dimensions provide the basis for the identification of four types of organizational culture labeled with the following action imperatives (see Figure 1): *collaborate*, *control*, *compete*, and *create* (Quinn *et al.*, 2011). Quinn et al. (2011) use the four terms as shorthand labels referring to a complex set of cultural characteristics which can be summarized as follows: Focusing on internal aspects, the *collaborate* culture is characterized by a strong sense of belonging to a community, while the *control* culture is driven by organizational rules, policies, and processes which account for security, efficiency, and uniformity. Regarding an external focus, the *compete* culture is concerned "with productivity, performance, and goal achievement" (Quinn *et al.*, 2011), while the *create* culture emphasizes growth, risk taking, trend identification, innovation, and adaptability to changing environments.

STRUCTURE

Flexibility ***Excellence*** *(continuous improvement/ innovation)*	collaborate	create
Stability ***Responsibility*** *(commitment/ accountability)*	control	compete

Internal Focus   **External Focus**   **FOCUS**

Teamwork   ***Customer orientation***
(cross-functional collaboration) *(proactiveness/responsiveness)*

Figure 1.   *CERT values (in italics, with short definitions) in the Competing Values Framework*

Comparing the identified four BPM core values with the specifications of the two CVF dimensions, we can observe the following: Looking at the dimension *focus*, customer orientation relates to an external focus from the perspective of an organization. Teamwork relates to an internal focus on collaboration within an organization across functional boundaries. A closer look at the dimension *structure* provides the following insights: Excellence, defined as the orientation towards continuous improvement and innovation, emphasizes flexibility in that constant change in an organization is perceived as a trigger to

performance enhancement. Finally, it can be argued that responsibility, defined as the commitment to process objectives and the accountability for process decisions, relates to stability because commitment and accountability represent a structural control mechanism that provides stability.

The comparison shows how the core values identified in our Delphi study can be linked to the characteristics of the two CVF dimensions (as per Figure 1). The relation to the CVF suggests that the competing nature of the four CERT values may be the reason for difficulties in realizing a BPM culture in practice. For example, organizations may perceive a trade-off between focusing on the excellence of internal processes and focusing on adapting to changing external customer requirements; or they may perceive fixed responsibilities as a static structural element that inhibits the creative atmosphere that is required for innovations. In other words, the CVF provides a possible explanation for organizational cultural obstacles in BPM practice.

Yet, this argumentation needs to be expanded through a more detailed look at the CVF. Though the CVF is labeled *competing* because the criteria within the model seem conflicting opposites at first, the originators of the framework recognize that the criteria are neither mutually exclusive nor necessarily orthogonal (Quinn *et al.*, 2011). In fact, they acknowledge it is possible and desirable for organizations to take all four perspectives simultaneously. This understanding allows us to extend our argumentation as follows. While the four CERT values may be considered *opposing* and provide an explanation for the apparent difficulties of realizing a BPM culture in practice, they should be considered *complementary* as only their simultaneous presence makes up a BPM culture. In other words, CERT values can and should be realized simultaneously in order to provide a supportive cultural setting for a BPM approach.

This interpretation suggests that while an existing organizational culture may be primarily determined by one of the four culture quadrants of the CVF, the other three can also be present, complementing this predominant culture focus. For example, as the experts of our study rated the identified values according to their perceived importance in the context of BPM, we can also determine a specific focus of a BPM culture on the basis of our study: The relatively strong perceived importance of customer orientation and excellence (see Table 4), i.e. external focus and flexible structure, emphasizes the *create* culture as a cultural background that particularly supports achieving BPM objectives. In other words, an organization's ability to adapt to changing environments can be identified as a major determinant of BPM success, represented by the values customer orientation and excellence.

Yet, according to our findings, a sole focus on a *create* culture would not be supportive of BPM in the long run as it would not give consideration to the comparative nature of the CERT values. This means that a successful BPM approach requires customer orientation which ensures that external requirements are carried in the organization along the value chain. Yet, these requirements can only be realized within the organization through teamwork between different functions. In short, external customer requirements need to be translated into internal cross-functional teamwork to fulfill these needs. Furthermore, it can be argued that the ability to adapt business processes to changing environments is based on the organization's stability. Defined responsibilities support embedding improvements and innovations in stable organizational structures. In this regard, BPM culture also comprises the interaction between change and adherence.

Implications for research

Contribution to the body of knowledge on BPM. Our Delphi study provides rigorous empirical evidence for the particular relevance of the identified CERT values for BPM. In this regard, our findings address the identified research gap regarding a lack of empirical examination of the BPM culture concept. Going beyond theoretical assumptions, our research firmly established the specific supportiveness of the CERT values for achieving efficient and effective business processes. In other words, our study established the specific relation between organizational culture and BPM objectives.

In fact, our research not only identified the CERT values but also provides concise conceptual definitions which offer a solid basis for future research on the BPM culture concept as outlined below. Additionally, the participants of our study suggested that the identification and definition of the four CERT values specifically adds value to BPM research. They recognized a lack of consideration of exactly these concepts in research on BPM, particularly customer orientation, teamwork, and responsibility.

Furthermore, a major contribution of our study lies in the explanatory power of BPM culture phenomena that is inherent in the nature of the relation between the CERT values which we could identify through their analysis in the CVF. While the CERT values are in line with the four *competing* culture quadrants of the CVF, we propose that they reflect *complementary* aspects of the holistic organizational culture that BPM requires. We posit that the duality of cultural values that support a BPM approach has not been considered before in BPM research and provides important insights in explaining and overcoming organizational cultural obstacles.

For example, realizing customer-driven innovations may be perceived as a trade-off to realizing efficient internal cross-functional processes. While, in fact, realizing both may require additional efforts, the two aspects are rather complementary than competing and are a pre-requisite for BPM success. In order to overcome cultural difficulties organizations need to understand that realizing efficient and effective business processes requires living all four CERT values at the same time. The duality of the CERT values particularly emphasizes the demanding efforts that BPM requires with regard to the establishment of an organizational culture that comprises all four values.

Though our research is intended to mainly contribute to the body of knowledge in BPM, we propose that the above mentioned duality which is also inherent in the CVF may offer perspectives for future studies in organizational culture research. While the originators of the CVF recognize the complementary nature of the culture perspectives, their research seems to focus on analyzing and changing organizational cultures without suggesting to particularly consider all four culture quadrants. Yet, it remains subject to future organizational culture research to what extent the CVF can be applied this way.

Areas of future research. Researchers can use our study findings in various ways. First, the CERT values serve to analyze cultural challenges of BPM initiatives in more detail. More specifically, future research can now qualitatively examine how far the CERT values have been perceived as competing values and how far a focus on only one, two or three CERT values may have caused cultural difficulties in realizing a BPM approach.

Further, the identification and definition of the CERT values represents a first step towards the operationalization of what has been identified as the concept of BPM culture. Identifying these cultural elements helps to derive an instrument that can quantitatively measure how far an existing cultural context is supportive of achieving BPM objectives. Such an instrument

can be used to analyze how far the identified cultural values are actually lived in an organization, i.e. how far an organization's culture is supportive of realizing efficient and effective business processes.

This would, in turn, serve as a basis for identifying measures towards achieving such a culture as a necessary, yet not sufficient means to obtain BPM success. It could be examined what methods or techniques stimulate the CERT values in order to develop a set of actions that could be implemented to achieve higher levels of each value. For that purpose, best practices and lessons learned could be analyzed. This could also involve studies on the differences between industry cultures or national cultures in implementing the values as the given cultural context may call for the need to realize the four values differently in daily operations.

In addition, future research may also examine how exactly the identified CERT values relate to BPM success, i.e. efficient and effective business processes. For example, one may assume that some of the CERT values can rather be associated with efficiency (e.g. teamwork) and others more with effectiveness (e.g. customer orientation). An analysis of these relations would provide insights for organizations regarding the specific value(s) they would need to develop to improve either efficiency or effectiveness.

Implications for practice

Our work provides input to cultural frameworks to be used in process-oriented projects in organizations. The identified CERT values are perceived as critical culture factors for a successful BPM approach in practice. The face validity of these findings was specifically valued by the practitioners involved in our Delphi study. They suggested that the identified values could immediately provide a common understanding of what is important to all parties at the beginning of new BPM projects, and also for established BPM programs.

Furthermore, they argued that the identified values were tacitly present among practitioners, yet raising awareness on their importance would provide clarification regarding the organizational capabilities required when aiming at more process orientation in an organization. In addition, the awareness for values supportive of BPM would represent a first step towards their realization in an organization.

In turn, living the identified cultural values was perceived as a foundation for employee participation in BPM efforts. One of the Delphi participants put it this way: "I believe BPM practice in general needs to focus more on cultural and behavioral issues to achieve further acceptance and truly engage people in business transformation." (Practitioner response in round six). Beyond these perceptions of the participating experts of our study, we further suggest the following implications for BPM practice.

While our Delphi study included a ranking of the CERT values on the basis of their relative importance, our analysis of the CERT values in the CVF shows that the establishment of a BPM culture requires the institutionalization of all four CERT values rather than a reductionist focus on single values only. Therefore, we posit that for realizing a BPM culture in practice, a balanced approach is necessary that ensures the institutionalization of all identified values in visible actions and structures of an organization. For example, CERT values can be institutionalized in corporate training programs; they can be used as guides in project team selection and even for hiring decisions; they can be used in end-of-year peer performance evaluations; and they can be used as a guide for managers on how to recognize and reward employees.

Limitations

Having thoroughly crafted our Delphi study, our research also contains limitations. First of all, it lies in the nature of the Delphi method that our findings are based on the perception of only a limited number of participants. While we carefully selected the involved experts, claims about the representativeness of our panel cannot be made (Schmidt *et al.*, 2001). Inviting both BPM academics and practitioners from various countries worldwide, we intended to avoid biases based on one-sided perspectives of participants and to establish a panel of BPM experts with different perspectives.

Whilst our methodological approach allowed us to consider views from experts around the globe, we did not study cross-professional, cross-organizational, or cross-national culture perspectives on BPM-supportive cultural values. One specific limitation stemming from the use of the Delphi method is the achievement of consensus about construct definitions without accounting for potential cultural differences on the topic (Sackman, 1975). Seeking consensus about BPM-supportive cultural values could have eliminated cultural specifics that are of relevance in a particular organizational or national cultural context (e.g., in Asia but not Europe). Notwithstanding this limitation, our design allowed us to identify four key cultural values that appear to be generally relevant to BPM initiatives globally.

Conclusions

The purpose of this paper was to examine which cultural values create an environment supportive of BPM objectives. Through our work, we developed an understanding of four key values that define the concept of BPM culture as a culture supportive of achieving efficient and effective business processes: customer orientation, excellence, reliability, and teamwork. Our Delphi study and the analysis of its results improved our understanding of BPM as summarized in the following conclusions:

- BPM culture comprises a set of four complementary values.
- Practitioners may perceive these values as competing values.
- A successful BPM approach requires the institutionalization of all CERT values.

The identification of the CERT values is an important basis for future research that may further examine their institutionalization in visible employee behavior and organizational structures. This would provide a more comprehensive understanding of the BPM culture concept and would also allow for its operationalization in assessment tools and methods.

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Appendix

Value	Definition	# of codes
Accountability	Accountability refers to the desire of defined and implemented liabilities.	2
Ambition	Ambition is the desire to execute effectively and efficiently.	1
Awareness	Awareness refers to the consciousness of processes and their improvement.	1
Collaboration	Collaboration is the positive attitude towards inter-departmental and inter-organizational interaction.	7
Commitment	Commitment refers to the motivation of an organization's members to play an active role regarding the achievement of BPM objectives.	3
Communication	Communication means a positive attitude towards the formal and informal constructive interaction with internal and external stakeholders on all organizational levels.	3
Continuous improvement	Continuous improvement refers to a positive attitude towards an ongoing advancement of organizational processes.	5
Contribution	Contribution refers to the desire of employees to deliver value to internal and external customers.	2
Control	Control refers to the positive attitude towards process review and performance measurement.	2
Coordination	Coordination refers to the ideal of aligning the allocation of resources and units with the organizational strategy.	4
Creativity	Creativity is the positive attitude towards thinking out of the box to create new process solutions.	6
Customer orientation	Customer orientation refers to the preference of actively identifying and serving internal and external customers' needs.	15
Discipline	Discipline refers to the positive attitude towards following systematic approaches and organizational rules to drive business processes.	2
Effectiveness	Effectiveness is the ideal of executing the right processes through strategic decisions to achieve organizational goals.	2
Efficiency	Efficiency is the ideal of executing processes right through the economic allocation of resources.	4
Empathy	Empathy refers to the ideal of caring for others.	1
Employee orientation	Employee orientation refers to the prioritization of the people in an organization.	1
Empowerment	Empowerment is the ideal that process responsible employees have the competences and authority to make process decisions.	4
Entirety	Entirety refers to an integrated view on an organization and its processes.	6
Excellence	Excellence refers to the desire to constantly realize best practices and systematically operate business processes with precision and accuracy.	5
Factual Orientation	Factual orientation refers to the preference for a decision-making process that is based on facts derived from a measurement system.	1
Flexibility	Flexibility is the opportunity and the willingness of people across an organization to adapt to new ways of working and new ideas.	4
Growth	Growth refers to the desire to constantly increase organizational performance.	4
Harmony	Harmony refers to the willingness to resolve conflict.	1
Innovation	Innovation refers to the positive attitude towards developing and optimizing processes in order to achieve a competitive advantage.	3
Integrity	Integrity is the desire to keep promises and agreements.	1

Table 6.   Codification of initial values (in alphabetical order) – part I

Value	Definition	# of codes
Leadership	Leadership means the preference for professional integrity, constructive communication and pragmatic approaches to achieve BPM objectives.	4
Learning	Learning means a positive attitude towards the ongoing acquisition of knowledge or skills for professional and personal development.	3
Motivation	Motivation refers to the preference of internal and external incentives to achieve goals.	3
Openness	Openness refers to the ideal of being responsive towards a challenging environment.	1
Openness for change	Openness for change refers to the positive attitude towards adopting new ways of doing things.	8
Ownership	Ownership refers to the ideal that all employees think and act like business owners to achieve organizational success.	1
Process orientation	Process orientation refers to the focus of an organization on processes as opposed to units.	4
Quality	Quality refers to the preference of realizing standards in process execution to deliver products and services that meet customer expectations.	4
Responsibility	Responsibility refers to the inner feeling of obligation towards achieving process objectives.	5
Responsiveness	Responsiveness is the orientation of an organization to respond quickly to internal and external inquiries	2
Result orientation	Result orientation refers to the ideal that employees work together with the end in mind.	1
Risk aversion	Risk aversion refers to an organization's preference to minimize risks in their operations.	1
Risk support	Risk support refers to an organization's preference for risk taking to improve processes.	1
Rivalry	Rivalry refers to the preference of competing aggressively against other organizations.	1
Simplification	Simplification refers to the preference for reducing complexity in business processes.	2
Skill	Skill refers to the preference of using knowledge and competences for the execution of reliable processes.	1
Standardization	Standardization means the orientation of an organization to provide standardized products and services.	1
Sustainability	Sustainability refers to the ideal of constantly maintaining enduring high organizational performance through the deliberate handling of resources and capabilities.	4
Teamwork	Teamwork refers to ideal of cooperating in groups to achieve common goals.	5
Transparency	Transparency refers to the ideal that relevant process-based information is available to serve both employees and customers.	1
Vision	Vision refers to the ideal of streamlining efforts through clear targets.	1

Table 7.   Codification of initial values (in alphabetical order) – part II

Value	Definition	# of codes
Development	**Development refers to the orientation towards continuous change and innovation through open-mindedness, creativity and risk awareness.**	**33**
Openness for change	Openness for change refers to the positive attitude towards adopting new ways of doing things.	8
Creativity	Creativity is the positive attitude towards thinking out of the box to create new process solutions.	6
Continuous improvement	Continuous improvement refers to a positive attitude towards an ongoing advancement of organizational processes.	5
Flexibility	Flexibility is the opportunity and the willingness of people across an organization to adapt to new ways of working and new ideas.	4
Innovation	Innovation refers to the positive attitude towards developing and optimizing processes in order to achieve a competitive advantage.	3
Learning	Learning means a positive attitude towards the ongoing acquisition of knowledge or skills for professional and personal development.	3
Openness	Openness refers to the ideal of being responsive towards a challenging environment.	1
Risk aversion	Risk aversion refers to an organization's preference to minimize risks in their operations.	1
Risk support	Risk support refers to an organization's preference for risk taking to improve processes.	1
Skill	Skill refers to the preference of using knowledge and competences for the execution of reliable processes.	1
Excellence	**Excellence refers to the orientation towards optimality in process performance through discipline, quality awareness and sustainability.**	**27**
Excellence	Excellence refers to the desire to constantly realize best practices and systematically operate business processes with precision and accuracy.	5
Efficiency	Efficiency is the ideal of executing processes right through the economic allocation of resources.	4
Quality	Quality refers to the preference of realizing standards in process execution to deliver products and services that meet customer expectations.	4
Sustainability	Sustainability refers to the ideal of constantly maintaining enduring high organizational performance through the deliberate handling of resources and capabilities.	4
Control	Control refers to the positive attitude towards process review and performance measurement.	2
Discipline	Discipline refers to the positive attitude towards following systematic approaches and organizational rules to drive business processes.	2
Effectiveness	Effectiveness is the ideal of executing the right processes through strategic decisions to achieve organizational goals.	2
Simplification	Simplification refers to the preference for reducing complexity in business processes.	2
Factual Orientation	Factual orientation refers to the preference for a decision-making process that is based on facts derived from a measurement system.	1
Standardization	Standardization means the orientation of an organization to provide standardized products and services.	1
Cooperation	**Cooperation refers to transparency amongst stakeholders, cross-functionality and the orientation towards constructiveness in communication.**	**19**
Collaboration	Collaboration is the positive attitude towards inter-departmental and inter-organizational interaction.	7
Teamwork	Teamwork refers to ideal of cooperating in groups to achieve common goals.	5
Communication	Communication means a positive attitude towards the formal and informal constructive interaction with internal and external stakeholders on all organizational levels.	3
Empathy	Empathy refers to the ideal of caring for others.	1
Harmony	Harmony refers to the willingness to resolve conflict.	1
Result orientation	Result orientation refers to the ideal that employees work together with the end in mind.	1
Transparency	Transparency refers to the ideal that relevant process-based information is available to serve both employees and customers.	1

Table 8.   Codification of 8 condensed values (shaded in grey) – Part I

Value	Definition	# of codes
Customer orientation	**Customer orientation refers to the responsiveness for internal and external customers' needs.**	**17**
Customer orientation	Customer orientation refers to the preference of actively identifying and serving internal and external customers' needs.	15
Responsiveness	Responsiveness is the orientation of an organization to respond quickly to internal and external inquiries	2
Leadership	**Leadership refers to professional integrity, responsibility, competence and pragmatism.**	**17**
Responsibility	Responsibility refers to the inner feeling of obligation towards achieving process objectives.	5
Empowerment	Empowerment is the ideal that process responsible employees have the competences and authority to make process decisions.	4
Leadership	Leadership means the preference for professional integrity, constructive communication and pragmatic approaches to achieve BPM objectives.	4
Accountability	Accountability refers to the desire of defined and implemented liabilities.	2
Employee orientation	Employee orientation refers to the prioritization of the people in an organization.	1
Integrity	Integrity is the desire to keep promises and agreements.	1
Entirety	**Entirety refers to an integrated view on an organization oriented towards business processes as opposed to functional units.**	**11**
Entirety	Entirety refers to an integrated view on an organization and its processes.	6
Process orientation	Process orientation refers to the focus of an organization on processes as opposed to units.	4
Awareness	Awareness refers to the consciousness of processes and their improvement.	1
Determination	**Determination refers to the feeling of ownership, ambition, motivation and commitment towards process objectives.**	**10**
Commitment	Commitment refers to the motivation of an organization's members to play an active role regarding the achievement of BPM objectives.	3
Motivation	Motivation refers to the preference of internal and external incentives to achieve goals.	3
Contribution	Contribution refers to the desire of employees to deliver value to internal and external customers.	2
Ambition	Ambition is the desire to execute effectively and efficiently.	1
Ownership	Ownership refers to the ideal that all employees think and act like business owners to achieve organizational success.	1
Strategy awareness	**Strategy awareness refers to the orientation towards growth and competitive advantage through awareness for the alignment of resources.**	**10**
Coordination	Coordination refers to the ideal of aligning the allocation of resources and units with the organizational strategy.	4
Growth	Growth refers to the desire to constantly increase organizational performance.	4
Rivalry	Rivalry refers to the preference of competing aggressively against other organizations.	1
Vision	Vision refers to the ideal of streamlining efforts through clear targets.	1

Table 9.   Codification of 8 condensed values (shaded in grey) – Part II