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When Process Is Getting in the Way of Creativity and Innovation

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Abstract

With increasing hypercompetition, information systems have become the main driver for sustaining innovation and competitive advantages. At the same time, many companies use various quality management standards and process models to increase business process efficiency and improve quality. How these process models and quality standards influence organizational cultures that enhance creativity and innovation is, however, under-researched within the field. Using a software analysis tool built on the competing values framework, we set out to investigate how commonly used process models and quality standards promote cultures of creativity and innovation. Our findings are overwhelmingly negative as the analyzed models and standards clearly promote an organizational culture emphasizing stability and control rather than creativity and innovation. To reconcile our findings with the nature of these models and standards, we suggest a new way forward by providing managers with theory-based guidelines to cope with cultural challenges of process improvement and quality management.

1. Introduction

During recent years, scholars have emphasized that the business environment of many companies is characterized by hypercompetition, making it increasingly difficult if not impossible for them to achieve let alone sustain competitive advantages [1]. Information systems (IS) are the main driver behind this development [2]. The pace of technological development confronts companies with two and perhaps conflicting challenges – on the one hand to use IS to increase efficiency and effectiveness of development, manufacturing, and service delivery, and on the other hand to utilize IS for innovation purposes. According to many politicians, business analysts, and researchers, creativity and innovation are key to business success now and in the future [3]. As Chu et al. point out: "Innovators face a key dilemma: Successful innovation requires excellence in each of two skills that are sometimes perceived as bitter enemies: Creativity and discipline“ [4: 949]. A pressing question is therefore whether it is possible to reconcile the dual imperative of efficiency improvement and innovation? A recent stream of literature on the topic of ambidexterity addresses this question. Different mechanisms – for example contextual and structural ambidexterity – are mentioned as the means to balancing the need for both exploitation and exploration (see for example [5, 6, 7]).

Many companies rely on various quality management standards and process models in their efforts to increase business process efficiency and improve product and service quality. Among the standards and models used are ISO 9001 (requirements for quality management systems), ISO/IEC 15504 (software development process and related business management functions), ISO/IEC 20000 (IT service management reflecting best practice guidance contained within the ITIL (Information Technology Infrastructure Library) framework), and the CMMI – Capability Maturity Model Integration (process improvement for systems development). Despite the interest in ambidexterity, research has neglected to investigate the impact of the use of these standards and models on creativity and innovation within companies and in particular also on creative and innovative information systems and their usage. Is it possible to adhere to these standards and models to achieve quality and process improvements and at the same time strive to enhance creative and innovative capabilities of a company? In this article we set out to analyze the organizational culture and management ideal underlying these standards and models as a first step toward answering this question. Specifically, this paper addresses the following research question:

> Is the organizational culture and management ideal underlying the most commonly used quality management standards and process models supportive of creativity and innovation?

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In this paper, we draw on Amabile's definitions of creativity and innovation. Creativity is "the production of novel and useful ideas by an individual or small group of individuals working together"; innovation in an organizational context is "the successful implementation of creative ideas within an organization" [8]. Since creativity is a precursor to and prerequisite for innovation, we will focus on creativity in the remainder of the paper.

The paper is structured as follows. In the next section, we describe state-of-the-art knowledge on creativity. Then, we account for our research approach, detailing the text analyses of the selected standards and models. Subsequently, we present the analysis results, emphasizing differences and similarities across documents. The following discussion focuses on answering the research question and deriving implications for practitioners and researchers alike. The conclusion summarizes the paper.

2. Theoretical Background

Extant literature describes various factors promoting and inhibiting creativity [9, 10]. Creativity is affected by personal attributes [11], organizational characteristics [12], technologies [13], and environmental factors [14]. While some researchers see creativity as a product of genetic endowment [15], others view creativity as something that can be taught and learned [16]. For example, individuals and groups can enhance their creative abilities by means of training programs and methods [17, 18] and creative attributes can be enhanced through the use of techniques and software tools for skill and creativity enhancement [17, 19], supplemented with various organizational strategies [20]. Last, but not least, some researchers stress that the creative output of organizations is influenced by the physical surroundings and organizational values and norms (the work environment) that promote and chart a course for creative activities in the organization [14, 21]. The creative environment can be supported by creativity enhancing software that combines creativity management techniques with collaborative information systems [22].

In relation to business processes guiding creativity at the workplace, there is a distinction in the literature between the freedom and structure approaches. On the one hand, the freedom approach adheres to the principle of not imposing any restriction or structure on people's thought processes [23]. On the other hand, the structure approach "asserts that it is not total freedom but rather some deliberate restriction that enhances creativity: Restricting the scope of a problem in a way that channels individuals to focus on its core elements is likely to lead to creativity" [23: 1089].

While past studies show that imposing structure and constraints is conducive for creativity among both intuitive and systematic individuals, some researchers point to a number of organizational characteristics and environmental factors that can either promote or inhibit creativity. Among other things, organizational climate, leadership style, organizational culture, resources and skills, and the structure and systems of an organization affect creativity [24]. Arad et al., for example, state that "while specialization, formalization, standardization, and centralization inhibit innovation; flat hierarchy, autonomy, and work teams facilitate innovation" [25: 47]. Similarly, Mumford et al. emphasize that centralization, formalization, and standardization make it difficult for people to draw on multiple sources of expertise, define new problems, short-circuit organizational restrictions, obtain requisite information, and undertake risky new projects [26].

Since organizational characteristics and environmental factors affect creativity, managerial practices become all the more important. Among the managerial practices promoting creativity are: Matching people with work assignments that allow them to use their expertise and creative thinking skills, establishing clear goals and providing people with autonomy in terms of the means to achieve those goals, providing adequate (but not unlimited) time and resources, establishing a participative and collaborative work climate, encouraging communication and information sharing, and offering supervisory encouragement and constructive feedback [8].

Despite the interest in managerial practices and the impact of standardization on creativity, no study has investigated the effects of process standardization on creativity (though mentioned by several authors); the only exception being studies of the impact of Total Quality Management (TQM) on innovation. Quality management standards and models have inherited their underlying management principles from the quality movement [27, 28, 29], for example that product and service quality is determined by the quality of business processes [30, 31, 32, 33, 34, 35].

Proponents of a positive relationship between TQM and innovation emphasize that "the philosophy of continuous improvement embodies a central commitment to innovation" [36: 2899]. The claim is that the greater the focus on quality management, the more innovative organizations tend to be. TQM stimulates new ideas and reduces risk aversion through rapid improvement and learning cycles where employees enjoy autonomy and flexibility in exploring solutions to existing problems, "driving self-confidence and further cycles of ideation and innovation" [37: 55].

Skeptics point out that the mindset, capabilities, and culture needed for breakthrough innovation are different from those of TQM: "While process excellence demands precision, consistency, and repetition, innovation calls for variation, failure, and serendipity" [38]. Work standards and routines constrain employees, making it difficult if not impossible to reap the benefits of creativity [39, 40]. Standardization and formalization lead to 'stickiness' of established rules and rigidity, inhibiting creativity as the primary source of innovation [41]. Management-by-fact as advocated by TQM overemphasizes rational thinking, trying to put creative and chaotic processes into systematic and rational sequences that may be incompatible with each other [41]. A more balanced view suggests that practitioners should learn to adapt their work styles – using both creativity and standardization – depending on the circumstances [39, 42]. A balance between process and practice is needed: "Practice without process tends to become unmanageable; process without practice results in the loss of creativity needed for sustained innovation" [43: 94]. In summary, various aspects of standardization associated with TQM inhibit and promote creativity. In the words of Levitt: "Organization exists in order to create that amount and kind of inflexibility that are necessary to get the most pressingly intended job done efficiently and on time. Creativity and innovation disturb that order. Hence, organization tends to be inhospitable to creativity and innovation, though without creativity and innovation it would eventually perish" [44: 143]. Clearly, more research is needed to investigate whether the organizational culture and management ideal underlying the most commonly used standards and best practice models – based on the same management principles as TQM and the quality movement – are supportive of creativity and innovation?

3. Research Approach

In this paper, we rely on a text analysis technique developed for this purpose [45]. This technique is based on the competing values framework [46] and it provides an efficient and effective method of establishing an organizational culture profile of any text, for example documents describing quality management standards and process models. Such standards and models are cultural artifacts embodying a desired future culture in the sense that they represent the goal of process improvement, i.e., they describe ideal practices that employees should strive for. Cultural incongruence, i.e., the differences between organizational cultures and the value orientations underlying standards and process models, "signals ambiguity, lack of unity, and discrepancies between organizational behaviors and espoused values" [45: 159]. Consequently, cultural incongruences should be managed as part of process improvement initiatives.

The text analysis technique is based on rigorous research and has been empirically tested [45]. The technique works in the following way. It searches the text being analyzed for words and phrases associated with each of the four organizational culture types. These words and phrases have been identified through painstaking analyses of the detailed description of each culture type [46: 33-40]. Both intracoder and intercoder reliability of these analyses were ensured through recoding and "check coding" parts of the data. (For example, the researchers who developed the text analysis technique read the four culture type descriptions individually in search of key words and phrases and subsequently compared results, revealing an estimated intercoder reliability (percentage of agreements between two authors coding the same transcript) of 80 percent.) See [45] for additional details on the process of identifying, discussing, and redefining more than 250 culture codes. Having searched the text systematically and exhaustively for words and phrases that describe the culture types, a weighed distribution analysis is performed taking into account an uneven number of words and phrases for each culture type to determine the prevalence of the four culture types in each of the documents. Lastly, based on the distribution analysis an aggregate culture profile of the text is established, showing percentages for each culture type. The text analysis technique yields results that have been validated (see [45]) against previous research [47].

The text analysis technique is accessible as an easy-to-use web service at http://www.processinnovation.dk/octat.html and is documented in [45]. The content of the document to be analyzed is copied, pasted, and analyzed using the web service. The resulting culture profile can subsequently be illustrated graphically for a visual overview. We have here used the web service for the purpose of analyzing the capability maturity models (CMMI for Development (CMMI-DEV), CMMI for Services (CMMI-SVC), and CMMI for Acquisition (CMMI-ACQ)) and selected ISO standards (9001, 15504, and 20000). These are among the most commonly used standards and models for process improvement and quality management within IT companies. The models and standards were acquired in PDF format through the Software Engineering Institute (SEI) and the International Organization for Standardization (ISO), including supplementary documents like the "Technical Corrigendum 1 to ISO 9001:2008", and

subsequently copied, pasted, and analyzed as described above. Though the technique displays a frequency distribution of occurrences of words across culture codes, allowing for follow-up qualitative analyses, this level of detail was not included in our study. However, such analyses could yield additional insight.

The competing values framework [46] shown in Figure 1 identifies two dimensions on which organizations differ: (1) flexibility and discretion versus stability and control; and (2) external focus versus internal focus.

On the one hand, some organizations are structured and act around the idea of stability, order, and control of human behavior while other organizations are structured and act with an emphasis on flexibility, dynamism, and trust in human judgment. On the other hand, some organizations are focused on internal integration and unity while other organizations are focused on external market differentiation, competition, and rivalry. These two dimensions delineate four organizational culture archetypes, representing competing basic assumptions, orientations, and core values. These culture types are archetypes and organizations contain mixtures of them all as every organizational culture is unique in nature with specific characteristics [46].

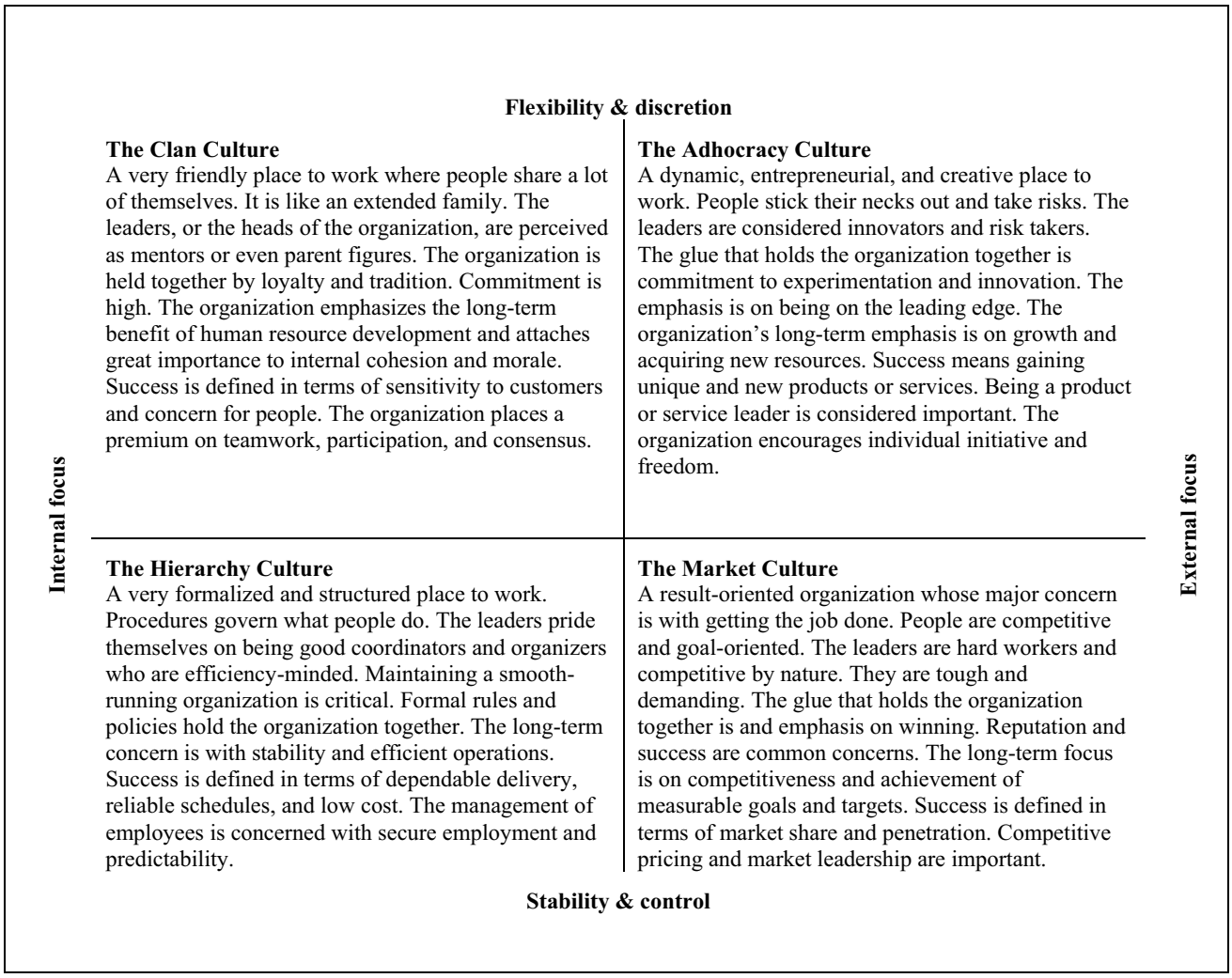

Figure 1: Competing Values Framework of organizational culture [46]

4. Analysis Results

Below the text analysis results are presented (see Table 1 & 2), separating the capability maturity models from the ISO standards. (Please note that not all values in a column sum to 100 because decimal points have been removed for the sake of simplification. In keeping with Cameron & Quinn (2006), the percentage points should be interpreted as expressions of tendencies rather than facts in order to avoid attaching too much importance to the numerical value ascribed to each

culture type [46].) The empirical evidence is clear: The best practice models and standards do not promote a culture of creativity and innovation!

A brief note on the these best practice models and standards: The CMMI models provide comprehensive, integrated sets of guidelines for developing products and services (CMMI-DEV), acquiring products and services (CMMI-ACQ), and providing superior services (CMMI-SVC) (see http://www.sei.cmu.edu). ISO 9001 contains requirements for quality management systems that help organizations ensure that customer and stakeholder needs are met while observing statutory and regulatory product requirements. ISO 155054 – also known as SPICE (Software Process Improvement and Capability dEtermination) – is a framework for process assessment and improvement of software development and related business management functions. ISO 20000 is a standard for IT service management, originally developed to reflect best practice guidance contained within ITIL (Information Technology Infrastructure Library) (see http://www.iso.org/iso/home.html).

Table 1: Cultural profiles of the CMMI models

	CMMI-SVC	CMMI-ACQ	CMMI-DEV
Adhocracy	9%	7%	8%
Clan	15%	13%	15%
Hierarchy	38%	33%	38%
Market	39%	47%	40%

The text analysis technique assesses the relative importance of elements of each culture type in the models and standards. The CMMI models are dominated by the Market (39-47%) culture type, supported by elements of the Hierarchy (33-38%) culture type, but only marginally influenced by the Clan (13-15%) – and in particular – the Adhocracy (7-9%) culture type. Our analysis of the ISO standards show a similar pattern though with some discernable differences across the standards. Whereas the ISO 15504 and ISO 20000 standards are dominated by the Market (40-47%) culture type, supported by the Hierarchy (33-38%), and marginally influence by the Clan (13-15%) and the Adhocracy (7-8%) culture types, the ISO 9001 standard is dominated by the Hierarchy culture type.[1]

[1] Supported by the Market (32%) culture type and marginally influenced by the Clan (9%) and Adhocracy (1%) culture types.

Table 2: Cultural profiles of selected ISO standards

	ISO 9001	ISO 15504	ISO 20000
Adhocracy	1%	9%	21%
Clan	9%	12%	9%
Hierarchy	58%	36%	26%
Market	32%	43%	44%

However, in all cases the Adhocracy and Clan culture types – emphasizing flexibility and discretion – are less dominant as a group, especially the Adhocracy culture type with its emphasis on creativity, innovation, experimentation, and flexibility. According to Müller & Nielsen (2013), "the Adhocracy type is an innovative organization pioneering new products; it emphasizes adaptation and flexibility in environments characterized by uncertainty and ambiguity" [45: 149]. Thus, our analyses show the same tendency across all models and standards, i.e., that these best practice models and quality management standards promote an organizational culture emphasizing stability and control.

5. Discussion

The results show that the analyzed best practice models and quality management standards do not promote a culture of creativity and innovation. Previous research has found that following best practices as described by the CMMI leads to stable (meaning repeatable and predictable) and rational processes [47]. In the sense that all the models and standards promote stability and control, our research shows that this conclusion holds true for all of them.

A reason for the lack of creativity in best practice models and quality management standards might be found in the distinction between divergent and convergent thinking as suggested by Guilford [48]. On the one hand, a culture of creativity supported by appropriate organizational structures could enable employees to form divergent patterns of wild and unconventional thinking like the entrepreneurial spirit and risk taking behavior characterizing the Adhocracy culture. On the other hand, organizational structures supporting quality management standards and best practice models could promote convergent thinking allowing people to rely on well-established solutions to identified problems.

Despite the fact that the organizational culture and management ideal underlying the analyzed standards and models are not supportive of creativity and innovation, it is unclear whether it is possible to reconcile the incongruences between culture profiles of the models and standards, and the organizational

cultures of adopting companies. Can creative and innovative IT companies (dominated by the Adhocracy culture type use the standards and models to drive process improvement and quality management (heavy on the Market and Hierarchy culture types) without compromising their organizational culture and creative spark? Whereas Cameron & Quinn (2006) describe the challenges associated with incongruence and the need for cultural change through management action [46], Müller & Nielsen (2013) show that cultural alignment is not always necessary [45]. It is possible to reconcile the differences between practiced and espoused organizational cultures and management principles. However, deliberate management action is needed, and more research is required to investigate the *hows* of those management actions.

Müller & Nielsen (2013) recommend a four-step process for managing cultural challenges in relation to process improvement: (1) Establish a culture profile of the organization; (2) Establish a culture profile of the model or standard used as basis for process improvement, using the text analysis technique; (3) compare the culture profiles and analyze gap; and (4) plan for culture management [45]. Cultural incongruence may challenge process improvement and quality management efforts driven by best practice models and quality management standards, and management action is required. Figure 2 presents guidelines for culture based process improvement (PI) management.

Clan based PI management ▪ Focus improvements on empowerment (enabling employees to tap into their potential) ▪ Emphasize training (process improvement, new processes) ▪ Ensure employee participation and involvement (identifying needed process improvements, designing new processes) ▪ Plan for cross-functional teamwork (developing and piloting processes) ▪ Celebrate successes and emphasize positive PI impact on work environment	**Adhocracy based PI management** ▪ Maintain openness to novel work practices ▪ Ensure that new processes allow for adaptation and tailoring ▪ Embrace experimentation during PI (test new and innovative ways of performing even routine tasks) ▪ Encourage creativity and knowledge sharing during PI ▪ Accept PI goals as emergent
Hierarchy based PI management ▪ Focus on best practice ▪ Identify and minimize waste (e.g. redundancy, rework, delays) in existing practices ▪ Use metrics to evaluate and improve process output ▪ Delegate authority to experts and local managers ▪ Specify process input, output, and roles (who does what and when)	**Market based PI management** ▪ Focus improvements on customer needs ▪ Set ambitious (process) performance goals ▪ Use benchmarks (expected PI benefits, process performance standards) ▪ Align PI with strategic business goals ▪ Ensure future competitiveness through increased productivity

Figure 2: Guidelines for culture based PI management

In line with Cameron & Quinn who suggest that companies perform a "means-does not mean" analysis (determining cultural implications) as part of an organizational change process involving cultural aspects [46], we provide managers with guidance on how to cope with cultural challenges of process improvement and quality management. The guidelines are based on extant theory and our interpretation of the competing values framework [8, 9, 45, 46, 47], and they point to the need for different management actions depending on the challenges confronting the company. Thus, Figure 2 helps managers decide on appropriate tactics given the organizational cultures and the values and assumptions underlying the models and standards used for process improvement.

The Adhocracy culture type normally dominates creative and innovative IT companies. If such companies need to improve quality management and existing business processes using the models and standards presented in this study, they would be pushed toward the Market and Hierarchy culture types embedded in the documentation. However, these companies can maintain their innovative edge by introducing contextual ambidexterity encouraging experimentation, creativity and knowledge sharing in adapting and tailoring best practice recommendations to the organizational context while trying to increase customer satisfaction and competiveness by minimizing waste and measuring process performance [5, 6, 7]. This recommendation is well-aligned with the ambidexterity literature stressing the importance of "the behavioral capacity to simultaneously demonstrate alignment and adaptability" [6: 209], whereby an organizational context encourages employees to make their own judgments about how to divide their time between conflicting demands, e.g., the need for both exploration and exploitation [5, 7].

Similarly, companies dominated by the Hierarchy culture type who wants to gain a competitive edge through creativity and innovation can successfully build an innovation culture around their ability to streamline innovation practices by delegating authority to key employees in the company and put them in charge of ideation activities [6: 209]. Companies dominated by the Hierarchy culture can also use creativity techniques to reduce waste in existing practices [49] and by creating evaluation schemes that screens the quality of novel ideas before implementation or further creative development if they do not meet the necessary quality standards [50]. This advice is consistent with extant theory emphasizing the need to balance autonomy and control. While creativity is promoted at the employees level by "freedom in deciding what to do or how to accomplish the task, a sense of control over one's own work and ideas" [9: 147], managerial control is needed in providing direction (e.g., goals), creating a sense of urgency, and securing sufficient but not lavish resources [8, 9, 23].

Companies dominated by the Market culture wanting to use standards and models as bases for quality and process improvement without sacrificing creativity and innovation in responding to customer needs would be well advised to focus on performance standards rather than work descriptions, i.e. to focus on *ends* (increased competitiveness and customer satisfaction) – not *means* (process compliance). Such companies can with advantage deploy IS (e.g., Creativity Support Systems and Group Support Systems) in support of ideation processes, for example allowing employees and customers to explore new ideas together. This recommendation is in line with existing research which has found that "information systems help define problems and provoke opportunities, compile relevant information, generate new ideas or concepts, as well as evaluate and prioritize ideas for implementation" [51: 182]. IS can facilitate communication, providing a stimulating environment that allows people to share novel ideas and collaboratively explore their creativity [13, 19].

Finally, if companies dominated by the Clan culture decide to drive process improvement initiatives based on quality management standards and best practice models, they can focus on employee empowerment and involvement in order not to jeopardize the creative spark of employees. Ownership of and participation in the improvement effort, maintaing a creativity nurturing organizational climate, are key to success. This advice is in keeping with the creativity literature underscoring that the creative output is influenced by, among other things, the work environment as well as a participative and collaborative leadership style [14, 21, 24].

These guidelines are based on the theory presented throughout this paper (in particular [49, 50]), and we invite researchers and practitioners alike to empirically test our guidelines for culture based process improvement management.

A word of caution: Figure 2 provides advice for each culture type, suggesting that every company should embrace these recommendations regardless of the specific characteristics of its organizational culture. This is, however, not the case. Just as the culture types define organizational archetypes, the guidelines for culture based PI management are generic in nature and should be adapted to the unique circumstances. Furthermore, the guidelines are not exhaustive but have to be supplemented with an in-depth understanding of other factors impacting creativity in organizations, such as fostering a creative environment [8], removing institutional barriers hindering creativity [17], and general management of creative people [52].

6. Summary

Enhancing creativity in the organizational environment is a daunting and challenging task [8, 9, 45, 46, 47] and although authors do not agree on the effect of process standardization on creativity, there is little evidence to support a positive relationship (see for example [9, 14]).

In this paper, we have investigated the relationship between creativity and process standardization. Using a text analysis technique built on the Competing Values Framework of organizational culture [39, 40], we

analyzed three commonly used quality management standards (ISO 9001, ISO 15504, and ISO 20000) and three best practice models for process-oriented systems development, service provision, as well as product and service acquisition (CMMI-SVC, CMMI-ACQ, and CMMI-DEV). Our analyses revealed a negative relationship between process standardization and organizational cultures (the Adhocracy) promoting creativity. Consequently, we conclude that the quality management standards and best practice models fostering process standardization do not emphasize creativity and could potentially have an adverse effect on the creative environment of an organization if not properly managed. We discuss the prospect of standardizing processes without jeopardizing the creative culture of the organization, and we provide directions for future research. Grounded in existing theory, we suggest guidelines for culture based process improvement management, which may help practitioners reconcile the incongruences between organizational cultures and the adopted standards and models. Hopefully, these guidelines will inspire additional research into the topic of creativity and process standardization.

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