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WHERE ARE THE PARTICIPANTS? INCLUDING MOTIVATIONAL ASPECTS INTO THEORIZING AND DESIGN IN IS RESEARCH

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Abstract

The purpose of this paper is to identify new research prospects for the information systems discipline, based on establishing a link to the body of knowledge in the fields of work psychology and organizational psychology. Since information systems are work systems consisting of information, technologies, and participants, who are supported by information and communication technology (IT), productivity is a function of human performance. Job demands and individual resources in IT-supported work environments should therefore be considered in order to facilitate employee motivation, prevent strain, and cope with the challenges related to an ageing workforce and a high prevalence of burnout in the IT sector. As an initial literature review shows, these research vistas are underrepresented in previous information systems research. The present paper proposes directions for including job demands and individual resources into the analysis, design and operation of IT-supported work environments from two angles. First, the benefits of including psychological theories in typical phases of a business process management project are discussed. Secondly, the contributions of extending five types of information systems theories for the discipline in general are outlined.

Keywords: Business Process Management, Burnout, Information System, Job Demands-Resources Model, Strain, Work Motivation, Work System.

1 A Work System View on Information System Productivity

Information systems are socio-technical work environments, i.e., they consist of human participants, information, and technologies, all of which contribute to the productivity of work processes and activities (Alter, 2008). As a part of information systems, business processes and activities aim at providing external and internal customers with physical goods and/or services. Starting from this view, Business Process Management (BPM) aims at managing the (re-)design of individual business processes, and developing a foundational BPM capability in organizations catering for a variety of purposes and contexts” (vom Brocke and Rosemann, 2010, p. viii). While BPM has high impact on the way that daily work is performed by individuals, BPM research traditionally focused on designing IT artifacts that provide utility for (re-)designing business processes in specific work environments, e.g., language constructs, models, methods, and instantiations (March and Smith 1995), whereas factors such as “people” and “culture” constitute a vital but underrepresented area (vom Brocke and Rosemann, 2010). Current people-focused topics in BPM research include issues such as the role of expertise in BPM, the BPM curriculum for the role of the business process analyst, change management, cultural aspects, and the management of unstructured and knowledge-intensive processes that escape the traditional understanding of mass transaction processing (such as computer-supported cooperative/collaborative work; cf. Greif, 1988). However, established and empirically valid psychological theories of motivation and strain at work have not yet been applied to BPM research on a broad scope, despite the great potential of these models for research addressing the role of human participants in BPM, and as kernel theories (Gregor and Jones, 2007) stimulating and guiding the design of related IT artifacts.

Participant-focused BPM is evolving into an urgent topic for at least two reasons. First, OECD societies are expected to undergo a process of significant demographic change, as indicated by a sharp increase of the number of workers retiring each year. *Ceteris paribus*, this trend would lead to an estimated total inactive population that clearly outnumbers the total size of the workforce in the majority of countries. OECD reports that “on the basis of unchanged participation patterns and productivity growth, the growth of GDP per capita in the OECD area would decline to around 1.7 % per year over the next three decades, about 30% less than its rate between 1970 and 2000” (OECD 2006, p.9). Thus, ageing constitutes a pivotal challenge to be addressed in the IS discipline, as it does for society in general. Although a direct negative causal relationship between age and job performance is unlikely (Kanfer and Ackerman, 2004), job experience may be associated with accumulated job strain due to increased work load and responsibility and thereby cause aged workers to leave the workforce due to illness, unsuitability for employment, or early retirement (Osipow, Doty and Spokane, 1985). In fact, a high proportion of older employees on sickness benefits suffer from mental rather than physical conditions (OECD 2006, p.77). However, replacing IT professionals is much more expensive than trying to retain them, for instance, by means of personnel retraining (Champy, 1997). As a consequence, organizations need to develop strategies to reduce the fluctuation, sick leave, and early retirement of their valuable employees. Secondly, chronic strain can lead to burnout, with severe consequences on productivity and other crucial psychological and behavioral outcomes, including motivation, absenteeism, turnover, job satisfaction, and employee well-being. These effects are not limited to human service jobs. Recent research suggests that burnout is highly prevalent in the IT sector (Pawlowski, Kaganer, and Cater III, 2007), which has long gone unnoticed due to coping attempts (such as substance abuse) temporarily masking burnout symptoms (Kreft, 2008). In order to address these highly pressing issues, the present paper proposes directions for more thoroughly incorporating job demands and individual resources into the research, design and operation of IT-supported work environments. In the following section, we provide theoretical grounding for our ideas by reviewing authoritative theories provided by work and organizational psychology. In Section 3, we present results from an exploratory literature review, demonstrating that these theories have hardly been recognized in the IS discipline so far. In Section 4, the implications and benefits of psychological theories for different areas of BPM are discussed, including setting up an organizational frame based

on strategy considerations, process modelling, process optimization, and process roll-out. Beyond these implications for BPM, prospects for information systems research and development in general are outlined in Section 5 with reference to the types of IS theories proposed by Gregor (2006).

2 Theoretical Background

Psychological approaches to job demands and individual resources in organizations, and their relations to individual well-being, motivation and performance provide insights to end user reactions to the demands and resources of IT-based work environments. Job strain results from a disturbance of the equilibrium between the job demands placed on employees on the one hand, and the resources the job provides on the other hand (Bakker and Demerouti, 2007, p. 310). Chronic job strain can severely impair psychological and behavioral outcomes including motivation and performance, turnover, absenteeism, job satisfaction, and well-being. In particular, burnout represents a prolonged response to chronic demands on the job which involves emotional exhaustion, cynicism, and inefficacy in terms of job performance (Maslach, Schaufeli, and Leitner, 2001, p. 397). As recent empirical research suggests, burnout is not limited to human service jobs but highly prevalent in the IT sector as well (Pawlowski, Kaganer, and Cater III, 2007), which has long gone unnoticed due to presenteeism, i.e., employees not taking sick leave despite health problems (Kreft, 2008). Behaviors related to presenteeism, such as self-exploitation and substance abuse, may temporarily mask burnout and delay its effects. Accordingly, burnout in the IT sector may be considered a ticking bomb and is likely to elicit severe problems in the foreseeable future.

Research on job strain and burnout traces back to Cannon (1929), who conceptualized stress as a uniform physiological reaction to external demands that provides energy for fight-or-flight reactions. Extending these ideas to long-term consequences of chronic demands (Selye, 1956), stress was considered an individual reaction to external demands. Lazarus (1991) specified this approach by stating that strain results from an individual appraisal process of external demands (“stressors”), and individual resources, thereby introducing the distinction of *stress* in terms of the total of external demands, and *strain* in terms of an individual reaction resulting from external demands exceeding individual resources. Specifically referring to job demands, the Job Demand Control Model (Karasek, 1979) states that job strain results from the interaction of job demands (time pressure, work load, role conflicts) and job resources (i.e., scope of job control, autonomy and skill variety). Advancing this approach, the Demand Control-Support Model (Johnson and Hall, 1988) included social support as an additional job resource and potential compensator of job demands. Two opposing interaction hypotheses were derived and tested based on the model. First, job strain was assumed to be highest when (1) job demands are (perceived as) high, and (2) job resources in terms of control and social support are (perceived as) low (strain hypothesis); secondly, sufficient resources such as autonomy and social support were assumed to buffer high job demands (buffer hypothesis). Robust empirical support was found for the strain hypothesis, but not for the buffer hypothesis (van der Doef and Maes, 1999), suggesting that besides the development of individual resources, the limitation of work load is a core element of burnout prevention.

The Job Demands-Resources Model (JD-R; Demerouti, Bakker, Nachreiner, and Schaufeli, 2001) not only focuses on job demands and resources in terms of control and support, but also takes employee motivation into account, suggesting that motivational processes determine the effects of job demands and resources on organizational and individual outcomes. The JD-R proposes that job demands (i.e., factors requiring attention and reaction by employees), and job resources in terms of all factors functional for goal attainment, reducing demands, or promoting employees’ professional or personal development), together determine employee performance and well-being. Indeed, high job demands were found to be linked to the exhaustion component of burnout, whereas low job resources are related to the disengagement component of burnout (Demerouti et al., 2001). Moreover, intrinsic motivation has been found to mediate the effects of job stressors (Rubino et al., 2009). Moreover, person-job fit was found to affect the development of burnout and its consequences in terms of

reduced job performance, increased turnover (intentions), and reduced individual well-being especially in IT jobs (Pawłowski et al., 2007). According to these findings, stressors in IT working places can result from relationships at work, aspects of the organizational and business environment, and conflicts related to the home/work interface, but also from job characteristics such as skill variety (cf. Figure 1). Accordingly, strain and burnout prevention should not only involve the reduction of work load and the development of individual resources, but also the design of motivating tasks.

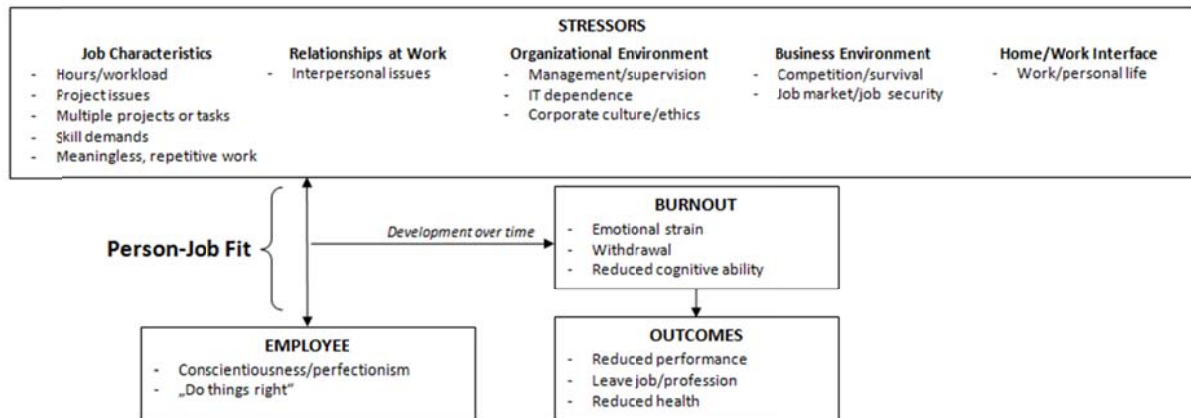


Figure 1. Model of stress and burnout in the IT profession (adapted from Pawłowski et al., 2007).

The JD-R builds on the Job Characteristics Model (JCM; Hackman and Oldham, 1976; Oldman and Hackman, 2005), one of the most influential theoretical approaches to intrinsic job motivation. The JCM conceptualizes the motivation potential of a job or job activity as a function of (1) meaningfulness due to skill variety, task identity, and task significance, (2) autonomy, and (3) feedback provided by the task itself, and these assumptions have received wide empirical support (Hulin and Judge, 2003). Consequences for motivational work design (Hackman, 1987) include that natural work units should be formed in order to increase task identity and experienced responsibility for work results, while still maintaining an efficient work structure. Similarly, combining tasks in order to put fractionalized tasks back together promote immediate feedback on work results, and increase skill variety. Contact with customers should be established in order to provide additional performance feedback, increase skill variety in terms of interpersonal skills, and enhance autonomy. Finally, vertical loading helps close the gap between executive and controlling aspects of work, thus increasing employees' autonomy. When a job is vertically loaded, employees receive responsibilities formerly reserved to management, e.g., autonomy in deciding on work methods, design processes, and activities in information systems.

While these approaches refer to increasing a task's implicit motivation potential due to task characteristics, motivation and effort may also result from deliberate processing of cost-benefit information (De Dreu, 2007). For instance, expectancy-value approaches to work motivation (e.g., VIE theory; Vroom, 1995) state that work motivation depends on (1) the instrumentality of performance for the achievement of valued outcomes, (2) the valence of these outcomes, and (3) the expectancy of achieving the required performance. The individual intention to act is defined as the product of these three components. The major propositions of expectancy approaches in terms of the impact of valence, instrumentality, and expectancy on behavioral outcomes have received empirical support (van Eerde and Thierry, 1996), and provide a helpful heuristic for the design processes and activities in information systems. Related questions may refer to adequate compensation (valence), sufficient feedback (instrumentality), and reasonable work load (expectancy). However, while these factors shape an individual's motivation in terms of an action intention, action intentions do not always lead to actions. There is a large body of research as to why, when, and how action intentions

promote the implementation of actions (e.g., improved performance). For instance, goal setting theory (Locke and Latham, 1990) and related management techniques such as Management by Objectives (Rodgers and Hunter, 1991) and group goal setting techniques (e.g., Pritchard et al., 1988), speak to this issue. The basic principles of goal setting theory have received substantial empirical support, and can be summarized as follows: (1) Challenging goals lead to higher performance than goals with low or medium difficulty; (2) Challenging goals lead to higher performance when they are specific compared to non-specific “do your best” goals. Challenging, specific goals help individuals to focus attention on relevant information, have an energizing function, increase persistence (i.e., help to stay focused), and improve the use and development of strategies relevant for task accomplishment. There are a number of context factors determining when goal setting works best. One of these moderators is the degree to which employees accept the goal and feel obliged to it (goal commitment; Locke and Latham, 1990). One way to ensure goal commitment is to enable participation and voice, thus changing goal setting into goal agreement (Hinsz, Kalnbach, and Lorentz, 1997). Another way to ensure goal commitment is to assign challenging and specific goals by supervisors who are trusted by employees and explain goals thoroughly (Latham, Erez, and Locke, 1988). In both cases, the important difference is that employees perceive the goal setting process as fair and appropriate instead of arbitrary and exploiting.

However, goal commitment does not always lead to goal implementation, for instance, due to failures in self-regulation (Bandura, 1991; Sheeran, 2002). For example, the degree to which individuals believe that they are capable to accomplish the goals they are assigned to may limit goal setting effects. This moderator covers similar aspects as the expectancy component in the VIE theory, and is related to the self-efficacy concept (Bandura, 1997). Aside from providing resources required for task completion and ensuring reasonable workload, self-efficacy can be increased by providing adequate role models (e.g., supervisors) and sufficient training. Further approaches to self-regulation involve the concept of regulatory fit between an individual’s degree of approach versus avoidance motivation, and situational demands and incentives (Higgins, 2005), the forming of explicit implementation intentions (Gollwitzer and Sheeran, 2006), and mental contrasting techniques (Oettingen and Stephens, 2009).

The Collective Effort Model (Karau, Markus and Williams, 2000) builds and extends the classic expectancy-value approach to group work. While the valence and expectancy components are similar in group and individual work, instrumentality gets more complex in groups. The instrumentality of individual contributions during group work depends on three additional contingencies: (1) the contingency between individual performance and group performance, (2) the contingency between group performance and group outcome, and (3) the contingency between group outcome and individual outcome. Thus, the probability that group members perceive their performance as instrumental is smaller in groups, because group outcomes are also determined by other group members’ performance. Similarly, goal setting theory has been successfully applied to team work (Pritchard et al., 1988), with best results achieved when both team-related and individual goals are provided, and are not in conflict with each other (Crown and Rosse, 1995).

3 Literature Review

In order to identify whether (and how) the identified psychology constructs have been addressed in the information systems literature so far, an initial literature review in top IS journals was conducted, including Management Information Systems Quarterly (MIS Q), Information Systems Research (ISR), Journal of the Association for Information Systems (JAIS), Information Systems Journal (ISJ), and Journal of Management Information Systems (JMIS). Since we focused on BPM, the Business Process Management Journal (BPMJ) was also included in the analysis. The entire history of each journal was searched since some of the discussed psychological theories related to stress and motivation were proposed decades ago. Consistent with the explorative nature of this literature review, the analysis was

limited to the JD-R as the most influential theory in work and organizational psychology, and the Model of Stress and Burnout in the IT profession as a model with an explicit focus on the discipline.

For each of the journals under investigation, we identified the papers in which a particular construct was found to occur in the full-text of the paper (e.g., 28 papers in the JMIS were found to contain the word “strain”). This analysis was quite fruitful for constructs that are used frequently in the information systems discipline in various contexts, such as “motivation”. Therefore, in this first step, an abundance of relevant papers was identified. In a second step, the search was restricted to constructs in the papers’ abstract or author-specified abstracts since the most important constructs referred to in a paper will likely also be included in its abstract. This approach significantly reduced the number of hits (e.g., from more than 150 to 19 hits for the phrase “motivation” in MIS Q). In a third step, we the search was restricted further by adding the requirement that the phrase “business process” was also contained in a paper’s full text. This way, the number of hits for “motivation” in ISR decreased from 105 (first step) to 6 (second step), and finally to 2 papers only (third step). This procedure was run for all journals except for EJIS due to using a different search engine.

Constructs	BPMJ	MIS Q	ISR	JAIS	ISJ	EJIS	JMIS
Job Demands-Resources Model							
“Job demands”	2 (0) (0)	0 (0) (0)	0 (0) (0)	1 (0) (0)	0 (0) (0)	3	4 (0) (0)
“Job resources”	0 (0) (0)	0 (0) (0)	0 (0) (0)	0 (0) (0)	1 (0) (0)	1	0 (0) (0)
“Strain”	3 (0) (0)	45 (5) (0)	6 (0) (0)	2 (0) (0)	6 (0) (0)	15	28 (1) (0)
“Motivation”	155 (8) (8)	>150 (19) (0)	105 (6) (2)	87 (3) (1)	4 (3) (0)	>150	>150 (21) (4)
“Organizational outcomes”	3 (0) (0)	0 (0) (0)	6 (1) (0)	0 (0) (0)	2 (0) (0)	13	12 (3) (1)
Model of stress and burnout in the IT profession							
“Stressor”	3 (0) (0)	17 (2) (0)	2 (1) (0)	0 (0) (0)	1 (0) (0)	1	10 (2) (0)
“Burnout”	2 (1) (1)	11 (1) (0)	3 (0) (0)	0 (0) (0)	1 (0) (0)	7	7 (0) (0)
“Job characteristics”	3 (1) (1)	0 (0) (0)	0 (0) (0)	0 (0) (0)	0 (0) (0)	5	23 (3) (0)

Table 1. Results from the exploratory literature review (number of hits reported for each round)

The results of our exploratory literature review are reported in Table 1. Most papers identified in the review address quite different aspects, such as user acceptance (Chiu, Chiu, and Chang, 2007), adoption of information systems, in terms of the motivation to use an information system rather than the motivation of employees in the workplace in general (Lee, Shin, and Lee, 2009), turnover (Guimaraes and Igarria, 1992; Joseph and Ng, 2007; Moore, 2000), individual-level technology adoption (Venkatesh, Davis, and Morris, 2007), or job satisfaction (Igarria and Guimaraes, 1993). These findings reveal that, based on two of the psychological models previously discussed, the information systems literature lacks a discussion of how to manage business processes with respect to psychological constructs. Remarkably, no design-oriented papers focusing on how to incorporate motivational aspects into the design of IT artifacts were found, suggesting that psychological constructs are largely underrepresented in IT development despite their immediate relevance.

4 Directions for Including Motivation Theories into BPM

Based on the psychological theories discussed in Section 2, we subsequently develop three principles about how to introduce psychological concepts in BPM, and in information systems management and research in general. Our approach is in line with previous views of BPM as “a customer-focused

approach to the systematic management, measurement and improvement of all company processes through cross-functional teamwork and employee empowerment” (Lee and Dale, 1998, p. 217). Based on the psychological models discussed in Section 2, the following principles refer to optimizing individual work load and individual resources, increasing task-related motivation potential, and increasing employee motivation in information systems based on deliberate processing.

Individual work load and resources in information systems. The empirical findings (van der Doef and Maes, 1999), as well as the psychological approaches discussed in Section 2 suggest that job demands represent powerful stressors whose negative effects in work environments based on information and communication technology are not buffered by individual resources, such as autonomy or social support. Thus, designing IT artifacts in order to reduce work load can be crucial for the reduction of job strain, the prevention of burnout, and the adaptation of IT work environments to an ageing workforce. Moreover, as high demands and lack of resources interact additively, individual resources in terms of autonomy or social support, but also in terms of skills and confidence, should be promoted wherever possible. This is in line with self-regulation theories suggesting that self-efficacy is a crucial precondition of goal attainment.

Task-related motivation potential in information systems. Secondly, motivational processes, mediating the effects of demands on burnout in IT jobs, may be promoted in order to reduce stress and strain. Transferring the JCM principles of motivational work design (Hackman, 1987), motivational design of information systems involves *providing meaningful tasks*, thereby increasing motivation potential provided by activities and processes included in a work system. Moreover, motivational design of information systems can involve the design of *natural work units*, the *combination of tasks*, *establishing relationships with customers*, *vertical loading*, and *opening feedback channels* in order to increase autonomy, skill variety, and immediate task and performance feedback. Together, these measures aim at increasing the motivation potential of business processes based on task characteristics.

Employee motivation in information systems based on deliberate processing. In addition to increasing motivation potential inherent to processes, expectancy-value approaches and goal setting theory should be applied to BPM with respect to employee motivation based on deliberate processing (cf. De Dreu, 2007). As outlined in Section 2, the expectancy-value models emphasize that motivation during individual and group work partly depends on the perceived valence of task outcomes, the perceived instrumentality of an individual’s performance for attaining these valued outcomes, and the individual’s task-specific and/or general perceived self-efficacy. While these factors determine the degree an individual’s intention to act, these intentions need to be transferred into more specific goal intentions and implementation intentions, as addressed in goal setting theory, and approaches to self-regulation. Accordingly, BPM should take into account the participants’ perspective of outcome valence, and the perceived contingencies between individual effort, individual performance, and valued outcomes, as well as goal setting and self-regulation mechanisms.

Together, these principles provide complementing approaches for incorporating psychology theories into BPM and research in information systems. Starting from these principles, we subsequently discuss their implications for each of the six stages of BPM (Becker, Kugeler, and Rosemann, 2011), including strategic and organizational frame, process analysis, process optimization, design of a process-oriented organizational structure, process implementation, and continuous management.

Strategy and organizational frame. Complex BPM involve business processes on various hierarchical levels. In addition to this complexity, business processes can affect adjacent processes that are situated in other business units or companies. In order to keep an overview of the processes investigated, an organizational framework can be helpful (Becker and Meise, 2011) for setting the strategic objectives and scope of the BPM project. Motivational aspects could be included in this strategic stage as design parameters in their own right, shaping the overall objectives and design of the BPM project. Thus, the organizational framework should depict organizational core processes with respect to natural work units, relationships with customers, and combined tasks in order to account for skill variety. Moreover,

the optimization of individual work load and individual motivation should be included as a strategic goal in order to facilitate subsequent information system design.

As-is modeling and process analysis. The process of setting up the strategy and scope of the BPM project is followed by modeling the current stage of business processes (Schwegmann and Laske, 2011). The prime objective of this stage is to document the core business processes in the notation of a modeling language, such as the Event-Driven Process Chain or Business Process Modelling Notation, in order to identify process weaknesses and improvements. Since streamlining technical efficiency is often the focus of this phase, most modeling languages used in BPM seem to have set an implicit focus on the activities, events, and control flow of the process, as well as on the IT systems, documents, and organizational units involved in this process. Modeling languages used to document the processes need to provide sufficient language constructs in order to incorporate aspects of motivation and strain. This approach would enable BPM analysts to more thoroughly consider the role of motivational factors when analyzing business processes, i.e. by identifying the need to redesign business processes because of job strain, and thereby more accurately and completely describe the status quo of business processes in terms of individual work load and resources, task-related motivation potential, and extrinsic motivation in terms of outcomes and goals setting processes.

Process optimization. Depending on the purpose for which a model has been designed, process optimization can address various weaknesses identified during process analysis. Among the factors traditionally considered in this phase of BPM are processing times, cost savings, increase in profits, and higher process quality (Speck and Schnetgöke, 2011). Also, this step often involves selecting an appropriate Enterprise Resource Planning system, which comes with a collection of reference business processes that an organization can adopt. This view can be extended by considering motivational aspects as important parameters for adapting either the system or the organization. Recognizing motivational aspects might lead to optimizing business processes according to employees' needs right from the beginning, and thereby enable more successful business process redesign and ERP adoption than optimizing a process for technical efficiency only. This is important, since the negative influence of employee resistance, job strain, and turnover might in the end outweigh the expected benefits. This approach can be considered as conceptualizing business process productivity at the work system level.

Design of a process-oriented organizational structure. The motivation behind a process-oriented organization is to facilitate an optimal execution of business processes. This includes identifying the best possible business process in terms of cost, time, and quality, but is not limited to just adjusting the pure sequence of activities (Kugeler and Vieting, 2011). In order to account for motivational factors, additional design guidelines of what constitutes an "optimal" execution of processes could be more prominently considered. Elements to be considered comprise reducing overall work load, increasing motivation potential by putting tasks together into meaningful entities, promoting vertical loading, and introducing individual and team goal setting procedures. Thus, in order to prevent job strain, perceived task demands should not exceed perceived resources.

Process implementation and roll-out. After business processes have been changed conceptually, the new processes have to be implemented into the organization. This is done in a change management process that comprises all planned, controlled, organized, and monitored changes in the strategies, business processes, structures as well as in the cultures of socio-economic systems (Hansmann, Laske, and Luxem, 2011). In terms of employee resistance, the issue of acceptance has been extensively discussed in the change management literature. Resistance against process changes should be avoided or reduced by taking the employee perspective into account during process implementation, and throughout the entire BPM project. In addition, considering aspects of motivation and stress might be helpful tools to discover and adequately address the rationales behind employee resistance at the individual as well as at the group level.

Continuous process management. Managing business processes is an ongoing task. Thus, in the post implementation stage, the organization must be continuously adapted to cope with the demands of changing environmental conditions (Neumann, Probst, and Wernsmann, 2011). Alterations made to

business processes must be consistent with the overall business strategy, and acknowledge the perspective of process participants. An ongoing evaluation and optimization of motivation management should be included in BPM in order to sustain the changes made to business processes.

5 Directions for Including Motivation Theories into Theorizing and Design in IS Research

In the future, contributions to the five types of information systems theories as proposed by Gregor (2006) can be expected from incorporating psychological theories more thoroughly into information systems research endeavors.

Type 1 theories: Theories for analyzing deal with “what is” as opposed to explaining causality or attempting to build predictive generalizations (Gregor, 2006, p. 622). As basic theories, they describe or classify specific dimensions or characteristics of the phenomenon under study when very little is known (Fawcett and Downs, 1986). The results from our explorative literature review suggest that the psychological concepts of work motivation and job stress have hardly been applied in the IS discipline yet. Psychological theories might therefore supply a new lens for looking at and describing behavioral phenomena that are encountered in information systems research. For instance, the levels of motivation and strain encountered by employees might be studied during information systems planning, development, and deployment projects in order to address the proximal and distal results of work system functioning.

Type 2 theories: The same argument holds for Type 2 theories, explaining how and why certain phenomena occur. Gregor (2006) distinguishes two subtypes of theories for explaining, i.e., high-level and low-level theories. A high-level type theory provides a sensitizing device (Klein and Myers, 1999) that can be helpful to view the world on a rather general level, whereas a low-level theory gives *a posteriori* explanations for how and why things happened in some particular real-world situation. For the first subtype, psychological theories provide a new sensitizing device with which phenomena in information systems can be viewed. For the second subtype, psychological theories could contribute, for instance, new insights to the discussion why so many business process reengineering projects (and IT projects in general) fail.

Type 3 theories: Theories for predicting „say that *what will be* but not *why*” (Gregor, 2006, p. 625), i.e., use explanatory factors to predict an outcome, but do not explain underlying causal relationships. Psychological theories can shed light on the effects of implementing new IT artifacts into work systems, and thereby provide hypotheses for the function and effects of an information system before the process (or the system) has actually been implemented.

Type 4 theories: Theories for explaining and predicting focus both on the prediction of a phenomenon, and the understanding of underlying theoretical constructs and their causal relationships, and can thereby “usefully contribute to either theory building or theory testing” (Gregor, 2006, p. 628). Psychological theories allow for deriving and empirical testing hypotheses about the relationships of IT artifacts with motivational aspects in the information system. Thus, beyond merely predicting outcomes, psychological theories can be applied to reason on the underlying causal relationships on which these predictions are based.

Type 5 theories: Theories for design and action focus on “*how to do something*” (Gregor, 2006, p. 628). At the core of these theories is identifying prescriptive knowledge on how to build and evaluate IT artifacts. IT artifacts contribute to the knowledge base if they provide utility to a set of users and constitute a novel approach to solving a problem that is superior to the contribution of preexisting artifacts (Hevner et al., 2004; March and Smith, 1995). IT artifacts that have been designed based on psychological theories as kernel theories (Gregor and Jones, 2007) could increase user acceptance and leverage work system productivity. For BPM projects, IT artifacts should provide language constructs for explicitly displaying motivational aspects in business process models. Moreover, workflow management systems could benefit from psychological constructs by routing a business process

through the organization based on individual strain rather than standardized capacity constraints in order to enable organizations to better cope with burnout and demographic change. In addition, money currently spent on change management projects could be freed up for strategic projects.

6 Concluding Remarks

The purpose of this paper is to identify prospects of including motivation theories into theorizing and design in the information systems discipline in general, and in BPM in particular. After providing a review of psychological theories of work motivation and strain, we presented insights from an exploratory literature review in top information systems journals. The apparent lack of psychological constructs in conjunction with BPM suggests that including motivation aspects into BPM more broadly seems to hold promising vistas for future research. These research directions were conceptualized from two angles. First, we discussed the application of psychological knowledge during typical phases of a BPM project based on a design perspective. Secondly, and based on a theory-building perspective, we discussed how different types of information systems theories might benefit from integrating psychological constructs.

Due to its conceptual character, the paper is subject to several limitations. First, due to space constraints, the literature review presented in this paper was limited to two of the theories discussed in this paper in order to give an initial impression of the integration of motivation theories in IS research. Secondly, the conclusions derived from our analysis need further extensions, refinement, and empirical testing in order to develop a more detailed research agenda. In particular, we encourage the design of IT artifacts to imbue them with design parameters related to aspects of stress and motivation. This can be done by drawing from psychological theories as kernel theories. Our expectation is that this approach would generate both practical and theoretical utility.

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