An Employee-Centered Perspective on Business Processes: Measuring "Healthy Business Processes" and their Relationships with People and Performance Outcomes

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Abstract

Purpose – Traditional approaches to business processes and their management consider the "people dimension" as an antecedent of process performance. We complemented this approach by considering employees as process perceivers and thus taking an employee-centered perspective on business processes. We investigated dimensions of healthy business processes, that is, processes which, while promoting performance, foster employee well-being.

Design/methodology/approach – Based on a qualitative dataset and two quantitative studies, we developed and validated a scale for healthy business processes, interpreted it from a salutogenic perspective and tested relationships with people and performance outcomes.

Findings – The scale comprises four factors reflecting the three dimensions of the salutogenic concept "sense of coherence": manageability was represented by the factors *process tools* and *process flexibility*, comprehensibility was represented by the factor *process description*, and meaningfulness was represented by the factor *management support*. The scale and its subscales were significantly related to people and performance outcomes.

Originality – We propose that health-oriented business process management and performance-oriented business process management are two components of an integrated business process management that favors neither a functionalist, efficiency-oriented approach nor an employee-oriented approach, but takes both approaches and their interaction equally into account in the sense of person-process fit.

Keywords business process, health, well-being, salutogenesis, scale development

An Employee-Centered Perspective on Business Processes: Measuring "Healthy Business Processes" and their Relationships with People and Performance Outcomes

Business processes, which can be defined as "end-to-end work across an enterprise that creates customer value" (Hammer, 2015, p. 4), are designed, implemented and enacted by people. From a psychological, health-oriented point of view, business processes will not lead to their desired effects, if employees perceive them as hindrance stressors (Cavanaugh *et al.*, 2000; Podsakoff *et al.*, 2007), and consequently disapprove of and resist the processes (Schmidt and Nurcan, 2008; Willaert *et al.*, 2007). We argue that those "unhealthy" business processes not only constitute a problem in terms of economic outcomes, but also negatively affect human resources, that is, employees' health. Given the enormous costs associated with stress at work and employers' increasing awareness of employees' health and safety (Noblet and LaMontagne, 2006), we took a health-oriented perspective on business processes and investigated what constitutes a healthy business process for process users, that is, a process that positively affects process users' well-being – while promoting performance.

Considering employees as *process perceivers*, we complement research on the interaction between people and processes by not investigating what people have to do to make a process efficient (see for example Rosemann and de Bruin, 2005; Rosemann and vom Brocke, 2015; Willaert *et al.*, 2007), but on the psychological needs a process must meet in order to foster its users' well-being, including affective outcomes such as satisfaction and commitment. Combining our approach with existing approaches on social business process management, we suggest a *person-process-fit* as an essential part of an *integrated business process management*, which considers both process performance and employee well-being.

To do so, we developed a scale measuring healthy business processes, based on a qualitative dataset (see Reif *et al.*, 2018). In two subsequent quantitative studies, we validated and interpreted the scale from a salutogenic, employee-centered perspective and predicted relationships with people and performance outcomes.

The "People Dimension" in Business Process Management

Business process management is "an integrated system for managing business performance by managing end-to-end business processes" (Hammer, 2015, pp. 4-5), which aims at increasing organizational performance in terms of service, quality, speed, costs, consistency, accuracy, flexibility and innovation (e.g., Armistead, 1996; Hammer, 2015). Research on social business process management (Prodanova and van Looy, 2017; Vugec *et al.*, 2018), holistic approaches to business process management, and business process maturity models (e.g., Rosemann and de Bruin, 2005; Rosemann and vom Brocke, 2015; Willaert *et al.*, 2007) increasingly acknowledge a "people dimension" of business process management (Mamoghli *et al.*, 2018, p. 991) that is, the role people play in managing business processes. "Employee aspects" (Kueng, 2000) or "people results" (EFQM, 2010) are also part of numerous organizational and process performance measurement models (van Looy and Shafagatova, 2016), and subject to research on the effective use of information technologies and systems (see, for example, Cho and Park, 2021).

In Rosemann and de Bruin's (2005) business process management maturity model, people are considered one of the six core elements of business process management. Successful business process management depends on people's process skills and expertise, process management knowledge, process-related collaboration and communication, and willingness to take responsibility for business processes (Rosemann and vom Brocke, 2015). A further core element within this model is culture, which is also related to people's values and beliefs, process attitudes and behaviors, and attention to process management. These culture aspects have also been described as people's "process awareness" (see Mamoghli *et al.*, 2018, p. 991), which means that people are familiar with process-related terms and are able to describe and name processes (Hammer, 2007; Willaert *et al.*, 2007).

In a review, Kettenbohrer (2016) analyzed and summarized how the people dimension has been integrated into business process management so far and concludes by identifying

three prevailing concepts: expertise, empowerment, and commitment. Expertise refers to people's training and acquisition of process-related expertise and knowledge. Empowerment (in the context of business process management) refers to people's accountability and responsibilities to define, improve and monitor business processes. Commitment (in the context of business process management) refers to people's identification with processes and related goals (Kettenbohrer, 2016).

Business Processes as Stressors

In practice, people are not always committed to and even deviate from a prescribed process because they feel the process was imposed on them, feel forced to use the process even though it does not fit their work practice, cannot see the process's benefit, do not understand its value, or are generally dissatisfied with the process due to a lack of involvement and understanding (Browning *et al.*, 2006; Vugec *et al.*, 2018). Consequently, processes are ignored and fall apart (Schmidt and Nurcan, 2008).

From a psychological perspective, process acceptance problems can be traced back to people's perception of processes as *hindrance stressors*. Hindrance stressors represent situational or organizational constraints and demands that are perceived as unmanageable (Dawson *et al.*, 2015; LePine *et al.*, 2005), such as burdensome rules, procedures or regulations, red tape, administrative hassles, and malfunctioning processes (see Cavanaugh *et al.*, 2000; Crawford *et al.*, 2010; Mazzola and Disselhorst, 2019; Podsakoff *et al.*, 2007). Hindrance stressors impede performance and subjective well-being outcomes such as job satisfaction and positive affect, and increase psychological and physical strain (Mazzola and Disselhorst, 2019). Employees experiencing hindrance stressors over a longer period of time might withdraw from work (Schaufeli and Taris, 2005) or choose other coping mechanisms to prevent damage, such as indifference, inattention, or ignorance (cf. Lauer, 2019).

Furthermore, people refusing to apply specific processes might perceive a misfit between what these processes offer (i.e., the process's supplies) and their work-related and

health-related needs, that is, a *person-process misfit*. Person-environment fit theory (e.g., French *et al.*, 1974) suggests that behavior is predicted better by person and environment together than by person or environment separately, and that outcomes are optimal when person and environment are compatible. Stress arises when a person and his/her environment do not fit (Edwards *et al.*, 1998; Edwards and Shipp, 2007; van Vianen, 2018). Fit or misfit encompasses not only the fit between employees' skills and the requirements of a process (as suggested in the aforementioned maturity approaches), but also the fit between employees' needs and the process's supplies. Negative consequences of a person-environment misfit include strain and negative behavioral outcomes (see Edwards *et al.*, 1998).

Healthy Business Processes

To prevent and counteract employees' stress and strain and improve their well-being and health, organizations are putting increasing emphasis on health promotion at work, which often builds on the concepts of salutogenesis (Bauer and Jenny, 2017; Jenny *et al.*, 2017). The term *salutogenesis* was coined by Antonovsky (e.g., 1987, 1996). In his search for the origins of health, Antonovsky (e.g., 1987, 1996) identified "sense of coherence" as a global feeling of confidence that stimuli in one's environment are comprehensible, manageable and meaningful. Applied to a work context, "'[c]omprehensibility' describes the extent to which a work situation is perceived as structured, consistent, and clear, 'manageability' describes the extent to which an employee perceives that adequate resources are available to cope with the demands in the workplace, and 'meaningfulness' describes the extent to which a situation at work is seen as worthy of commitment and involvement" (Jenny *et al.*, 2017, p. 202; see also Gregor *et al.*, 2017; Vogt *et al.*, 2013). Jenny *et al.* (2017) simplified and specified Antonovsky's (e.g., 1987, 1996) model and suggested that coherent work experiences (i.e., comprehensive, manageable, and meaningful work experiences) contribute to positive employee health outcomes.

Given the increasing focus on health promotion in organizations and a healthy work organization (e.g., Wilson *et al.*, 2004) and building upon salutogenesis as health-promoting concept, we focus on the following research questions:

1) *Which psychological needs does a process have to fulfil to make it a "healthy" process (i.e., one that promotes well-being) from an employee's point of view? (Study 1a)*
2) *How can "healthy" business processes be measured? (Study 1b)*
3) *How are "healthy" business processes related to people outcomes and performance outcomes? (Study 2)*

Regarding Research Question 3, we build on salutogenesis (Antonovsky, 1987, 1996; Jenny *et al.*, 2017) and expect that healthy business processes are positively related to employee well-being. Well-being is a multi-dimensional construct describing the "overall quality of an employee's experience and functioning at work (Warr, 1987)" (cited in Grant *et al.*, 2007, p. 52) and includes psychological, physical and social aspects (e.g., Diener and Seligman, 2004). Accordingly, we consider satisfaction and commitment (psychological aspects), stress (physical aspect), and team conflict and team interaction (social aspects) as facets of well-being. Moreover, building upon the importance of people aspects in business process performance models (e.g., Rosemann and de Bruin, 2005) and process acceptance models (Nissen and Müllerleile, 2019), we suggest that healthy business processes are positively related to process outcomes such as process performance, reduced error rates, and process acceptance. We therefore formulate the following hypotheses (see Figure 1):

Hypothesis 1: Healthy business processes are positively related to people outcomes (well-being, i.e., satisfaction, commitment, reduced team conflict, positive team interaction, and reduced stress).

Hypothesis 2: Healthy business processes are positively related to process outcomes (process acceptance, reduced error rate, and process performance).

--- please insert Figure 1 about here ---

Study 1: Instrument Development

In developing an instrument to measure healthy business processes, we followed well-established approaches for scale development (Hinkin, 1998; MacKenzie *et al.*, 2011).

Conceptualization of Healthy Business Processes

We preliminarily define healthy business processes as end-to-end work in organizations which is managed in such a way that it positively affects employee well-being in terms of improved psychological outcomes (organizational commitment, job satisfaction), social outcomes (positive teamwork, fewer conflicts at work) and health-related outcomes (decreased stress and strain). Based on existing theories on stress and health (e.g., Antonovsky, 1987), we expect that different sub-dimensions characterize the "healthy business processes" construct, which itself will be a function of these sub-dimensions and change if only one sub-dimension changes. Therefore, we conceptualize healthy business processes as a formative construct (cf. MacKenzie *et al.*, 2011).

Previous research has developed instruments to assess *process requirements* (e.g., Zelt *et al.*'s (2018) process variety scale, Karim *et al.*'s (2007) process complexity scale, or Tanriverdi *et al.*'s (2007) items on business process modularity), which refer to specific characteristics of a process; instruments to assess *process users' acceptance*, process attitudes (e.g., Moore and Benbasat, 1991; Recker and Rosemann, 2010) and process satisfaction (Andres and Zmud, 2001); and instruments to measure specific (business process culture, Schmiedel *et al.*, 2014) and general (business process capability, business process maturity) *organizational framework conditions* for business process management (e.g., van Looy, 2019). However, these instruments and related constructs do not address process users' psychological needs and requirements for a process that promotes their health. With our research, we aim to fill this gap and thereby complement business process management research by including the perspective of process users.

Study 1a: Item Generation

The goal of Study 1a was to develop a pool of items reflecting employees' subjective perception of healthy business processes, that is, of business processes that positively influence their subjective well-being. We did not seek to create items based on objective facts (see van Looy, 2019), but rather items based on subjective opinions.

Method

Sample. We built on an existing dataset consisting of $N = 26$ interviews with 15 managers and 11 employees from a German automotive manufacturer with international reach. The interviewees worked with processes as part of their daily work as either experts or process users (Reif *et al.*, 2018).

Data. The interviews were originally focused on employee-centered process implementation but also contained a section in which interviewees spoke freely about what they considered a "good, satisfactory" business process, one they really enjoyed working with and that positively influenced their well-being. This section served as the basis for developing an extensive item pool. As our interest lay in the characteristics of processes that foster employee well-being, we did not include content referring to the 'process' of process design, process implementation, or process outcomes. Item generation was inductive, with no theoretical framework guiding the initial development process.

Results and Discussion

Based on the interviews, 142 items referring to "good, satisfactory" business processes that increase well-being were developed. To ensure *content validity* and comprehensibility, the items were checked by six experts on business processes from research and practice. We applied the think-aloud method (e.g., Lewis, 1982) and received 177 comments on the items' relevance, redundancy, and understandability. Based on these comments, several items were reformulated to make them more precise, or were eliminated due to redundant content. After this content validation, a set of 109 items remained. The items that had been originally

developed in the German language were then translated into English by a professional translator whose native language was English in an iterative process, with repeated cross-checks by the authors and process experts.

Study 1b: Item Analysis

In Study 1b, we empirically explored the factor structure of the item set developed in Study 1a and the items' psychometric properties. The goal was to further reduce the number of items and achieve a stable factor structure.

Method

Procedure and Measurement. We developed an online questionnaire in English, which took about 60 minutes to complete. The sample was recruited via Amazon MTurk, a portal that can be used to assign tasks to participants for payment. Prerequisite for participation was that participants were employed full time or part time and that they were familiar with specific business processes within their company. Since we deliberately wanted to address employees' perceptions of "everyday" business processes, we recruited a broad sample of people who worked with business processes but did not necessarily have to be process managers or process owners. In this way we wanted to ensure a broad applicability of the developed scale. Participants were paid $3 for completing the questionnaire, which is above the average hourly wage on this platform (Hara *et al.*, 2018).

After a short introduction to the research topic, informed consent was obtained. Participants were asked to think of a specific business process within their company they were familiar with and to briefly describe it in one to two sentences. Descriptions ranged from short keywords (e.g., "End-to-end payment process") to more detailed and elaborated statements ("I'm extremely familiar with the process of granting refunds to customers who use our apps. The process involves communicating with the customer if necessary, investigating the situation to determine eligibility, processing the refund within the system, and recording any related information."). We checked the descriptions for quality and content to ensure that

participants referred to business processes that fell within the scope of our research, that is, a sequence of logically linked working steps executed in order to achieve a certain goal. We then coded the descriptions in terms of the type of processes they referred to and found that 17.16% referred to sales, 13.68% referred to customer services, 11.44% referred to quality management and 10.20% referred to production. The remaining processes referred to rather specific, single topics (e.g., 1.24% product development, 1.24% compensation, 1.24% auditing). Process descriptions had no generic or definitional character, but were throughout linguistically idiosyncratic which underlines the authenticity of the obtained data and indicates that participants had real process experience.

We asked participants to refer to this specific business process when answering the subsequent items about healthy business processes developed in Study 1a. The items were presented in a randomized order and answered on a 7-point Likert scale (1 = *strongly disagree*; 7 = *strongly agree*). At the end, demographic data was collected and instructions on how to receive payment were given. (As the data was collected as part of a master's thesis, further scales on process performance and subjective outcomes were included, which were not used in this study.)

Sample. All in all, 407 participants completed the questionnaire. We excluded five participants due to an insufficient description of the process they selected (the exclusion was double-checked by two authors of this paper), resulting in a final sample of 402 participants (mean age = 35.88 years, *SD* = 9.17 years; range = 20 – 71 years; 52.99% male, 46.77% female; 67.16% American, 16.17% Indian, 15.92% else). Regarding education, 46.77% had a bachelor's degree, 22.14% had a master's degree, 15.42% had an associate's degree, 13.18% had a high school diploma and 1.00% had a PhD (the rest indicated another degree). Regarding tenure, 49.75% had been in their job for up to 5 years, 30.35% for 6-10 years, 15.67% for 11-20 years and 3.48% for more than 20 years. Participants were diverse in terms of their professions, e.g., management (18.36%), information technology (10.45%), sales and

retail (9.70%), finance and insurance (8.96%), engineering (7.21%), office management (4.48%), research and education (4.23%).

Item Reduction. In a first step, we conducted an exploratory factor analysis (EFA) with promax rotation. Items with cross-loadings on multiple factors as well as items that did not thematically correspond to any one factor were excluded. We also excluded items that had a complex or imprecise wording, were too specific in their focus or were redundant compared to better formulated items. In this way, the set of 109 items was reduced to 24 items.

Using these 24 items, we conducted a parallel analysis to identify the ideal number of factors. On the basis of the four determined factors, we performed a second EFA with promax rotation. To increase the scale's psychometric properties and to foster its applicability, we checked for remaining cross-loadings on multiple factors and factor loadings below 0.5, as recommended by Hair *et al.* (2010). Finally, we retained the three best-loading items per factor, leading to our final scale with a total of 12 items.

Results

Exploratory Factor Analysis. The EFA with the identified 12 items yielded four factors with three items respectively. Cronbach's alpha for the full scale was .85, and all four factors together explained 60.3% of the variance. Items loading on *factor one* included the quality of process tools (e.g., "The process tools are easy and fast to use"). Therefore, this factor was labeled *process tools*. Item loadings were between .71 and .93 and Cronbach's alpha was .87. Items loading on *factor two* assessed to what extent management supports the process (e.g., "Management is committed to the process"). Hence, we labelled factor two *management support*. Item loadings ranged from .66 to .87 and Cronbach's alpha was .82. Items loading on *factor three* addressed how flexibly users can adjust the process in accordance with different circumstances (e.g., "The process allows the process users freedom to react to special situations"). Thus, we labeled this factor *process flexibility*. Item loadings ranged from .65 to .87 and Cronbach's alpha was .81. Items loading on *factor four* focused on

characteristics of the process description (e.g., "The process description orders the different process steps in the overall process"), for which reason this factor was labeled *process description*. Item loadings were between .60 and .80 and Cronbach's alpha was .72. The full scale and respective factors showed acceptable internal consistency reliabilities, as all Cronbach's alpha values were above the threshold of .70. Results of the EFA and descriptive statistics regarding the items are summarized in Table 1.

--- please insert Table 1 about here ---

Discussion

We identified four factors of healthy business processes: Healthy business processes have a *process description* that provides clarity about the process in terms of its internal structure, temporal course, and interpersonal coordination (factor four). From a salutogenic perspective, a clear process description contributes to a process's *comprehensibility*. Healthy business processes also provide user-friendly *tools* in terms of applicability (factor one) and are *flexible* so that process users can individually adapt them to non-standard situations (factor three). Interpreting these factors from a salutogenic perspective, user-friendly process tools and process flexibility contribute to a process's *manageability*. Finally, healthy business processes are characterized by *management support* (factor two). Management is committed to the process, emphasizes its necessity, and demands its application. From a salutogenic perspective, process users experience the process as *meaningful*. Comprehensibility, manageability, and meaningfulness constitute the three dimensions of sense of coherence which contributes to employee health according to salutogenesis (Jenny *et al.*, 2017).

Study 2: Instrument Validation

The goal of Study 2 was to validate the factor structure of the "healthy business processes" construct identified in Study 1b and place it within a nomological network of people outcomes and performance outcomes.

Method

An online questionnaire was distributed via a panel at a German university, posts on the social networks LinkedIn, XING, Facebook, and SurveyCircle (SurveyCircle, 2016), as well as by a research assistant's personal contacts. Prerequisite for participation was that participants were employed full-time or part-time, that they worked in an organization in which business processes were applied to support collaboration, and that participants were familiar with at least one of those business processes. As an incentive, participants could take part in a lottery in which four winners would receive €25 each. Students had the option to receive extra credit for their participation.

Procedure

At the beginning of the questionnaire, participants were informed of the study's goals, data protection regulations and their rights. Informed consent was obtained. Then, participants could choose whether they wanted to answer the questionnaire with respect to a single, specific process (single process version) or whether they wanted to refer to the work-related processes in general that characterize their daily work (processes in general version). The subsequent item formulations were adapted based on their choice. Participants could choose whether to fill in the questionnaire in German (81.34%) or English (18.66%). Item translation followed a well-established translation-back-translation procedure (Degroot *et al.*, 1994).

In the subsequent questionnaire, participants first described the specific process or general processes they would be referring to. Descriptions varied in length and detail. We coded the descriptions in terms of the type of processes they referred to and found that 21.05% referred to research and development, 17.70% referred to administration and human resources, 14.35% referred to project management, and 8.13% referred to sales and logistics. The remaining processes referred to rather specific topics (e.g., 5.26% customer services, 2.87% production, 2.40% quality management). Process descriptions had no generic or definitional character, but were throughout linguistically idiosyncratic which underlines the authenticity of the obtained data and indicates that participants had real process experience.

Next, participants answered the items on healthy business processes developed in Study 1 and items referring to people and performance outcomes. Finally, demographic data was collected.

Sample

All in all, 210 participants answered the questionnaire. One participant was excluded due to an incomprehensible, cryptic process description (the exclusion was double-checked by two authors of this paper), so that the final sample consisted of 209 participants (mean age = 42.37 years, *SD* = 12.86 years, range = 18 – 69 years; 48.33% male, 42.58% female; 67.46% German, 3.35% American, 16.27% else). Regarding education, 38.28% had a master's degree, 18.66% had a PhD, 15.79% had a bachelor's degree, 8.13% had a high school diploma, and 7.18% had a vocational training (the rest indicated another degree). The sample comprised employees (44.50%), managers (35.41%), paid student interns (4.78%) and freelancers (0.96%). Participants were diverse in terms of their industries, e.g., engineering and electronics (36.84%), entertainment (6.70%), health (5.74%), academia and education (5.26%), consulting (3.82%), construction, finance, information technology (each 3.35%), logistics (2.87%), consumer goods, hospitality, law (each 2.39%), and insurance (1.91%).

Measurement

Unless stated otherwise, items were answered on a 7-point Likert scale (1 = *strongly disagree*; 7 = *strongly agree*).

Healthy Business Processes. Healthy business processes were measured with the 12 items developed and selected in Study 1. In the single process version, items were formulated as shown in Table 1. In the processes in general version, items were formulated in plural. Cronbach's alpha was .84 for the full scale and .88 (*process tools*), .72 (*management support*), .77 (*process flexibility*), .82 (*process description*) for the subscales.

Job Satisfaction. Job satisfaction was measured with three items from Spector's (1997) job satisfaction survey as suggested by Mitchell *et al.* (2001) (e.g., "All in all, I am satisfied with my job"). Cronbach's alpha was .89.

Organizational Commitment. Organizational commitment was measured with six items from Meyer *et al.*'s (1993) affective commitment scale (e.g., "I would be very happy to spend the rest of my career with this organization"). Cronbach's alpha was .81.

Work-Related Stress. To measure work-related stress, we adapted a one-item stress measure by Elo *et al.* (2003) to the work context: "Stress means a situation in which a person feels tense, restless, nervous or anxious or is unable to sleep at night because their mind is troubled all the time. Do you feel this kind of stress these days due to your job?". The item was answered on a 7-point Likert scale (1 = *not at all*; 7 = *very much*).

Team Conflict. We measured team conflict with seven items adapted from Wakefield *et al.* (2008). Three items referred to process conflict (e.g., "How frequently do your team members disagree about the way to complete a team task?"), and four items referred to task conflict (e.g., "How often is there conflict in your team about the work you do?"). Items were merged to form a composite measure. Cronbach's alpha was .90. Items were answered on a 7-point Likert scale (1 = *never*; 7 = *always*).

Positive Team Collaboration. We adapted two items from Lester *et al.*'s (2002) communication-cooperation scale (e.g., "There is a lot of cooperation among members of my team") and four items from Guinan *et al.*'s (1998) team production behaviors (e.g., "My team has done a good job in figuring out how work will flow among team members") and merged them to form a composite measure. Cronbach's alpha was .90.

Process Acceptance. Two items to measure process acceptance were developed for the purpose of this study ("The process has a good reputation in the company" and "The process users are committed to the process"). Cronbach's alpha was .89 (In accordance with Eisinga *et al.*, 2013, we also used Cronbach's alpha to measure reliability for the two-item scales).

Error Rate. Error rate was measured with two items that were developed for the purpose of this study. The items were "How often do mistakes that significantly limit the process and the work involved happen during the application of the process?" and "How often do minor errors happen during the application of the process, while still allowing the process and the work involved to function well?". Cronbach's alpha was .70. Items were answered on a 7-point Likert scale (1 = *never*; 7 = *always*).

Process Performance. Process performance was measured with 10 items developed by Schmiedel *et al.* (2020). Five items referred to process effectiveness (e.g., "In the past year, our organization has achieved the desired outcomes of its business process"), and five referred to process efficiency (e.g., "In the past year, our organization has realized the outcomes of its business process with an economical use of resources"). Cronbach's alpha was .93.

Results

Confirmatory Factor Analysis

We conducted a confirmatory factor analysis to cross-validate the four-factor structure identified in Study 1b. The model contained the four previously described, correlated factors (*process tools*, *management support*, *process flexibility*, and *process description*), all loading on one higher-order factor (*healthy business processes*; see Figure 2). We used the chi-square test and multiple fit indices to evaluate the fit of the 12-item model (see Table 2). The fit measures Chi^2 (45, n = 203) = 65.269, $p < .05$, RMSEA = 0.047, SRMR = 0.050, CFI = 0.984, TLI = 0.976, indicated a good fit (Browne and Cudeck, 1993). The four-factor model fit the data significantly better than a model with only one factor ($\Delta\chi2 = 396.65$, df = 4, $p < .001$) and a model with four uncorrelated factors ($\Delta\chi2 = 155.54$, df = 4, $p < .001$). Cronbach's alpha was .86 for the full scale, .89 for *process tools,* .81 for *management support,* .87 for *process flexibility* and .78 for *process description*. Loadings are provided in Figure 2.

--- please insert Figure 2 about here ---

Correlates of Healthy Business Processes

Means, standard deviations, and correlations of our variables are shown in Table 2.

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To test our hypotheses, we calculated partial correlations (Table 2, above diagonal), controlling for age, gender and company size. We included age and gender as control variables as previous research has shown that well-being changes over the life span (López Ulloa *et al.*, 2013) and might differ between women and men (Batz-Barbarich *et al.*, 2018). In addition, age may influence the relationship between various work characteristics and well-being (Zacher and Schmitt, 2016). To control for potential differences in processes as a function of company size, we further included company size as a control variable (cf. Karim *et al.*, 2007 and Schmiedel *et al.*, 2020, for similar approaches).

In Hypothesis 1, we assumed that healthy business processes are positively related to people outcomes. Partial correlations showed that healthy business processes were significantly positively correlated with job satisfaction ($r = .51$, $p < .001$), organizational commitment ($r = .40$, $p < .001$), and positive team collaboration ($r = .52$, $p < .001$). Furthermore, healthy business processes were significantly negatively associated with team conflicts ($r = -.41$, $p < .001$) and work-related stress ($r = -.17$, $p < .05$). Hence, the data support Hypothesis 1. Partial correlations for the four factors *process tools*, *management support*, *process flexibility*, and *process description* were similar to the results for the full scale. Only regarding the relationship with work-related stress did the results for the four factors differ from those for the full scale, as only *process description* correlated significantly negative with work-related stress (see Table 2).

Hypothesis 2 stated that healthy business processes are positively related to process outcomes. The partial correlations show that healthy business processes were significantly positively correlated with process acceptance ($r = .75$, $p < .001$) and process performance ($r = .70$, $p < .001$), and negatively correlated with error rate ($r = -.31$, $p < .001$). Thus, the results are in line with Hypothesis 2. The four factors *process tools*, *management support*, *process*

flexibility, and *process description* exhibited similar correlations with the respective process outcomes compared to the full scale. The results for the four factors slightly differed from those for the full scale, as only *process tools*, *management support*, and *process description*, but not *process flexibility*, correlated significantly negative with error rate (Table 2).

Discussion

The four-factor structure of our instrument to measure healthy business processes was confirmed. The four factors loaded on a higher-order factor, which makes our instrument applicable both for measuring a process's salutogenic properties in sum and for differentially diagnosing salutogenic subdimensions. This structure also underscores the conceptualization of healthy business processes as a formative construct. Overall, healthy business processes were positively related to people outcomes and process outcomes.

Turning to the correlations between subscales and outcomes, only *process description* (representing the salutogenic dimension of comprehensibility) was significantly negatively related to stress. According to Antonovsky (1987; see also Eberz and Antoni, 2018), comprehensibility is impaired by over-complexity and a lack of confidence in the continuity of existing systems. Thus, the complexity of business processes and a continuous change of existing processes (rather than their manageability and meaningfulness) might be a primary source of stress. The non-significant relationship between error rate and *process flexibility* could be explained as follows: *Process flexibility* might be related to increased errors in some cases (due to counterproductive deviations from the process flow), but decreased errors in others (due to efficiency-increasing deviations from the process flow), which adds up to a non-significant relationship with error rate overall.

General Discussion

Taking an employee-centered approach to business processes, we developed a new scale to measure "healthy business processes" which we interpreted from a salutogenic perspective. The scale comprises four factors reflecting the three dimensions of sense of

coherence: manageability (represented by the factors *process tools* and *process flexibility*), comprehensibility (represented by the factor *process description*) and meaningfulness (represented by the factor *management support*). The scale exhibited a valid factor structure, good internal consistency, and was substantially related to people and performance outcomes.

We finally define healthy business processes as end-to-end work in organizations which is managed in a way that enables process users to perceive comprehensibility (through clear process descriptions), manageability (through user-friendly process tools and flexibility in process application) and meaningfulness (through perceived management support). These salutogenic characteristics make healthy business processes a job resource that is positively related to employee well-being in terms of improved individual psychological outcomes (organizational commitment, job satisfaction), improved social outcomes (positive teamwork, fewer conflicts at work), improved health outcomes (decreased stress and strain), and improved process outcomes (process acceptance, reduced error rate, process performance).

Theoretical Contributions

By presenting a validated scale to measure healthy business processes, we elaborated on the people component of "holistic" business process management frameworks. However, we did not consider people as mere process operators, but instead as *process perceivers*. In this way, alongside the frequently studied process-oriented obligation on behalf of people, we emphasized the psychological, people-oriented obligation on the behalf of the process as perceived by the workforce.

From an person-environment fit perspective, our work therefore allows us to propose a new form of person-environment fit to the research discourse, that is, *person-process fit*: Just as people's capabilities (process expertise, process collaboration, process awareness) should complement process demands (correct execution, performance, acceptance), process supplies (clear process description, user-friendly tools, flexibility, management support) should also complement process users' salutogenetic needs (comprehensibility, manageability,

meaningfulness). While the former reflects elements of existing "social" approaches to business process management (which are directed towards process performance and thus consider people in their functionalistic role), the latter, newly proposed approach represents a complementary, health-oriented perspective on business process management.

Thus, previous models that claimed to be holistic in actuality (though stressing their social component) followed a one-sided process and performance-focused view, taking people into account only in their process-serving or operating function with successful business process management depending on people's technical, methodological, social, and communicative skills, their explicit and tacit knowledge of business process management practices and principles, their dissemination of process-related knowledge (Rosemann and vom Brocke, 2015), and willingness to comply with processes (Mamoghli *et al.*, 2018).

To neither systematically neglect people outcomes (such as health) nor performance outcomes, we propose an *integrated business process management* that takes into account the reciprocal influences of people and processes (Figure 3): People's process-related capabilities should be complemented by the process's person-related demands (performance-oriented business-process management), and people's process-related needs should be complemented by the process's person-related supplies (health-oriented business process management).

--- please insert Figure 3 about here ---

Our work also contributes to psychological research on job resources and work design by proposing healthy business processes as a job resource that can have a positive impact on employees' psychological, physical, and social well-being. By showing how business processes can be designed and implemented to increase comprehensibility, manageability, and meaningfulness, we also added to research on work design, suggesting that good work design can lead to improved organizational practices (Parker and Wall, 1998).

Moreover, we contributed to research on salutogenesis at work (cf. Vogt *et al.*, 2013) by showing that sense of coherence is also applicable to the design and implementation of

business processes. In this way, and by suggesting a clear and concise model of integrated business process management we offered a path to bridge the gap between technical disciplines and health-oriented disciplines.

Practical Implications

The "healthy business processes" scale can be applied in an organizational context as a diagnostic instrument for evaluating business process quality – not in terms of effectiveness (other scales exist for this, see above), but rather in terms of healthiness, yet without compromising process performance. The scale enables benchmarking existing processes in several respects: Different processes can be compared with regard to their healthiness and good practices can be identified; a specific process can be diagnosed over time to uncover the effects of potentially salutogenic process improvements; or a selected process can be diagnosed with regard to the three dimensions of comprehensibility, manageability and meaningfulness in order to identify specific health-related strengths and weaknesses. Through its application in organizations, our scale not only contributes to process improvement, but could also create awareness for a health-promoting process landscape and thus contribute to health promotion and stress prevention in general.

The scale, in the sense of a checklist, can also contribute to organizational development in that it provides valuable information for the phases of process creation, process implementation, and process application (see Reif *et al.*, 2018): Participation of process users in process design and educating them in the phase of process application can help to create flexible processes, usable tools, clear process descriptions, knowledge, and competence, which contribute to process manageability and process comprehensibility. Communication of process-related goals and vision, benefits and functionality in the process implementation phase can help to convey the meaningfulness of the process. The scale's brevity and precision contributes to its applicability for these kinds of organizational diagnosis and organizational development.

Limitations and Future Research

The samples we used to develop and validate our scale were recruited using MTurk (Study 1b) or contained partially student workers (Study 2). However, as participants in Study 1b delivered substantial process descriptions and the percentage of students in Study 2 was rather low (less than 5%), we assume that our data and respective results have a substantial informative value. In addition, the breadth and diversity of our samples in terms of addressed processes and involved process users promotes the generalizability of our results to everyday business processes. Moreover, as the aim of our study was not to study process experts' perspectives on healthy business processes but employees' experiences with everyday business processes we deemed our sample as appropriate.

We used Antonovsky's (e.g., 1987) notion of salutogenesis to interpret the empirically identified factor structure of our scale. Future research should use longitudinal approaches to test whether the identified subdimensions of healthy business processes statistically predict sense of coherence at work with its dimensions comprehensibility, manageability, and meaningfulness (cf. Vogt *et al.*, 2013). Furthermore, future research could measure the impact of healthy business processes on employees' health by gathering objective health-related data such as sick days in addition to self-reports as well as on changes in objective productivity and process performance indicators. This would allow for a systematic evaluation of the practical implications of our proposed health-oriented approach and to compare the explanatory power of our approach in terms of people and process outcomes to existing approaches of social business process management.

In our work, we investigated the four factors representing the three dimensions of sense of coherence in a rather isolated way. Future research should investigate how the three dimensions of healthy business processes are related to each other in predicting health-related and performance-related outcomes. Comprehensibility, for example, might form the basis for manageability (cf. Bauer *et al.*, 2015).

Future research should also empirically examine the integrated business process management proposed in Figure 3. Besides the suggested complementary fits, further interaction between performance-oriented and health-oriented process management could be tested in order to further establish an evidence-based, integrated approach to business process management that considers people and processes. People and processes might act as reciprocal resources and realizing synergies between the two entities could lead to a self-reinforcing dynamic, promoting people outcomes and performance outcomes.

Finally, we want to acknowledge that business processes and their management are only one factor that can affect employee health (see for example Reif *et al.*, 2018). The quality of business processes is inevitably linked to the general organizational culture, to organizational structures, and to the quality of leadership, which together form indicators of health-promoting management (Spieß and Stadler, 2016). Future research should investigate employee health in this larger context of personalized and depersonalized influences and their reciprocal relationships.

Conclusion

By developing a theory-based scale to measure healthy business processes, which is practically applicable in process-related organizational diagnosis and development, we build the ground for a new, health-oriented approach to business process management. With this health-oriented, employee-centered perspective, we complement previous research on business process management to form an integrated business process management by considering people not only as a source for increasing process efficiency but as process perceivers and, as such, as a stakeholder group with psychological needs that ought to be met when designing, implementing, and performing health-promoting processes.

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Table 1

EFA results and descriptive statistics

	M	*SD*	**Process tools**	**Management support**	**Process flexibility**	**Process description**	Uniqueness
The process tools are easy and fast to use.	5.45	1.54	**0.93**	−0.04	0.00	−0.08	0.23
The process tools are user friendly.	5.44	1.56	**0.87**	−0.03	0.01	0.00	0.26
The process tools are easy to locate.	5.69	1.40	**0.71**	0.08	−0.02	0.09	0.39
Management demands application of the process.	5.94	1.18	0.00	**0.66**	−0.05	0.04	0.56
Management is committed to the process.	6.00	1.16	−0.06	**0.87**	0.01	0.00	0.28
Management makes clear the necessity of the process.	6.04	1.18	0.04	**0.83**	0.05	−0.05	0.30
The process offers ways how to deal with exceptional situations.	5.07	1.63	0.10	0.04	**0.65**	−0.01	0.48
The process allows the process users freedom to react to special situations.	5.08	1.57	−0.03	0.00	**0.87**	−0.03	0.30
The process also allows own thinking and initiative.	5.01	1.67	−0.04	−0.03	**0.76**	0.04	0.46
The process description orders the different process steps in the overall process.	5.55	1.40	−0.01	−0.05	0.03	**0.80**	0.39
The process description defines when the process is terminated.	5.03	1.71	0.00	0.01	−0.06	**0.60**	0.67
The process description states which process partners are involved in which tasks of the process.	5.38	1.52	0.00	0.05	0.07	**0.67**	0.48
Proportion of variance			.18	.16	.15	.12	

Note. Applied rotation method is promax; *M* = mean, *SD* = standard deviation.

Table 2

Means, standard deviations, Cronbach's alphas and correlations

Variable	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Healthy business processes (12)	4.99	0.97	(.86)	.79***	.65***	.68***	.69***	.52***	-.41***	.40***	-.17*	.51***	.75***	.70***	-.31***			
2. Process tools (3)	4.46	1.39	.80***	(.89)	.41***	.40***	.40***	.34***	-.34***	.22**	-.09	.34***	.55***	.56***	-.29***			
3. Management support (3)	5.49	1.18	.70***	.47***	(.81)	.17*	.35***	.48***	-.37***	.27***	-.11	.38***	.42***	.55***	-.32***			
4. Process flexibility (3)	4.84	1.46	.68***	.39***	.23**	(.87)	.24**	.30***	-.17*	.36***	-.04	.34***	.55***	.42***	-.11			
5. Process description (3)	5.16	1.28	.71***	.44***	.42***	.27***	(.78)	.38***	-.30***	.25***	-.26***	.39***	.58***	.48***	-.19**			
6. Positive team collaboration (6)	5.60	0.98	.53***	.31***	.48***	.34***	.41***	(.90)	-.48***	.24**	-.14*	.49***	.44***	.45***	-.14			
7. Team conflict (6)	3.07	0.93	-.41***	-.33***	-.34***	-.23**	-.29***	-.41***	(.90)	-.18*	.18*	-.23**	-.34***	-.40***	.40***			
8. Organizational commitment (6)	4.64	1.29	.42***	.21**	.31***	.40***	.26***	.25***	-.20**	(.81)	-.01	.50***	.43***	.36***	.01			
9. Work-related stress (1)	3.07	1.63	-.22**	-.13	-.15*	-.08	-.29***	-.18**	.17*	-.08	-	-.28***	-.16*	-.15*	.16*			
10. Job satisfaction (3)	5.82	1.15	.53***	.34***	.42***	.36***	.42***	.50***	-.22**	.53***	-.32***	(.89)	.47***	.52***	-.17*			
11. Process acceptance (2)	4.82	1.47	.77***	.59***	.48***	.55***	.61***	.43***	-.33***	.45***	-.20**	.49***	(.89)	.64***	-.30***			
12. Process performance (10)	4.61	1.15	.72***	.60***	.62***	.40***	.52***	.44***	-.35***	.38***	-.20**	.52***	.65***	(.93)	-.37***			
13. Error rate (2)	3.84	0.91	-.35***	-.34***	-.38***	-.12	-.21**	-.13	.40***	-.03	.19**	-.18*	-.33***	-.44***	(.70)			
14. Age (1)	42.37	12.85	.03	-.11	.02	.11	.03	.09	.06	.32***	-.10	.21**	.02	.00	.09			
15. Gender (1)	-	-	.10	.23**	.03	.00	.01	-.03	-.09	-.12	-.06	-.03	.04	.06	-.15*	-.22**		
16. Company size (1)	4.59	2.50	-.18*	-.18*	-.19**	-.13	-.01	.07	.05	-.20**	.02	-.05	-.21**	-.15*	.19*	.00	-.07	

Notes. Number of items in brackets in left column; Cronbach's alpha on correlation matrix diagonal; Pearson's correlation below diagonal; Pearson's correlation with control variables (gender, age and company size) included (partial correlations) above diagonal; Gender coded as 0 = male, 1 = female (n = 1 person with diverse gender was not included in the calculation of correlations); * p < .05, ** p < .01, *** p < .001